

Standard Textbook for Medical Massaged (*Anma*)
for Visual Impaired People in Asia

Compiled by the Asia Medical Massage Instructors
Network (AMIN)

Tsukuba University of Technology

Sponsored by the Nippon Foundation

On the occasion of publication

Working toward Passing on, Innovating, and Sharing Medical Massage (*Anma*) Education with People with Visual Impairment in Asia

In order to improve the outcomes of education for visually impaired people to promote independence in society, it is necessary for people in education to have expertise in their field. Nowadays, not only in Japan but also in other countries in the Asia Pacific region, it is becoming difficult to transfer educational contents, methods, techniques, and knowledge created through the experiences of our predecessors to future generations. The passing on of expertise and educational methods that work closely with visually impaired people is essential to continue promoting the independence of visually impaired people in Asia.

With the advancements of science and technology and changes in society, there is also greater demand for innovations aiming for creating new environments conducive to education for visually impaired people such as by compensating for visual impairment through proficient expertise, taking advantage of IT to secure the archiving of information, and developing sophisticated methods of teaching and educational materials. It is also very important for educational experts in the field of visual impairment in Asia to understand the various political and cultural differences that inform educational assets that have been passed on and developed in each country so that we may share the assets appropriately.

I believe that this newly published textbook, which provides extensive descriptions of techniques in acupressure that have been passed through generations in Japan, will play an important role for Asian people wishing to acquire techniques in acupressure. I am extremely pleased to see this textbook published, and I hope for the development of solutions for issues faced in the independence of visually impaired people in Asia and for the success of AMIN activities.

July 2007

National University Corporation, Tsukuba University of Technology
President Naoki Onuma

Introduction

The 8th WBUAP Massage Seminar was held in Tsukuba in September 2006 for the purpose of collecting information regarding current conditions of acupressure in Asia and for academic exchange. The seminar focused on improving the quality of massagers and their job opportunities in a timely fashion. The Massage Seminar has as its fundamental idea the promotion of the independent living of visually impaired people in the Asia Pacific region, and our activities have steadily achieved positive results.

In conjunction with the 8th Massage Seminar, the Asia Medical Massage Instructors Network (AMIN) has been established with the support of the Nippon Foundation, with an information desk located in the Tsukuba University of Technology. The purpose of its establishment is to improve the conditions for visually impaired people in the Asia region to gain employment in the area of medical massage in each country and to create a network for instructors proactively supporting the activities of visually impaired people. In the meeting, it became clear that a textbook regarding medical massage that can be used to train instructors at seminars was necessary. This textbook will provide source material for seminars held by AMIN and also plays a role as educational material for self-education. This textbook was written by authorities in each field and consists of five chapters. The textbook is easy to understand, with the basics of medical acupressure, summaries of the structures and functions of the human body, basics of oriental medicine, operative methods of acupressure for entire body, and major symptoms and practices of acupressure explained in a very straightforward manner. As one of the project planners, I hope this textbook will be widely used for the Asian Medical Massage Instructors Network.

July 2007

National University Corporation, Tsukuba University of Technology
Faculty of Health Science, Department Director
AMIN Project Representative

Yoshitoshi Ichiman

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List of Authors

Akihiro Ogata: Tsukuba University Special Support School for the Hearing and Visually Impaired

Nobuhiko Ogata: Fukuoka High School for the Blind

Syuichi Katai: Tsukuba University of Technology

Tsuyoshi Kitajima: Nara School for the Blind

Katsumi Kurihara: Tokyo Metropolitan Bunkyo School for the Blind

Tomomi Sakai: Tsukuba University of Technology

Saburo Sasada: Former National Visual Impairment Center of Kobe

Masahiko Takeuchi: Okayama School for the Blind and Visually Impaired

Eiji Nagaoka: Tsukuba University of Technology

Yoichi Nakamoto: Okinawa Prefectural School for the Blind

Eitaro Noguchi: Tsukuba University of Technology

Ryosuke Fujii: Tsukuba University of Technology

Masahiro Minowa: Chiba School for the Blind

Miki Muto: Ibaraki Prefectural School for the Blind

Keishi Yoshikawa: Acupuncture and Physical Therapy Teacher Training School

(In alphabetical order without titles)

Chapter 1 Basics of medical massage

Section 1 Medical massage and ethics

1. Mental attitude of massage therapist

The title of this book is not “massage” but “medical massage.” Medical massage is a method for relaxation and maintaining health as well as curing diseases and returning the patient to good health. Medical massage is performed by massage therapists who have gained the knowledge and techniques of medical massage.

Massage therapists shall not only have a thorough knowledge of modern medicine but also manifest interest in phenomena occurring in society today, i.e., social phenomena and natural phenomena occurring in their areas, regions, nations, and on earth, obtain their information, and have a mind of their own. Massage therapists shall have rich knowledge and scholarly acquisition suitable for practical use in contemporary society and always keep their eyes wide open for practices.

Additionally, medical massage therapists treat patients. Most patients not only report pains and disorders but also mental issues. Patients visit us with systemic problems such as diseases of the mind and body. It is important for the practitioner to recognize patients as such and have life experiences, techniques, great breadth of mind, and a deep insight to receive such patients. For that purpose, practitioners have to step up efforts every day.

Meanwhile, the objective of medical massage is to cure patients. Therefore, practitioners shall bear firmly in mind that they do not perform massage for obtaining a lot of money and advance the interests of their group. As a matter of course, it is important to make a living from practice. However, practitioners shall not provide treatment in order to earn money.

Further, medical massage therapists shall pay particularly attention to their physical appearance and clean clothing. Medical massage therapists shall maintain their hygiene and safety at the same level as other medical personnel when medical massage therapists work with other medical staff.

Needless to say, high ethical standards and honor are required for medical massage therapists. Pride and noble-mindedness as a practitioner are required. Ability to maintain their health is also important.

2. Hygiene control of hands

Obviously, clean hands that come in contact with the skin of patients are required. That is the

reason why it is important to wash hands before treatment. Wash hands with soap. Scrub every part of the hands for approximately 15 seconds and rinse well under running water. Practitioners shall not only wash hands before treating patients but also cut their nails close and have smooth palms.

Additionally, it is required to warm the hands before treating patients. Warm hands provide patients with a sense of security. Practitioners in nations with low environmental temperature and hands that are cold shall use hot water when washing their hands or warm the hands with a heater or the body by putting their hands under clothing. Practitioners shall do the training for warming their hands more quickly than common people by massage hands together or giving a mental uplift to start the treatment.

Ideally, massage therapists shall have plump hands to give patients a soft sensation of pressure encompassing the affected areas. The hands of practitioners shall not make patients feel sharp pain. For that purpose, practitioners shall conduct and repeat training for compression and massage constantly in order to develop such hands.

3. Structure, environment, and hygiene control of a treatment room

Appropriate moisture and drying, good ventilation, sufficient luminance, and a hygienic environment are required for the treatment room.

History and culture differ from one country to another. The environment in treatment rooms is also different depending on the country. In some Asian countries, treatment rooms are dark with the curtains drawn to cut off all outside light, and the interior lights are turned off. In other Asian countries, only a simple mat is put down on an earthen floor or flooring and treatments are seen from a street.

In Japan, generally, it is desirable that the treatment room be moderately illuminated by indirect illumination, quiet, and maintained at the proper temperature. Japanese patients are likely to desire that each operating table is separated with a wall or curtain, that they are not be observed by other people, and that they receive treatments without undressing. It does not become something of a problem depending on the country. However, a certain level of environment is required for medical massage. Japan and Korea have a licensing system for the massage therapist and standards in the area of a clinic. In Japan, the area shall be 6.6 m² or more.

We should prepare a clean environment for treatment where patients feel at home depending on country-specific history and culture. Even a traditional environment and equipment shall be improved as appropriate considering modern hygienic concepts, safety, and privacy. We should establish an environment where patients can receive treatment in a relaxed manner by stepping into the patient's shoes.

4. Privacy and draping (covering) of patients

In spite of the situation shown above, it is inevitable to expose the body in various styles of massage. In that case, the body of patients other than the operative field shall be covered with a bath towel or sheet considering the privacy and modesty of patients. However, in Japanese-style massage, patients do not strip to their underwear or strip naked. They receive treatments with their Japanese bathrobe, clothes, or treatment gown on. Therefore, the privacy is rarely invaded. However, in some countries, patients always receive treatments totally naked. In that case, we should consider patient feelings.

The privacy of patients is to be protected and includes individual information such as personal profile, clinical history, and human relationships. We should not give patient information obtained during treatments to other people. In some cases, we should not reveal personal information to the family members of patients. In Japan, there is a legal duty to maintain the privacy of patients. We will be punished if we act contrary to the legal duty.

5. Informed consent

Informed consent is often considered to be “explanation and agreement.” Before starting treatment, patients are explained the results of the clinical examinations and diagnoses, options of treatments for the disease, estimated therapeutic process for the treatment, and expected results in order to help patient choose a therapeutic method. That is a series of communications between a practitioner and a patient. It is natural that we explain what we will do before doing it and conduct it after obtaining consent. However, in an environment where a medical practitioner has overwhelming power over patients, and the patients have to be obedient to the orders, patients hardly object to the traditional attitudes of the medical practitioner. We should treat patients in a manner founded on trust and reliance with empathy for them avoiding forced treatment. In social situations where patients do not have awareness and attitude, medical practitioners should lead patients. However, we should fully explain the situation to patients and make them draw their own conclusion in order to educate patients.

Objective data are required for explaining therapeutic process and curative effects to patients. No rigorous research results of medical massage have been reported. Further investigations are required.

We should ask a patient about his condition and perform an examination before performing medical massage in order to understand the clinical condition. Treatments, grounds, predicted course, and estimated therapeutic effects should be explained. It is desirable that we should start treatment after patients are satisfied with the explanation and have given informed consent in the

manner described above.

6. Medical mistakes caused by procedures and safety managements

Medical mistakes rarely occur in massage and finger pressure if practitioners acquire the fundamental skills necessary for the procedures, follow them faithfully, and treat patients carefully. Patients will be satisfied if the treatments they received are fully effective. However, patients will not accept the treatment if invasions and disorders by procedures are more significant than the effects. For example, patients will be satisfied if a tumor is removed and the symptoms are reduced by surgery. Conversely, patients will complain that they have been damaged if the operative wound is more significant than the improvement in symptoms.

In Japan, 235 medical allegations of malpractice, including contused wounds and broken bones, have occurred during such procedures as massage and finger pressure for the 28 years from 1975 to 2002 based on the number of cases paid from insurance proceeds. A total of 8.4 medical malpractice allegations have occurred per year. Allegations of medical malpractice include fractures involving intercostal neuralgia and bruises (approximately 58%), sprains (contused wound, approximately 13%), aggravation of symptoms (approximately 26.5%), dermatitis (approximately 2%), and others (approximately 2%). A total of 32 errors in medical treatment were caused by structural defects and insufficient management of facilities other than treatment. The cases include a patient injured by a falling advertising display, a patient injured due to a broken side ditch of a car parking space, patients injured by a falling clock or an electric fan, a patient burnt with hot water in a kettle on a heater, and damaged glasses and watches of patients.

Practitioners have to control mistreatments and accidents due to insufficient facilities. In some countries, patients have relatively lower mistreatment victim consciousness and do not well understand the right to claim compensation for damages and the amount of insurance against injuries is not high. However, practitioners shall perform treatment in a cautious and safe manner irrespective of the amount of any liability claim.

7. Evaluations and records of patients

In medical massage, practitioners should verify that medical massage has been performed based on appropriate examinations and correct evaluations and evaluate the level of changes occurred after the procedure (e.g., effectiveness of treatment).

For that purpose, results of examinations and evaluations shall be recorded before and after and, if appropriate, during the procedure. In order to accomplish the purpose, we prepare a format in

advance so that we can complete the necessary information in a rapid and appropriate manner. In other words, we should prepare a medical chart (e.g., fill-in-the-blanks form). As a general rule, blind people may use the point system. It is worth considering that we should make electronic medical charts if people with normal vision and blind people share medical charts. Medical findings may be dictated into a speech recorder. We can correctly understand the indications and limits of massage practices based on statistical processing and analyses of patient records obtained in a step-by-step fashion.

8. Indications and limits of medical massage

The indications and effects of medical massage are limited. All medical acts other than medical massage have their limitations.

Medical massage stimulates the living body in a physical and mechanical manner and improves the circulation of blood and lymph fluid systemically or locally to accelerate metabolism. Medical massage also adjusts the functions of visceral organs by somato-visceral reflex via the autonomic nerves. Further, medical massage directly affects articular contractures, joint fusions, rigidity of muscles, and connective tissues to improve functions. Indications include those diseases and symptoms. However, diseases and symptoms for which medical massage is ineffective or those exacerbated by medical massage are not eligible.

Contraindications include (1) diseases and symptoms on which massage has no effect or therapeutic effect and (2) diseases and symptoms aggravated by massage.

For example, contraindications include acute febrile diseases, contagious diseases, peritonitis, appendicitis, cancer, sarcoma, hemoptysis, hematemesis, immediately after intracerebral hemorrhage, severe visceral disease such as nephritis and valvular disease of the heart, immediately after fractures and luxations, wound areas, contagious diseases such as tuberculosis, syphilis, gonorrhea, and purulent diseases.

If patients with these diseases and conditions ask you to perform procedures, recommend that they visit medical institutes such as hospitals and clinics. If possible, it is required to maintain appropriate communication with the medical institutes during treatment.

Section 2 Meanings of vital observations and surface anatomy

1. Meanings of vital observations

The practice of massage and finger pressure is a medical technique for appropriately stimulating

muscles, nerves, blood vessels, joints, and organs located below the skin that cannot be directly observed by eyes or hands. Therefore, it is important to correctly understand the structures and surface of the body based on anatomical knowledge of major skeletal structures, travels of muscles, nerves and blood vessels, and the locations and sizes of organs. Then, we should acquire the skill for palpating tissues and organs that can be observed from the surface of the body. If these knowledge and techniques are insufficient, sufficient curative effects cannot be expected, symptoms deteriorate, and medical accidents occur.

In other words, practitioners who perform massage and finger pressure (abbreviated to “practitioners” hereinafter) shall have a higher ability for observing living humans from a medical viewpoint. The technique including visual and manipulation examination is called “vital observation.” The visual examination is mainly a gross observation which can obtain biological information on body type,¹ habits, complexion, and skin color. Manipulation examination is an observation based on the tactile sensation of the hands and fingertips. It is possible to ascertain the condition of the soft tissues of the skin, subcutaneous tissues, muscles, tendons, ligaments, bones, joints, and organs located close to the surface of the body. Considerable amount of biological information can be collected if these observations are performed correctly. Acquisition of these techniques has a great significance for practitioners who cannot perform diagnostic imaging or X-rays.

It is desirable to instruct a pair of students about vital observation in a warm environment. In this instruction, two students observe the surface of the body of the partner. The sexes should be separated from an ethical viewpoint and partitions should be prepared depending on the body parts. Generally, the skin to be observed should be exposed. Therefore, each student should give heed to cleanliness of the body and clothing so that they do not make others uncomfortable if they strip their clothes off.

For the order of vital observation, at first, the physical frame and body type are visually observed (palpation is also possible). According to the categories of the body surface, skin, and its adnexa (hair and nails, etc), skeletal structure, muscular system, nervous system, vascular system, and visceral are observed. Practical training of vital observations is useful for confirming and reviewing knowledge obtained from anatomy and developing clinical applied skill. Therefore, this practical training shall be performed when each lecture on a chapter of anatomy has completed and at the introduction of clinical study. In this chapter, we learn the outlined anatomy of the body surface and anatomical nomenclatures as basic items so that we can acquire systematic knowledge.

2. Outlined anatomy of the body surface

The method for anatomically categorizing the body surface of the human body is like geography.

In other words, a country is roughly divided into several regions. And the regions are fractionized into prefectures or states. The similar method is used for the anatomy of the body surface. However, the margin lines used in geography are clear while the boundaries of the body parts used in the anatomy are different depending on the academic fields. For example, the complex of superior limb girdle consisting of scapula and clavicle and the free superior limb is called “upper extremities” in the field of osteology, while the scapula and clavicle are included in the back and chest respectively and “upper extremities” in the field of the surface anatomy refer to the free superior limb in osteology. The body segments used in this text is based on surface anatomy and a consistently convenient classification.

(1) Body segments and boundaries

The human body surface is classified into head, neck, chest, stomach, back, perineum, and upper and lower extremities (mentioned below). Among them, the head and neck are collectively called head and neck area, breast, stomach, back and perineum are collectively called the body trunk, the upper extremities and lower extremities are collectively called membra (extremities). Boundaries of parts of the body are roughly shown below:

- 1) The boundary between the head and neck: Line connecting the mentum region—left and right mandibular body inferior margin—mandibular ramus posterior margin—mastoid process—superior nuchal line—external occipital protuberance.
- 2) Boundary between the neck and breast: For the anterior surface, the line connecting the superior margin of the sternum—upper margin of the clavicle—acromion. For the posterior surface, the line connecting the acromion—the seventh cervical spinous process.
- 3) The boundary between the breast and abdomen: The line traveling the ensiform process—right and left costal arch—the twelfth costal inferior margin through the twelfth thoracic vertebra spinous process.
- 4) The boundary between the upper extremities and body trunk: A loop line linking the line originated from the deltoid (the anteroposterior fossa on the acromion when unfurling arms)-anterior edge of deltoid—axilla—posterior margin of deltoid.
- 5) The boundary between lower extremities and body trunk: A loop line linking the inguinal sulcus—anterior superior iliac spine—iliac crest—posterior superior iliac spine—sacrum exterior edge—lateral of the coccyx and anus—genitofemoral sulcus—inguinal sulcus.

(2) Subdivision of each bodily part

Parts of the body shown above are further subdivided into several sections. Parts of the body are often subdivided by the constructions such as the skeletal structures in the deep part of the body, muscles, and ligaments. Therefore, we require knowledge about anatomical constructions in

order to understand the sections of the parts of the body.

1) Cephalic region: This is classified roughly into narrowly defined “head” and “facial surface.”

The boundary is the line linking the nasal root—eyebrow—zygomatic arch —ear canal. The cephalic region is divided into four parts including the frontal region, parietal region, occipital region, and temporal region. The facial surface is also divided into coryza, oral region, mentum region, orbital region, infraorbital region, zygomatic region, and parotid masseter muscle region.

2) Neck region: This region is roughly divided into anterior neck region, sternocleidomastoid region, posterior triangle of neck, and posterior cervical region.

(1) Anterior neck region: An area between the left and right sternocleidomastoid muscle. It is an isosceles triangle with base of mandibular base (rounded inferior margin of mandibular body) and apex of jugular notch of sternum (superior edge of manubrium). Further this region is divided into submandibular triangle² and carotid triangles.³

(2) Sternocleidomastoid region: An area from the lower region of mastoid process to sternoclavicular joint and lesser supraclavicular fossa.⁴ A wide raised area covering the sternocleidomastoid muscle.

(3) Posterior triangle of neck: A section surrounded by sternocleidomastoid muscle posterior margin, trapezius anterior edge and upper margin of the clavicle including greater supraclavicular fossa.⁵

(4) Posterior cervical region: It is explained at the dorsal region.

3) Breast region: This region is briefly divided into the precordial region and side chest. The posterior surface is considered to be the dorsal region.

(1) Precordial region: This region is divided into the clavicular part, sternal part, clavipectoral muscular triangle (infraclavicular fossa),⁶ mammary region and inframammary region. The left and right clavicular part and the sternal part form a T-shape. Inframammary region corresponds to the thoracic region below the breast and the lacteal gland. In this section, the part above the rib cartilage on both sides of epigastric region is called the hypochondriac region.

(2) Side chest region: The left and right section in the breast region contacting the upper extremities. The boundary with the precordial region is not clear. In this region is the axilla region below the shoulder joint. The axilla region is bounded by greater pectoral muscle anteriorly, latissimus dorsi muscle posteriorly, anterior serratus muscle medially, and upper arm exteriorly. The fossa is called axilla.

4) Abdominal region: Abdominal region is separated into upper abdominal region, mesogastrum and lower abdominal region by two horizontal lines linking the left and right tenth costa bottom points and the highest point of the iliac crest. Further, each abdominal region is separated into the middle, left and right area by the left and right mid-clavicular line (described below).

Consequently, the abdominal region is subdivided into nine sections. The post-abdomen belongs to the dorsal region.

(1) Upper abdominal region: Central region between left and right costal arch in the upper abdominal region is called epigastric region or regio epigastrica. The section located on both sides of it overlapping the breast region is called the hypochondriac region.

(2) Mesogastrium: In the mesogastrium, the center of the abdominal region around the umbilicus contacting the lower part of the epigastric region is called the umbilical region. Both sides are called the lateral region.

(3) Lower abdominal region: In the lower abdominal region, the center of the lower abdominal region contacting bottom part of the umbilical region above the pubic mound is called the pubic region. The section on both sides between the inguinal sulcus section is called the subilium.

5) Dorsal region: The area in which the posterior surfaces of the neck, breast and abdomen in a vertical row is called the dorsal region. It is divided into the following parts.

(1) Posterior cervical region: It is located at the rear of the posterior triangle of the neck. This region is from the external occipital protuberance to trapezium region. It is also called the “regio nuchalis.”

(2) Vertebral region: The center of the back corresponding to the vertebral column.

(3) Scapular region: A part of the back corresponding to the scapula.

(4) Infrascapular region: A part on both sides of the vertebral region below the scapular region. The inferior margin connects the hypochondriac region via the twelfth costa. The medial edge connects to the hypochondriac region via vertebral region. The lateral edge connects to hypochondriac region via side chest.

(5) Interscapular region: A part between the shoulders in the back. Or, a part between the scapulas.

(6) Lumbar region: A part outside the vertebral region between the twelfth costa iliac crest.

(7) Sacral region: A part of the back covering the sacrum. It is also a part of the vertebral region.

6) Perineum: An area margined anteriorly by the inferior margin of the symphysis pubis, margined caudally by the tip of the coccyx and margined laterally by the ischial tuberosity. A rhombic part between bilateral thighs. It corresponds to the outlet of the pelvis. This is divided into three parts including the external genitals, narrowly defined perineum, and anal region.

(1) Pubic region: The pubic region of females consists of the labia majora and vulvar cleft. The pubic region of males consists of the scrotum and the penis.

(2) Narrowly defined perineum: This is a part between the external genitals and the anal region. However, the boundary between them is not clear.

(3) Anal region: A section from the tip of the coccyx to the anus. The anal cleft is formed between the bilateral gluteal muscles in the standing position.

7) Upper extremities: Definitions of the upper extremities change depending on academic fields.

In osteology and kinesiology, the upper extremity is divided into the superior limb girdle and free superior limb (upper arm, forearm, hand). However, in surface anatomy, as mentioned above, the clavicle and scapula constituting the superior limb girdle belong to the dorsal region as the clavicular part and scapular region, respectively. In other words, the upper extremity in surface anatomy is a part of the free superior limb. In accordance with this concept, the upper extremity is divided into the brachial region, cubital region, antebrachial region, and hand region.

(1) Brachial region: This is a region of the upper extremity between the shoulder and cubitus. This region is divided into the deltoid region (the lateral division of the shoulder sectioned by the line of the deltoid), anterior division (a section corresponding to the approximate range of the biceps brachii muscle), and the posterolateral region (a section corresponding to the approximate range of the triceps brachii muscle).

(2) Cubital region: A part of the upper extremity around cubital joint between upper arm and forearm. The posterior part is around the olecranon. The anterior part is a fossa called cubital fossa above and below the Hutter line.⁷

(3) Antebrachial region: A part of the upper extremity between the cubital joint and the wrist. This is divided into the anterior division (section having superficial flexor muscle), the posterolateral region (section having extensor muscles) and the lateral division (a section having lateral muscles).

8) Hand region: A part of the upper extremity situated distal to the wrist (wrist joint). This is divided into the carpal region, the metacarpal region, and fingers.

(1) Carpal region and metacarpal region: The carpal region corresponds to the wrist bone. The metacarpal region is located distally to the carpal region with the metacarpals lined up. The boundary between the carpal region and metacarpal region is unclear. The anterior surface is called the palm. The posterior surface is called dorsal surface of the hand. The palm has two elevated portions laterally and medially located called thenar eminence and the hypothenar eminence.

(2) Fingers: A section located distally to the metacarpophalangeal joint, which consists of the thumb, index finger, middle finger, medicinal finger, and little finger. The distal end of each finger is called the extremity of the finger. The anterior side of each finger is called the finger pulp. The posterior side of each finger is called the dorsal surface of the digit. The four fingers other than the thumb are called the four fingers.

9) Lower extremities: In osteology, the lower extremity is divided into the inferior limb girdle,⁸ thigh, lower leg, and the foot. In surface anatomy, the lower extremity is divided into gluteal region, femoral region, the lower leg, and the foot.

(1) Gluteal region: An elevated portion corresponds to the gluteal muscle. The upper part ends at

the iliac crest. The lower part is separated from the femoral region by the gluteal fold.

(2) Femoral region: This region is divided into the anterior division (the section with extensor muscles) and the posteolateral region (the section with the superficial flexor muscles). The former is a section from the inguinal area to the base of the patella. The latter is a section from the gluteal fold to the popliteal region.

(3) Knee region: A section around the knee joint, which can be divided into the patellar region and the popliteal region.⁹ The patellar region corresponds to the anterior surface of the knee joint from the patella to the tibial tuberosity. The popliteal region is the shallow rhomboid fossa on the posterior surface of the knee joint.

(4) Lower leg: A part of the lower extremity between the knee joint and the podarthrum, which can be divided into the anterior division (the section with the extensor muscles), posteolateral region (the section with the superficial flexor muscles), and the lateral division (the section with the lateral muscles). The almost upper half of the lower leg posteolateral region has an elevated portion corresponding to the muscle belly of the gastrocnemial muscle called the sural region. The lower half is called the Achilles tendon region. The medial and lateral sides of the podarthrum are the medial malleolus and the lateral malleolus, respectively.

(5) Foot part: This part is divided into the calcaneal region, the foot back, the sole, and digits of the foot.

3. Anatomical position and body posture

(1) Anatomical position

A reference posture for explaining the positional relationship of the body parts is called “anatomical position” in the field of medicine. The anatomical position is a posture where a human rises to his full height with the sole on floor, lines up the feet, points his toes, extends the cubital joints with his arms straight down at his sides, makes the palm face forward with maniphalanxes stretched. This is somewhat a cramped posture. However, the positional relationship between body parts is expressed by using this anatomical position as a benchmark in any posture. Without this anatomical position, the positional relationship between body parts becomes different depending on the posture. For the positional relationship between the mouth and eyes, the mouth is located below the eyes in the standing position. Meanwhile, the heights of the mouth and eyes are the same in the dorsal position. However, in anatomy, “the eyes are located above the mouth” in any postures based on the anatomical position as a benchmark.

(2) Types of body posture

The body posture is a position of the body where the body is supported naturally under certain conditions. Body postures frequently used in the clinical practices of massage and finger pressure

are explained below.

(1) Standing position: A body posture where a human stands erect with the soles put on the floor irrespective of anatomical position or not.

(2) Seated position: A body posture with the gluteal region on the floor and the body trunk maintained erected. Seating oneself in a chair is called “chair sitting.” Sitting at the edge of a bed is called “sitting position.” Sitting with bilateral lower extremities extended is called “long sitting position.”

(3) Dorsal position (supine position): A body posture where a human is lying face up with the dorsal region toward the floor.

(4) Lateral position: A body posture where a human is lying down on his side with a side of body parts toward the floor.

(5) Abdominal position: A body posture where a human lies on his face front with the abdominal region toward the floor.

4. Anatomical terms

In the field of medicine, technical terms of structure of the human body are called anatomical terms. Among anatomical terms, the terms about positional relationship of the body parts and directions of articular movement are called anatomical descriptive terms. Practitioners participating in massage and finger pressure and healthcare professionals should share medical terms when they discuss and describe medical and clinical items, or exchange information and opinions about patients. Anatomical descriptive terms are the bases of a common language.

(1) Terms expressing the positional relationship of the body

Major terms expressing relative positional relationship of two body parts are as follows:

(1) Anterior and posterior side: A part that is on the abdomen side or the part nearest to the front of a structure is called the anterior side. A dorsal part or a part nearest to the backside is called the posterior side.

(2) Superior and inferior side: The direction towards the cranial side or the side nearest to the top of a structure is called the superior side. The side on the caudal direction or the lowest part of a structure is called inferior.

(3) Medial and lateral side: The part nearest to the center of a structure or a surface separating a structure into right and left is called the medial side. The part that is the most distant from the center of a structure or a surface separating a structure into right and left is called the lateral side.

(4) Anterior and posterior margin: The margin at the forefront of a structure is called anterior margin. The margin on the tail of a structure is called the posterior margin.

- (5) Superior and inferior margin: The uppermost margin of a structure is called the superior margin. The undermost margin of a structure is called the inferior margin.
- (6) Medial and lateral margin: A peripheral of a structure which is the nearest to the centerline is called the medial margin. A peripheral of a structure that is the most distant from the centerline is called the lateral margin.
- (7) Interior and exterior surface: Inside and outside a wall separating the inside and outside of a structure are called an interior and exterior surface, respectively.
- (8) Internal and exterior layer: If a structure is constructed in layers, the layer nearest to the outer wall is called the exterior layer (superficial layer) and the layer the most distant from the outer wall is called the internal wall. The exterior and internal layer are collectively called the intermediate layer.
- (9) Deep and superficial layer: A part distant from the exterior surface of a structure is called the deep layer and a part near the exterior surface is called the superficial layer.
- (10) Proximal and distal: Parts in the extremities near the body trunk are proximal and parts distant from the body trunk are distal.
- (11) Radial and ulnar side: In the forearm, the lateral side is called the radial side and the medial side is called ulnar side.
- (12) Palmar and dorsal side: The palm and the anterior surface fingers are called the palmar side and posterior surface is called the dorsal side.
- (13) Plantar and dorsum of the foot: The sole side of the foot is called the plantar and acrotarsium is called the dorsum of the foot.

(2) Terms expressing the position of the body surface and organs

Several sections of the body surface and deep organs in the anatomical position are sometimes assumed as an index for explaining the position of the body surface and deep organs. They are roughly divided into the sagittal plane, frontal plane, and horizontal plane.

1) Three planes

- (1) Sagittal plane: All longitudinal sections in an anteroposterior direction that divide the body into the left and right.
- (2) Frontal plane: All sections making a right angle with the sagittal plane in the horizontal direction. This plane divides the body into the front and the rear.
- (3) Horizontal plane: A horizontal plane obtained when assuming that the vertical plane is sectioned at a right angle is called a horizontal plane or transverse plane.

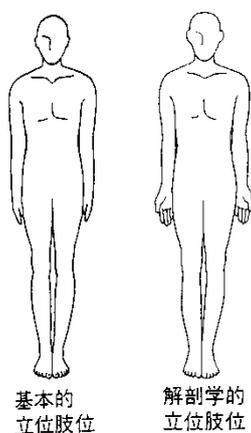


図1 基本肢位

Fig. 1 Basic position

Basic standing position

Anatomical standing position

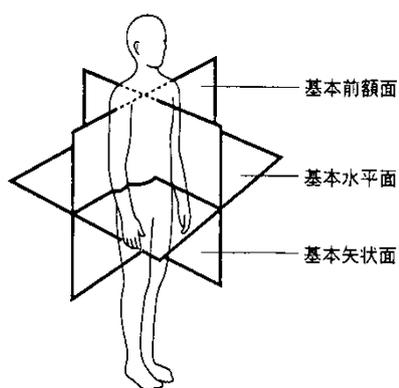


図2 身体の基本面

Fig. 2 Basic plane of the body

Basic frontal plane

Basic horizontal plane

Basic sagittal plane

Fig. 3 Frontal plane

Sagittal-horizontal axis

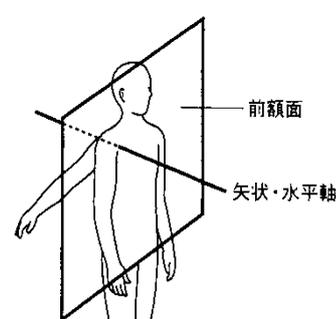


図3 運動の面と軸

上肢を横に上げる運動(肩関節外転)は前額面, 矢状-水平軸(肩関節を通る)で行われる。

An exercise to outstretch an upper extremity (shoulder joint evagination) is performed on the frontal plane and sagittal-horizontal axis (passing through the shoulder joint).

2) Among the clinically important horizontal plane, the horizontal planes shown below are often clinically used.

(1) Sternal angle plane: A horizontal plane at the height of the sternal angle (junctional region with the second costa). Generally, it passes at the height of the intervertebral disc between the fourth and fifth thoracic vertebra.

(2) Xiphoid process of the sternum plane: A horizontal plane passing through the connected portion between the gladiolus and ensiform process. Normally, it passes through the height of the ninth thoracic vertebra.

(3) Umbilical plane: A horizontal plane passing through at the height of the umbilicus. It passes at the height of the fourth lumbar vertebra or at the height of the intervertebral disc between the third and fourth lumbar vertebrae.

(4) Scapular spine horizontal plane: A horizontal plane passing by the root of scapular spine. It passes at the height of the third thoracic vertebra.

(5) Angulus inferior scapulae plane: A horizontal plane passing by the angulus inferior scapulae. It passes at the height of the seventh thoracic vertebra.

(6) Infracostal plane: A horizontal plane passing the lowest part of the infracostal line. Normally, it passes at the height near the line on the third lumbar vertebra.

(7) Jacoby's line: A horizontal line connecting highest point of the left and right iliac crest. The horizontal surface passing at this height passes at the height of the fourth lumbar spinous process.

(8) Iliac crest tubercle: A horizontal plane passing at the height of the iliac crest tubercle and the fifth lumbar vertebra.

3) Clinically important tentative line

In some cases, the body trunk is assumed to be a tube, on which the latitude lines (tranverse line) and meridians (vertical lines) are temporarily drawn in the same way as a globe, and the lines are used as landmarks for expressing the positions of body parts. Costae and intercostal areas are used for latitude lines. The following vertical lines are used for meridians.

(1) Anterior median line: A vertical line passing the midline of the breastbone and abdominal region.

(2) Posterior median line: A vertical line passing the midline of the vertebral column.

(3) Midclavicular line: A vertical line passing the center of the clavicle.

(4) Subcenter line: A vertical line passing in the middle of the anterior superior iliac spine and anterior median line. The right subcenter line passes the ninth rib cartilage.

(5) Mamillary line: A vertical line passing the papilla (It does not stay constant in adult females having a well-developed breast, therefore the midclavicular line is used).

(6) Scapular line: A vertical line passing the angulus inferior scapulae.

(7) Axillary line: A vertical line passing the center of the axilla. It is called middle axillary line when defining the anterior axillary line (A vertical line passing the anterior end of the anterior axillary cross-striated muscle) and the posterior axillary line (A vertical line passing the posterior end of the anterior axillary cross-striated muscle).

By using these methods, for example, the location of the heartbeat can be explained and described precisely to be “in the fifth spatium intercostale and slightly outer side of the midclavicular line.”

(3) Terms expressing directions of motions

The direction of motions of each joint can be expressed with three vertical lines (e.g., sagittal axis, frontal axis and vertical axis) on the three plane mentioned above.

1) Three axes

(1) Sagittal axis: A vertical line on the frontal plane penetrating the body anteroposteriorly (anteroposterior axis).

(2) Frontal axis: A vertical line on the sagittal plane penetrating the body laterally (=transverse axis)

(3) Vertical axis: A vertical axis on a horizontal plane penetrating the body vertically (=perpendicular axis).

2) Directions of articular movements

(1) Bending and extension: Flexion is a movement on the sagittal plane centering on the frontal axis. In the anatomical position, a movement that approaches the body or a movement towards the front is called flexion and a movement of body parts away from the body or a movement towards backward is called extension. Meanwhile, a movement of the knee joint towards backward is called flexion and a movement towards the front from the flexed position is called extension.

(2) Abduction and adduction: Movements on the frontal plane centering on the sagittal axis. A movement away from the body is called abduction and a movement approaching the body is called adduction.

(3) External rotation and internal rotation: Movements on the horizontal plane centering on the vertical axis are called rotations. Among them, outward rolling is called external rotation and inward rotation is called internal rotation.

Chapter 2 Structure of the human body and outline of functions

Section 1 Organs and organ systems

1. What are organs and organ systems?

An organ is a coherent structure consisting of multiple tissues for performing specific functions. An organ system consists of multiple organs connected to one another to form a section that performs a vital function.

2. Organ system

- 1) Skeletal system: It consists of bones and cartilage connected via joints. This is an organ system constituting the support of the body.
- 2) Muscular system: The muscular system is connected to the bone structure and makes the bone structure move by muscular contractions in order to control body movements. The skeletal system and muscular system are collectively called the locomotor system.
- 3) Vascular system (circulatory system): It consists of the blood vascular system and blood vessels and lymph vascular system. It is a traffic route connecting body parts for transporting substances.
- 4) Digestive system: An organ system for assimilating the nutrients. This system consists of the gastrointestinal tracts such as the mouth cavity, pharynx, esophagus, stomach, small intestine and large intestine, and digestive glands such as the salivary gland, liver and pancreas for supplying digestive fluids to the gastrointestinal tracts.
- 5) Respiratory system: An organ system consisting of the air passage and lungs for getting oxygen from air into the blood and releasing carbon dioxide gas into the air.
- 6) Urinary system: This system consists of kidney and urinary passage (e.g., urinary tract, urinary bladder and urinary tract) for producing and excreting urine.
- 7) Reproductive system: This is an organ system consisting of male and female genitals for producing offspring.
- 8) Endocrine system: This system produces hormones and adjusts the circulation in the body.
- 9) Nervous system: This system consists of the central nervous system and the peripheral nervous system. The brain and spinal cord belongs to the central nervous system. Twelve pairs of cranial nerves and 31 pairs of spinal nerves and autonomic nerves belong to the peripheral nervous system.
- 10) Sensory organ system: This organ system receives stimuli from external sources and transmits

them to the central nervous system. Five organs—the skin, gustatory organ, olfactory organ, visual organ and vestibulocochlear organ—belong to the sensory organ system.

Section 2 Structures and functions of muscular system and skeletal system

1. What is bones and bone structures?

(1) Functions of bones

Bones have the five functions as shown below:

- 1) Supporting function: Bones support the head and the body as the backbone of the body. Humans can be in a standing position because they have bones in the body.
- 2) Motor function: Humans can make movements with the contractions of muscles attached to bones. A human can bend his knees because the thighbone is connected to the shinbones via muscles.
- 3) Protective effect: Bones gather to form bone structures. The brain and lungs are protected in bones. Soft visceral organs are protected by hard bones.
- 4) Hematopoietic function: Bone marrow in bones produces hematopoietic cells. Hard bones internally contain soft sponge-like bones. The soft sponge-like bones produce red blood cells that are components of blood.
- 5) Calcium storage function: Bones are made of calcium. Getting old and insufficient calcium intake (e.g. fish bones) may weaken the bones. .

(2) Morphologies of bones

Bones can be classified into four types by morphology.

- 1) A long bone is long-bar shaped (e.g., humerus, femur). The swollen parts at the ends of long bones are called the epiphysis. The middle portion is called the diaphysis of a long bone.
- 2) Short bones are short and have various shapes (e.g., wrist bone).
- 3) A flat bone is a plate-shaped bone (e.g., breastbone, ilium).
- 4) A pneumatic bone has syringes (e.g., maxillary).

(3) Structures of bones

A bone consists of the four tissues including the periosteum, bone substance, bone marrow, and cartilage.

- 1) The periosteum is rich in blood vessels and nerves. They wrap bones in order to protect them, furnish nutriment for them, thicken them, and mend broken ones.
- 2) The bone substance consists of the compact substance and spongy substance. The compact substance is a hard part that covers the surface of the bone and has Volkmann's

canal and Haversian canal medially through which nerves and blood vessels pass. The spongy substance is a spongy bone located medial to the compact substance. The spongy bone has many small porous sections containing the bone marrow.

- 3) Bone marrow exists in the center of the bones and within the spongy substances. Bone marrow looks red because it produces blood (i.e., red bone marrow). Bone marrow changes into the yellow fat if the function is lost (i.e., yellow bone marrow).

- 4) Bones grow in the chondrin at the osteoepiphysis of the long bones. The bone increases in length at this point. The bone gets thick at the diaphysis by the periosteum.

2. Joints (bony joints)

(1) The body has approximately 200 bones. They are connected to one another to make a bone structure.

There are two types of bony joints called the synarthrosis and diarthrosis.

- 1) Synarthrosis: This is a joint that rarely moves. Typical examples include the cranial sutures, synchondrosis, and osseous union.
- 2) Diarthrosis: A joint formed with a few bones connected to one another. In other words, a movable bony connection is a joint.

(2) Structures of joints

- 1) Projecting end of a bone constituting a joint is called the articular head. A hollow epiphysis is called the joint fossa. The surface where both parts make contact is called the articular surface. The articular surface is covered with a smooth bone called the articular cartilage.
- 2) A joint is wrapped with a strong articular capsule that is a strong membrane bag. The articular capsule is filled with synovial fluid in order to reduce the friction between articular surfaces. It is just like lubricant for machines. The synovial fluid is excreted from the synovium inside the articular capsule. If a joint is wrenched, this articular capsule is twisted to stimulate secretion of synovial fluid in large amounts from the synovium resulting in a swollen joint.
- 3) The outside of the articular capsule is reinforced with belt-like ligaments in order to prevent bone dislocations.

(3) Types of joints

Joints are classified by the number of bones into the simple joint (e.g., shoulder joint) consisting of two bones and complex joint (e.g., cubital joint, knee joint) consisting of three or more

joints. Joints can be also classified by the direction or degree of movement.

- 1) Ball joint: A joint having a spherical articular head, a shallow articular fossa, which can move in all directions (e.g., shoulder joint) or can move in multiple directions though the movements are slightly restricted because the joint fossa is deep is called the cotyloid joint (e.g., hip joint).
- 2) Ginglymoid joint: The articular head is column-shaped and functions as a hinge allowing movement in only one direction (e.g., interphalangeal joints of the hand).
- 3) Pivot joint: The articular head is cylindrical and connected to the joint fossa as it is inserted. The head of the bone rotates like a wheel (e.g., atlantoaxial joint).
- 4) Saddle joint (biaxial): The articular surfaces look like two saddles lapped one on another. The joint rotates in only two directions (e.g., carpometacarpal joints of the thumb).
- 5) Flat joint: Articular surfaces of both bones are almost flat (intervertebral joint).
- 6) Amphiarthrosis: Amphiarthrosis is a type of the flat joint with little mobility (e.g., carpal joint, tarsal joint).

(4) Overview of bone structure

Approximately 200 bones are connected to one another to form the bone structure including the cranial bone, vertebral column, compages thoracis, pelvis, upper extremities, and lower extremities.

- 1) Cranial bone consists of fifteen types and 23 bones including the neurocranium and viscerocranium.
- 2) Vertebral column consists of 26 bones (i.e., 7 vertebrae, 12 thoracic vertebrae, 5 lumbar vertebrae, 1 sacrum, and 1 coccyx).
- 3) The compages thoracis consists of 1 breastbone, 12 pairs of costae (i.e., 24 costae), and 12 thoracic vertebrae to form a cage-like pleural cavity.
- 4) The pelvis forms a mortar-like container with the left and right innominate bone, sacrum, and coccyx in order to contain the vesica and uterus.
- 5) The upper extremities are connected to the body via the clavicle and scapula, forms the shoulder joint with the scapula and humerus, and the cubital joint with the humerus, the ulna and the radius, the wrist joint with the ulna, the radius and the wrist bone, the palm with the metacarpal bone, and maniphalanxes with 14 bones.
- 6) For lower extremities, the innominate bone and femur form the hip joint, femur, shinbone, and the patella forms the knee joint, the shinbone, the splint bone, and the tarsal forms the podarthrum, the tarsal and metatarsal form the sole, and 14 bones form the digitus pedis.

3. Muscle

Muscles are categorized into the smooth muscles constituting the gastrointestinal, the myocardium for making the heart pump, and the skeletal muscles that perform articular movements. Above all, the skeletal muscles to be massaged will be explained here.

(1) Shapes of muscles

Basically, a skeletal muscle is generated from a bone and attaches to another bone over a joint. One end of a muscle that attaches to an unmoving bone is called the “origin.” An end of a muscle that attaches to a moving joint is called the “insertion.”

One end of a skeletal muscle is called the head of the muscle and the other is called the muscle tail. Most of muscles change into a tendon to attach to a bone. The central region is called the muscle belly. A muscles pumps and becomes tight when the muscle is flexed. The etymology of an English word “muscle” is “mouse” because the shape of the muscles looks like the shape of a mouse.

(2) Functions of muscles

1) Motor effect

A joint moves when skeletal muscles stretch (relaxation) or flex (contraction).

The muscles that bend or flex the joints are called the flexor muscles. The muscles that extend or relax the joints are called the “extensor muscles.”

For example, the biceps brachii muscle is a flexor for bending the cubitus. The triceps brachii muscle is a muscle for extending the cubitus. When the cubitus is bent, the flexor gets hard (contracted) and the extensor remains soft (relaxed). Conversely, the cubitus is extended, the extensor contracts and the flexor is relaxed. Thus, the flexor and extensor should be alternately actuated in order to move the cubitus smoothly.

2) Posture maintaining function

Even if the body does not move, the skeletal muscles repeat slight contractions and relaxations in order to maintain joints stable and prevent the body fall.

3) Production of heat

Moving muscles expends energy. At this time, heat is generated as a byproduct. This is because we are flushed from the heat and sweating.

(3) Muscle structure

1) Structure of skeletal muscles

Skeletal muscles consist of a large amount of muscle fibers wrapped by fascias.

Muscle fibers are made of several hundreds or thousands of finer myofibrilles.

Regular stripes are observed in the myofibrilles through a microscope. Therefore, it is called the

striped muscle.

Stripe patterns are observed because actin filaments and myosin filaments, which are finer fibers, overlap each other with regularity.

Muscles contract (shorten) because actin filaments and myosin filaments brush against each other.

2) Contraction of skeletal muscles

(1) Twitching and tetanus

A muscle twitches once when it is stimulated once. This is called twitching. For example, a muscle twitch occurs when the patellar tendon is struck once.

Two or more continuous stimuli (normally, stimuli are generated in the brain and go to the motor nerve) trigger continuous muscle contractions. The continuous muscle contractions are stronger than the twitch. This is called the summation.

In the patellar tendon reflex, a single muscle contraction has a force only to raise a lower leg. Stronger force is generated when a person kicks a soccer ball or kicks in the door.

(2) Isometric contraction and isotonic contraction

Isotonic contraction is a way of muscle contraction observed when the cubitus is bent or extended. The muscles shorten by contraction and both ends of the muscle approach each other resulting in the articular movement. At this time, the pull force (tensile force) applied to the muscles is constant.

Isometric contraction occurs when a heavy weight is carried without moving the cubitus. At this time, the length of muscles does not change.

All muscular movements of humans are generated by the combinations of these two types of contraction. Persons walk mainly by isotonic contraction. The same posture (standing straight and stiff) is maintained mainly by isometric contraction.

(3) Energy of muscular contraction

Muscular contractions are primarily caused by the energy from the decompositions of a substance called the ATP (adenosine 3'-phosphate) in muscles. Muscular contractions are caused by the decompositions of substances (exercise without oxygen).

Then, anhydrous dextrose (glucose) is decomposed and ATP is regenerated to continue exercises by supplying oxygen from arterial blood.

If oxygen is insufficient due to extreme exercise, lactic acid generated in exercise without oxygen builds up resulting in muscle fatigue.

When fingers are bent and stretched with the arm bound, strength soon diminishes. That is because arterial blood in the arm does not supply oxygen to the muscles to move the fingers.

(3) Effects of massage on muscles

Massage increases circulation in the muscles and provides a large amount of arterial blood containing oxygen and then the venous blood carries away lactic acid from the muscles.

Therefore, massage is the most appropriate method for preventing and reducing muscle fatigue.

4. Structure and function of upper extremities

(1) Bone structure of upper extremities

Bone structure of the upper extremities is roughly divided into the skeleton of the free superior limb having free movability and the superior limb girdle that connects the free superior limb to the body trunk. The superior limb girdle consists of the clavicle and scapula. The skeleton of the free superior limb consists of bones in the upper arm, bones in the forearm, and bones in the hand.

1) Bones of the superior limb girdle

(1) Clavicle (1 x 2): A rod-like bone lying horizontally between the breastbone and scapula at the superior edge of the precordial region. It is slightly bent making an S-shape.

Scapula (1×2): A triangle flat bone located on the dorsum of the shoulder. There is a prominence traveling almost horizontally on the superior division of the dorsal surface. This is called the scapular spine. The lateral end is called the acromion which towers highly. Hooked coracoid process projects forward from the lateral end of the superior border of scapula.

2) Skeleton of the free superior limb

(1) The bone in the upper arm (1×2): A long tubular bone which is a nucleus of the upper arm.

(2) Bones of the forearm: The region from the cubitus to the wrist is called the forearm. The bone structure consists of the ulna and the radius parallel to each other.

a. Radius (1×2): It is laterally located to the forearm in parallel with the ulna. The styloid process projects from the outside of the inferior end.

b. Ulna (1×2): A long tubular bone located medial to the forearm. The rear side of the superior extremity is beak shaped and called the olecranon. There is a hooked projection anterior and inferior to the olecranon. There is the trochlear notch between them. The styloid process projects from the medial side of the inferior end.

(3) Bones of hands

Hand bones which is a bone structure situated distal to the wrist are further divided into the wrist bones, metacarpals, and phalanges.

a. Wrist bone (8×2): Eight small bones in the carpal region. They form two lines including four bones, respectively (i.e., proximal row and distal row). The proximal row nearer to the wrist consists of the navicular bone, semilunar bone, triquetral bone, pisiform bone in the order from the radial side to the ulnar side. The distal row consists of trapezium bone, trapezoid bone, capitate bone and hamate bone in the order from the radial side to the ulnar side.

- b. Metacarpal bone (5×2): Long bones in the metacarpal region. They are called the first to fifth metacarpal bone starting from the radial side.
- c.(Hand) phalanx (14×2): The second to fifth finger have three phalanxes respectively. They are the proximal phalanx, the middle phalanx, and the terminal phalanx in the order from the proximal side to the distal side. The thumb (the first finger) consists of the proximal phalanx and the terminal phalanx. The thumb has no middle phalanx.

(2) Joints in the upper extremities

- 1) Acromioclavicular joint: It connects the scapula to the clavicle. Acromioclavicular joint consists of the acromial articular surface of the scapula and the acromial extremity of the clavicle.
- 2) Sternoclavicular joint: It consists of the clavicular notch of the manubrium sterni and the sternal end of the clavicle.
- 3) Shoulder joint: It connects the scapula to the upper arm. Shoulder joint consists of the glenoid cavity of the scapula and the head of the humerus.
The joint has a wide range of movement. Movement directions include flexion, extension, abduction, internal rotation, and external rotation.
- 4) Cubital joint: It connects the upper arm bone to the forearm bone. The cubital joint is further divided into the humeroulnar joint, humeroradial joint, and proximal radioulnar joint. The cubital joint bends and extends the cubital joint and pronates and supinates the fore arm.
- 5) Inferior radioulnar joint: Inferior radioulnar joint connects the radius and the ulna. It consists of the ulnar notch on the radius and articular circumference of ulna.
- 6) Radiocarpal joint: It connects the forearm bone to the hand bones. It performs dorsal flexion, palmar flexion, radial flexion, and ulnar flexion of the wrist joint.
- 7) Intercarpal joints: It connects the metacarpal bones to one another. The connections include connections among the wrist bones in the proximal row and connections among the wrist bones in the distal row.
- 8) Carpometacarpal joints: Carpometacarpal joints consist of wrist bones in the distal row and the second through the fifth metacarpal bones.
- 9) Metacarpophalangeal joint: A joint consists of the metacarpal bone and proximal phalanx.
- 10) Interphalangeal joints of hand: A joint consisting of the proximal phalanx and middle phalanx is called the proximal interphalangeal joint. A joint consisting of the middle phalanx and the distal phalanx is called the distal interphalangeal articulation.

(3) Muscles of the upper extremities

Muscles of the upper extremities are classified into muscles of joints of pectoral girdle,

brachialis muscle, forearm muscles, and hand muscles depending on the positions of the muscle belly.

1) Muscles of superior limb girdle

Muscle	Origin	Insertion	Nerve	Action
Deltoid	Acromion of clavicle the scapular spine 1/3 of lateral side of clavicle	Deltoid eminence	Axillary nerve	Abduction (lateral elevation), flexion (anterior elevation) extension (posterior elevation) of the upper arm
Supraspinatus muscle	Scapula supraspinous fossa	Greater tubercle of humerus	Suprascapular nerve	Abduction of upper arm
Infraspinatus muscle	Scapula infraspinous fossa	Greater tubercle of humerus	Suprascapular nerve	External rotation of upper arm
Teres minor muscle	Lateral border of scapula	Greater tubercle of humerus	Axillary nerve	External rotation of upper arm
Teres major muscle	Angulus inferior scapulae	Crest of lesser tubercle	Subscapular nerves	Internal rotation and adduction of upper arm
Subscapular	Subscapular fossa	Lesser tubercle	Subscapular nerves	Internal rotation of upper arm

2) Muscles of the upper arm

Muscle	Origin	Insertion	Nerve	Action
Biceps brachii muscle				
1. Long head	Supraglenoid tubercle	Radial tuberosity, antebrachial fascia	Musculocutaneous nerve	Flexion and supination of forearm
2. Short head	Scapula coracoid			

Triceps brachii muscle				
1. Long head	Infraglenoid tubercle	Olecranon	Musculocutaneous nerve	Flexion and supination of forearm
2. Lateral head	Lateral surface of humeral body			
3. Medial head	Posterior surface of humeral body			

3) Muscles of the forearm

(1) Flexor muscles of the forearm

Muscle	Origin	Insertion	Nerve	Action
Pronator teres muscle				
1. Upper arm head	Medial epicondyle of humerus	Tuberosity of round pronator muscle (the radius)	Median nerve	Pronation and flexion of the forearm
2. Ulna head	Ulna hooked projection			
radial side carpus flexor	Medial epicondyle of humerus	The second and third metacarpal bone base		Flexion of carpus and radial flexion
Long palmar muscle	Medial epicondyle of humerus	Palmar aponeurosis		Flexion of carpus
Flexor carpi ulnaris				
1. Humeral head	Medial epicondyle of humerus	Pisiform and the fifth metacarpal bone base	Ulnar nerve	Flexion of carpus and ulnar flexion
2. Ulnar head	Posterior border of superior half of ulna			
Flexor pollicis longus	Anterior surface of the body of the radius	Base of distal phalanx of the thumb	Median nerve	Flexion of the distal segment of the thumb

(2) Extensor muscles of the forearm

Muscle	Origin	Insertion	Nerve	Action
Brachioradial muscle	Upper arm inferior exterior border	Styloid process of radius	Radial nerve	Elbow-bending
Extensor carpi radialis longus muscle	Lateral epicondyle of humerus	Base of the second metacarpal bone		Extension and radial flexion of wrist
Extensor carpi radialis brevis muscle	Lateral epicondyle of humerus	Base of the third metacarpal bone		Extension of wrist
Digital extensor muscle	Lateral epicondyle of humerus	Middle phalanx and distal phalanx from the second to fifth finger		Extension of wrist
Extensor digiti minimi muscle	Lateral epicondyle of humerus	Extensor aponeurosis of the fifth finger		Extension of the fifth finger
Extensor carpi ulnaris muscle	Lateral epicondyle of humerus	Base of the fifth metacarpal bone		Wrist extension and ulnar flexion
Abductor pollicis longus muscle	Dorsal surface of body of radius and body of ulna and antebrachial interosseous membrane	Base of the first metacarpal		Abduction and radial flexion of thumb
Extensor pollicis brevis	Inferior dorsal surface of body of radius and antebrachial interosseous membrane	Base of proximal phalanx of thumb		Extension, abduction and radial flexion of proximal phalanx of thumb

Extensor pollicis longus	Posterior surface of body of ulna and antebrachial interosseous membrane	Base of distal phalanx of thumb		Extension of distal phalanx of the thumb
Extensor indicis muscle	Inferior dorsal body of the ulna and antebrachial interosseous membrane	Dorsal aponeurosis of the second finger		Extension of the index finger

4) Muscles of the hand

(1) Thenar muscles

Muscle	Origin	Insertion	Nerve	Action
Oppose muscle of thumb	Trapezium and flexor retinaculum	Radial border of the first metacarpal bone body	Median nerve	Alternate movement of thumb
Adductor muscle of thumb				
1. Transverse head	Volar aspect of the third metacarpal bone	Base of proximal phalanx of thumb	Ulnar nerve	Adduction of the thumb
2. Oblique head	Coronoid process of ulna			

(2) Other major muscles: Musculi lumbricales, palmar interosseous muscle, dorsal interossei muscle, etc.

5. Structure and function of lower extremities

(1) Bone structure of lower extremities

Like upper limb bones, the bone structure of the lower extremities is roughly divided into the inferior limb girdle bones and the skeleton of the free inferior limb. The inferior limb girdle bone consists of the innominate bone. Skeleton of the free inferior limb consists of the thighbone, the lower thighbones, and the bones of the foot.

1) Bones of the inferior limb girdle

innominate bone (1×2): The innominate bone consists of the ilium (superior region), the ischium (posteroinferior region) and the pubis (anteroinferior region). There is a deep hemispherical depressed part on the lateral surface of the section where three bones join together. The deep hemispherical depressed part is called the acetabulo. The acetabulo forms the hip joint with the femur.

(1) Ilium: The ilium consists of the thick iliac body that forms the upper half of the acetabulo and wing of the ilium expanding upward. The anterior edge of the wing of the ilium has two processes. The superior process is called the anterior superior iliac spine. The inferior process is called the anterior inferior iliac spine. Additionally, the posterior margin has two processes, too. The superior one is called the posterior superior iliac spine. The inferior one is called the posterior inferior iliac spine.

(2) Ischium: The ischium is located at the posterior inferior part of the acetabulo. There is a large oval rough-surfaced prominence at the inferior end of the posterior margin of the ischium. It is called the ischial tuberosity.

(3) Pubis: The pubis is located at the anteroinferior part. The symphyseal surface is located at the anteromedial extremity and forms the pubic symphysis by connecting to the heteronymous symphyseal surface.

2) Thigh bones

(1) Femur (1×2): It is the longest bone in the human body. There is a spherical femoral head on the superior extremity that forms a hip joint with the acetabulo. The slightly slim part below the femoral head is called the femur neck. Two prominences are observed near the transitional site between the femur neck and the body of femur. The larger prominence located at the lateral superior side is called the great trochanter. A smaller prominence at the inferior medial part is called the lesser trochanter. The great trochanter can be detected on palpation from outside.

The inferior end of the femur becomes thickened mediolaterally to form the medial condyle and lateral condyle. There is a recessed area called the patellar surface between the medial condyle and the lateral condyle on the front surface of the inferior end. It forms a joint with the

posterior surface of the patella. The parts projected from the lateral side of the medial condyle and the lateral condyle are called the medial epicondyle and the lateral epicondyle respectively.

(2) Patella (1×2): The patella is in the tendon of the quadriceps femoris muscle, a chestnut-shaped flat bone and forms an articular surface with the femur.

3) Bones of the lower thigh

(1) Shinbone (1×2): It is a long bone located medial to the superior extremity becomes thickened and throws out mediolaterally. The medial ampulla is called the medial condyle. The lateral ampulla is called the lateral condyle. The superior surface of the medial condyle and lateral condyle is an oval articular surface covered with cartilage, respectively, which is called the superior articular surface. There is a prominence called the intercondylar eminence extending upward positioned roughly in the centre of the superior surface of the superior edge between the two articular surfaces. The fibular articular surface is located posterior to the lateral condyle and forms tibiofibular articulation surface with fibula. There is a rough-surfaced prominence called the tibial tuberosity at the superior border of the anterior edge of the body of tibia. The patellar ligament attaches to the tibial tuberosity. The medial part of the lower end of the tibia projects downward and medially, which is called the medial malleolus.

(2) Splint bone (1x2): It is a long bone located at the lateral compartment of the leg. The ampulla of the superior extremity is called the head of fibula, which is the insertion part of the biceps femoris muscle. The lateral part of the inferior end projects inferiorly and is called the lateral malleolus.

4) Bones of the foot

Bones of the foot are further divided into the tarsal, metatarsal, and bones of the toe.

(1) Tarsal (7x2): Seven bones of the posterior half of the foot. The tarsal consists of the anklebone and calcaneus in the proximal row, and navicular, medial cuneiform bone, medial cuneiform bone, intermediate cuneiform bone, external cuneiform bone, and cuboid.

(2) Metatarsal bone (5x2): Metatarsal bone consists of five long bones. They are called the first through fifth metatarsal from medial to lateral.

(3) Bone of the toe (14x2): Like bones of digits, for bone of the toe, the second through fifth digiti pedis consist of three phalanges, respectively. They are called the proximal phalanx, middle phalanx and distal phalanx from proximal side. The first toe (great toe) has no middle phalanx and consists of the proximal phalanx and distal phalanx.

(2) Leg joints

1) Hip joint: It is a joint consisting of the acetabular fossa of the innominate bone and femur head. The articular capsule of the hip joint is thicker and stronger than that of the shoulder joint and

reinforced with many ligaments.

- 2) Knee joint: The knee joint is a joint consists of the femur, patella, and shinbone. The splint bone is not involved in the knee joint. The major components of the knee joint include the medial condyle and the lateral condyle of the lower end of the femur and the medial condyle and the lateral condyle of the upper end of the tibia. Additionally, the patellar surface on the anterior aspect of the lower end of the femur and the articular surface located posteriorly in the patella are also involved. These joints are wrapped with a common articular capsule. There is the semilunar cartilage between the femur and shinbone. The semilunar cartilage consists of the C-shaped medial meniscus located medial and the O-shaped lateral meniscus located lateral. The semilunar cartilage resolves the morphological incongruity and absorbs shocks. The patella is reinforced by the anterior cruciate ligament, posterior cruciate ligament, medial collateral ligament, lateral collateral ligament, and patellar ligament. These ligaments are vulnerable in sports.
- 3) Tibiofibular joint: It is formed by the articular surface of the splint bone at the upper end of the tibia and articular surface of head of fibula at the upper end of the fibula. The motional range is very small.
- 4) Talocrural joint: It consists of the articular surface of the splint bone at the upper end of the tibia and trochlea of the talus.
- 5) Intertarsal joints: These are located in the tarsal including joints as follows:
 - (1) Subtalar joint: A joint consisting of the anklebone and the calcaneus calcaneus.
 - (2) Talocalcaneonavicular joint: A joint consisting of the anklebone, calcaneus and navicular bone.
 - (3) Calcaneocuboid joint: A joint consisting of calcaneus and cuboid.
 - (4) Cuneonavicular joint: A joint consisting of the medial cuneiform, intermediate cuneiform, lateral cuneiform and navicular.
 - (5) Transverse tarsal joint: It is a joint between proximal anklebone and calcaneus, and distal navicular bone and cuboid, and also called the Chopart.
- 6) Tarsometatarsal joints: A joint consisting of tarsal distal row (i.e., the medial cuneiform, intermediate cuneiform and lateral cuneiform) and the base of metatarsal (i.e., the base of the first through fifth metatarsal). It is also called the Lisfranc joint.
- 7) Metatarsophalangeal joint: A joint formed with the metatarsal and proximal phalanx.
- 8) Interphalangeal joints of the foot: As the interphalangeal joints of hand, this joint is formed with the proximal phalange and distal phalange.

(3) Muscles of leg

Muscles of leg are categorized into the muscles of the pelvic girdle, femoral muscles, muscles of the lower leg and muscles of the foot depending on the position of the muscle belly.

1) Muscles of the pelvic girdle

(1) Musculus iliopsoas

Muscle	Origin	Insertion	Nerve	Action
Iliopsoas muscle				
1. Iliac muscle	Iliac fossa	Lesser trochanter of femur	Femoral nerve	It bows the hip. The upper body bends forward when the lower extremities are fixed.
2. Greater psoas muscle	Vertebral body of lumbar spine and costal process			

(2) Iliacus muscle

Muscle	Origin	Insertion	Nerve	Action
Gluteus maximus	Exterior surface iliac bone, sacrum, posterior surface of coccyx and sacrotuberous ligament	Gluteal tuberosity of the femur and iliotibial band	Inferior gluteal nerve	Extends the knee joint by the extension of the thigh and tenses of iliotibial band to maintain standing posture.
Gluteus medius	External surface of ilium	Great trochanter of femur	Superior gluteal nerve	Abduction of thigh
Gluteus minimus	External surface of ilium	Great trochanter of femur		Abduction of thigh
Musculus tensor fasciae latae	Anterior superior iliac spine of ilium	Iliotibial band → upper end of the tibia	Superior gluteal nerve	Flexion of thigh and extension of the lower leg
Piriform muscle	Anterior surface of sacrum	Great trochanter of femur	Sacral plexus	External rotation of thigh

2) Muscle in the thigh

(1) Extensor in the thigh

Muscle	Origin	Insertion	Nerve	Action	
Sartorius muscle	anterior superior iliac spine	Medial part of tibial tuberosity	Femoral nerve	Flexion, abduction, and external rotation of thigh and flexion and adduction of the lower leg	
Quadriceps				Extension of the lower leg	
1. Rectus femoris muscle	Anterior inferior iliac spine	The four muscle gather and attach to the patella and are inserted into the tibial tuberosity via patellar ligament.			
2. Lateral vastus muscle	Linea aspera of the femur lateral lip				
3. Intermediate great muscle	Anterior surface of corpus femoris				
4. Medial great muscle	Posterior surface of corpus humeri				

(2) Flexor of the thigh

Muscle	Origin	Insertion	Nerve	Action
Long adductor muscle	Anterior surface of pubic body	Medial lip of linea aspera of the femur	Obturator nerve	Adduction of thigh
Short adductor muscle	Anterior surface of inferior ramus	Medial lip of linea aspera of the femur		

Adductor magnus muscle	Ischial tuberosity, ischial ramus and anterior surface of inferior ramus of pubis	Medial lip of linea aspera of the femur		
Gracilis muscle	anterior superior iliac spine	Medial part of tibial tuberosity		Flexion of hip joint, and the flexion and internal rotation of lower leg at knee joint

(3) Flexor of thigh

Muscle	Origin	Insertion	Nerve	Action
Biceps femoris				
1. Long head	Ischial tuberosity	Head of fibula	Tibial nerve	Extension of hip joint and flexion and external rotation of lower leg at knee joint
2. Short head	Lateral lip of linea aspera of the femur		Common fibular nerve	Flexion and external rotation of the lower leg at knee joint
Semitendinosus muscle	Ischial tuberosity	Medial part of tibial tuberosity	Tibial nerve	Extension of hip joint and flexion and external rotation of lower leg at knee joint
Semimembranosus muscle	Ischial tuberosity	Posterior surface of medial condyle of tibia	Tibial nerve	Extension of hip joint and flexion and external rotation of lower leg at knee joint

3) Crural muscle

(1) Extensor of the lower leg

Muscle	Origin	Insertion	Nerve	Action
Anterior tibial muscle	Lateral surface of tibia and crural interosseous membrane	Medial cuneiform and base of first metatarsal	Deep fibular nerve	Dorsal flexion and varus of the foot
Extensor pollicis longus	Inferior division of anterior surface of body of fibula and crural interosseous membrane	Base of distal phalanx of thumb of acrotarsium		Extension of the thumb and dorsal flexion of the foot
The extensor digitorum longus muscle	Anterior surface of body of fibula, lateral epicondyle of tibia and crural interosseous membrane	Transfer to extensor aponeurosis and is inserted into middle phalanx and distal phalanx		Extension of second through fifth fingers and dorsal flexion of the foot

(2) Peroneal muscle group

Muscle	Origin	Insertion	Nerve	Action
Long fibular muscle	Head of fibula and body of fibula	Medial cuneiform and base of first metatarsal	Deep fibular nerve	Extroversion and plantar flexion of the foot

Short fibular muscle	Inferior division of anterior surface of body of fibula and crural interosseous membrane	Base of fifth metatarsal		
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(3) Flexor of the lower thigh

Muscle	Origin	Insertion	Nerve	Action
Triceps surae muscle				
1. Gastrocnemius muscle	Medial epicondyle of femur	Both heads gather to form the Achilles tendon and are inserted into calcaneal tuberosity.	Tibial nerve	Plantar flexion of the foot
Medial head	Lateral epicondyle of femur			
Lateral head	Head of the fibula and line for soleus muscle			
2. Soleus muscle				
Plantar muscle	Lateral epicondyle of femur	Adheres to medial edge of calcaneus tendon.		Helps the action of triceps surae muscle

Popliteal muscle	Lateral epicondyle of femur	Posterior surface of upper part of the tibia	Flexion of knee joint and internal rotation of shinbone
Posterior tibial muscle	Posterior surface of crural interosseous membrane	Navicular bone and medial cuneiform	Plantaflexion and varus of the foot
Flexor longus	Posterior surface of center of ischium	Base of second through fifth distal phalanx	Flexion of the digitus pedis and plantaflexion of the foot
Flexor pollicis longus	Posterior surface of inferior part of body of fibula	Base of distal phalanx of the thumb	Flexion of the thumb and plantaflexion of the foot

(4) Foot muscles include extensor pollicis brevis muscle, adductor muscle of thumb, lumbrical muscle, and dorsal interossei muscle.

6. Structure and function of vertebral column and compages thoracis

(1) Role of vertebral column

The vertebral column consisting of many vertebrae is a bone structure that travels vertically in the dorsal side of the body trunk. The vertebral column (1) supports and moves the cephalic region and body trunk and (2) protects the spinal cord. The vertebral column is an axis of any motions of the body. Many muscles and ligaments attach to the vertebral column for supporting those motions. The vertebral column itself performs anteflexion, retroflexion, side flexion, and rotation.

(2) Configuration of the vertebral column

The vertebral column consists of 7 cervical vertebrae, 12 thoracic vertebrae, 5 lumbar vertebra, 1 sacral vertebra (5 fused vertebrae) and 1 coccygeal vertebra (3-5 fused vertebrae).

(3) Essential structure of vertebrae

The vertebrae are composed of columnar vertebral bodies and vertebral arches that surround vertebral foramina located posteriorly. Vertebral foramina are stacked vertically to form a vertebral canal containing the spinal cord. A vertebral arch has four types of processes: one spinous process, two transverse processes, two superior articular processes, and two inferior articular processes. A proper muscle of the back adheres to a transverse process. An inferior articular process of an upper vertebral body and a superior articular process of an inferior articular process form an intervertebral joint. Additionally, an inferior vertebral notch of an upper vertebral body and a superior vertebral notch of an inferior vertebral body form a hole called the intervertebral foramen from which a spinal nerve sticks out.

(4) Bones of the vertebral column

1) Cervical vertebrae

A cervical vertebra is most characterized by the fact that a transverse process has a hole called the transverse foramen through which the vertebral artery and vertebral vein pass. A transverse process of a cervical vertebra is short. However, the spinous process of the seventh cervical is especially long and called the prominent vertebra, which can be palpated through the body surface. The first cervical vertebra and the second cervical vertebra have a special shape. The first cervical vertebra has no vertebral body and is called the atlas because it is like a ring. The odontoid process sticks out from the second cervical vertebra toward the upper side of the vertebral body, which is called the epistropheus, and is the axis of rotation.

2) Thoracic vertebrae

Thoracic vertebrae have representative morphology of vertebrae. The most distinctive characteristic of these vertebrae is that they are connected to costae to form joints.

3) Lumbar vertebra

The vertebral body of each lumbar vertebra is large and wide in order to bear full weight of the upper body. The spinous process is wide and strong. A process that extends long laterally, looks like transverse processes, and is called the costal process to which the costa fused.

The original transverse process remains as a small accessory process in the base of a costal process.

4) Sacrum

The sacrum is a bone with 5 sacral vertebrae fused. The entire sacrum has the shape of an inverted isosceles triangle. The posterior surface has the median sacral crest indicating fusion of spinous processes. The sacral canal is continued from the vertebral canal. Anterior surface and posterior surface have four pairs of sacral foramina respectively open to the outside. The lateral sides have the auricular surfaces articulating with the ilia.

5) Coccyx

Coccyx is a bone made of 3-5 caudal vertebrae fused.

(5) Curves of Vertebral column

Viewed laterally the vertebral column of a normal adult presents several curves. The cervical and the lumbar portion have a slight anterior curvature (anterior curvature). The thoracic and sacrococcygeal portion have a slight posterior curvature (posterior curvature). The vertebral column is slightly S-shaped viewed as a whole.

(6) Connection of vertebral column

1) Connection between vertebrae

Vertebrae are connected to one another by the intervertebral disc, ligaments, and intervertebral joints.

(1) Intervertebral disc: It is also called the disk. Intervertebral discs lie between vertebral bodies of an upper and lower adjacent vertebrae in the spine. A disk exists between the adjacent vertebrae. It exists from the second cervical vertebra to the fifth lumbar vertebra. Intervertebral discs absorb the shock applied to vertebral column. Discs consist of an outer annulus fibrosus, which surrounds the inner nucleus pulposus. The nucleus pulposus is a jellylike tissue containing water. The annulus fibrosus consists of several layers of fibrocartilage around the nucleus pulposus. As people age, disks begin to dehydrate, get more and more fibrotic and thinner. When the annulus fibrosus tears, the nucleus pulposus can begin to extrude through the tear. This is called the disc herniation causing back pain and inferior limb pain.

(2) Ligaments: The anterior longitudinal ligament is a ligament that runs down the anterior surface of the spine. It traverses all of the vertebral bodies and intervertebral discs. The posterior longitudinal ligament extends along the posterior surfaces of the bodies of the vertebrae.

The ligamenta flava connect the vertebral arches of the upper and lower adjacent vertebrae. The interspinous ligament connects the spinous processes of adjacent vertebrae. The supraspinal ligament vertically travels along the posterior edge of the spinous processes.

(3) Intervertebral joint: A joint articulated with the inferior articular process of the superior vertebra and the superior articular processes of the inferior vertebra.

2) Connection between the vertebral column (superior extremity of cervical vertebrae) and cranial bone

The occipital bone articulates with C1 (atlas) to form the atlanto-occipital joint. The occipital bone articulates with C2 (axis) to form the atlantoaxial joint.

(1) Atlanto-occipital joint: A joint formed by the articulation between the atlas (C1) and occipital bone.

(2) Atlantoaxial joint: A joint formed by the articulation between the atlas (C1) and axis (C2).

(7) Compages thoracis

1) Bones constituting the compages thoracis

The human rib cage is a part of the human skeleton within the thoracic area. A typical human ribcage consists of the sternum, 24 ribs (12 pairs), and the 12 thoracic vertebrae.

(1) Sternum: The sternum is a long, flat bone located in the center of anterior surface of the thorax (chest). It consists of three parts: Manubrium, body of sternum, and xiphoid process.

(2) Rib: Ribs are 12 pairs of bones that are long and curved constituting the thoracic wall of the compages thoracis. It consists of the costal bone in the posterior area and costal cartilage in the anterior area.

2) Connection of compages thoracis

(1) Sternocostal joints: A joint formed by articulation between the ribs and thoracic vertebra. It consists of rib cartilage of the first to seventh ribs and costal notch of sternum.

(2) Costovertebral joints: A joint formed by articulation between the rib and thoracic vertebra. It includes the joint of head of rib and costovertebral joint. The former consists of the articular surface of head of rib and body of thoracic vertebra. The latter consists of the tubercle of rib and the costal pit of transverse process of thoracic vertebra.

(8) Muscles of dorsal region and breast and abdominal region

Muscles of dorsal region and breast and abdominal region are divided into back muscles, thorax muscles, and the muscles of the abdomen. The back muscles are further divided into the superficial back muscles and proper back muscles (deep muscles of the back). The thorax muscles are divided into the pectoral and diaphragm. The superficial back muscles are related to the motions of the upper extremities. The proper back muscles are related to the motions of the vertebral column. The pectoral is related to the motions of the upper extremities and ribs. The pectoral also related to the respiratory motion in cooperation with diaphragm. The muscles of the abdomen are related to the forward flexion of the body trunk and the side flexion of the lumbar vertebrae.

1) Superficial back muscles

Muscle	Origin	Insertion	Nerve	Action
Trapezius	External occipital protuberance, nuchal ligament and spinous processes of all thoracic vertebrae	Scapular spine, acromion and 1/3 of lateral side of the clavicle	Accessory nerve and cervical plexus	The superior division raises scapula and clavicle. The middle division medially pulls the scapula. The inferior region rotates the scapula and helps upper arm to rise.
Latissimus dorsi muscle	Thoracic vertebrae T7 or inferior, lumbar vertebra, spinous processes of sacral vertebrae, iliac crest and 9 through 12 ribs	Lesser tubercle crista of humerus	Thoracodorsal nerve	Adduction of the upper arm. Helps the upper arm to rotate further dorsally.
Levator scapulae muscle	Spinous process of C1 through C4	Superior angle of scapula		
Lesser rhomboid muscle	Spinous process of C6 and C7	Medial margin of the scapula (above the scapular spine)	Dorsal scapular nerve	Pulls the scapula supramedially.
Greater rhomboid muscle	Spinous process of T1 through T4	Medial margin of the scapula (below the scapular spine)		

2) Proper muscles of the back

Muscle	Origin	Insertion	Nerve	Action
Splenius muscle	Spinous process of C4-C7 and T1-T5.	Mastoid process (temporal bone) and cervical transverse process of C1 and C2.	Posterior branch of spinal nerve	Dorsal flexion and side flexion of neck and vertebral column
Erector spinae muscles	Dorsal surface of the sacrum, lumbar spinous process of lower vertebrae and iliac crest	Iliocostalis muscle: It is located at outermost part and inserted into the rib. Longissimus: It is located at the intermediate [intermediary] part and inserted into spinous process or rib. Spinal muscle: It is medially located and inserted into superior spinous processes.		

3) Pectoral

Muscle	Origin	Insertion	Nerve	Action
Greater pectoral muscle	Clavicle (half of medial side), breastbone, rib cartilage and rectus sheath	Crest of greater tubercle of humerus	Medial pectoral nerve and lateral pectoral nerve	Flexion, adduction and internal rotation of upper arm and accessory muscle of respiration
Smaller pectoral muscle	Second through fifth rib	Coracoids process	Medial pectoral nerve and lateral pectoral nerve	Pulls scapula anteriorly and inferiorly. Accessory muscle of respiration
Subclavian muscle	First rib	Clavicle	Nerve to the subclavius	Pulls clavicle downward and inward and protects sternoclavicular joint.
anterior serratus muscle	First through ninth rib	Medial border of scapula	Long thoracic nerve	Pulls scapula and angulus inferior scapulae anteriorly, and rotates scapula.

4) Diaphragm

Muscle	Origin	Insertion	Nerve	Action
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Diaphragm	Lumbar vertebra part: vertebral body surface of L1 through L4 and apical segment of twelfth rib	Center of umbilicus	Phrenic nerve	Breathing muscle
	Costal part: Interior surface of seventh through twelfth rib cartilage			
	sternal part: Small muscle bundle near xiphisternum			

5) Musculi abdominis

Muscle	Origin	Insertion	Nerve	Action
Abdominal rectus muscle	Symphysis pubis and pubis	Anterior surface of fifth to seventh rib cartilage and ensiform process	Intercostals nerve	Anteflexes body trunk.
Abdominal external oblique muscle	Exterior surface of fifth through twelfth rib	Rectus sheath, inguinal ligament and iliac crest		Pulls down ribs, anteflexes vertebral column, rotates and laterally flexes body trunk and increases abdominal pressure.
Internal abdominal oblique muscle	Thoracolumbar fascia, iliac crest, inguinal ligament	Inferior margin of tenth through twelfth rib and rectus sheath		
Transverses abdominis muscle	Interior surface of seventh through twelfth rib cartilage, thoracolumbar fascia and iliac crest, inguinal ligament	Rectus sheath		
Lumbar quadrate muscle	Iliac crest	Twelfth rib	Lumbar plexus	Side flexion of lumbar vertebrae and retroflexion of lumbar vertebra if both sides work simultaneously.

(9) Major cervical muscles

1) Platysma muscle: It is a broad dermal muscle arising from the lower border of mandible and ends at the acromion over the clavicle. It serves to draw down the angle of the mouth

2) Sternocleidomastoid muscle: It arises from the sternum and clavicle and inserts in the mastoid process. Moving one sternocleidomastoid muscle rotates the chin to the opposite side. Moving both muscles flexes the head posteriorly (i.e., retracts the neck).

3) Scalene muscles: The scalene muscles are a group of three pairs of muscles in the lateral neck, namely the scalenus anterior, scalenus medius, and scalenus posterior. They originate from the transverse processes from the cervical vertebrae. The scalenus anterior and scalenus medius insert into the first rib. The scalenus posterior inserts into the second rib. They flex the cervical vertebrae laterally if ribs are fixed. They elevate the first rib if the cervical vertebrae are fixed (i.e., support to breathing muscle). The space between the scalenus anterior and scalenus medius is called the interscalene gap through which pass the subclavian artery, subclavian vein, and brachial plexus.

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Section 3 Structure and function of the circulatory system

The circulatory system is an organ system that supplies nutrients and oxygen and removes carbon dioxide and wastes to and from cells through blood vessels in the body.

1. Blood

Blood is a red fluid flowing through blood vessels accounting for 7%-8% of the body weight. Liquid portion of blood is called the plasma. Blood cells called the red blood cells, white blood cells, and platelets are suspended within the plasma.

(1) Plasma

Plasma is mildly alkaline. Various nutritive components and waste products are dissolved in plasma. The most important solute is proteins. The proteins include albumin, globulin, and fibrinogen. Albumin is a raw material of cells and secretions throughout the body. Globulin protects the body against pathogens. Fibrinogen resolves itself to fibers and stops bleeding when blood vessels are broken.

(2) Blood cell

(1) Erythrocyte; It is a disc-shaped cell. Men have about 5 million and women have about 4.5 million erythrocytes per microliter (cubic millimeter) of blood. Erythrocytes consist of a protein called the hemoglobin, which links to oxygen molecules in the lungs and release them throughout the body. Anemia is a disease characterized by significantly low red cell counts.

(2) Leukocytes; Basically, it is a spherical cell. However, it can change its shape like ameba to move. There are 7,000-8,000 per cubic millimeter of blood. Leukocytes defend the human body against both infectious disease and harmful substances by breaking them.

(3) Platelets; They are cellular debris in various shapes. There are 200,000-300,000 per cubic millimeter of blood. When a blood vessel is broken, platelets contact the wound and are broken to discharge an enzyme (thromboplastin). Thromboplastins change fibrinogens into fibers to stop bleeding.

2. Blood vessels

The blood vessels are pipes that transport blood throughout the body. The blood vessels include arteries, veins, and capillaries.

(1) Artery

Arteries are muscular blood vessels that carry blood away from the heart to peripheral portions. Arteries transport blood to peripheral portions while they expand or get thin corresponding to the movement of the heart. This motion of arteries is called the pulse. The pulse of arteries near the body surface can be palpated.

An artery consists of three membranes including intima, media, and tunica externa.

(1) Intima: This is a membrane that covers the inner surface of a blood vessel. This is made up of mainly endothelial cells.

(2) Media: This surrounds the outer surface of the intima, which is made up of annular smooth muscle cells and elastic tissue. The muscle fiber constrict by receiving stimuli of automatic nerve, temperature and chemicals to adjust the diameter of the artery.

(3) Tunica externa: This is the outermost membrane of the blood vessel to maintain the shape of the artery and binds to surrounding tissues.

Taking in too much nourishment makes fat, which is mainly cholesterol, adhere to the inner surface of the artery like sludge and gradually narrows the space through which blood flows and hardens the whole artery. This is called arteriosclerosis. Severe arteriosclerosis prevents blood from flowing resulting in angina and cerebral infarction.

(2) Capillary

Capillaries are the small blood vessels that connect arteries. The walls of capillaries are composed of only a single layer of cells, the endothelium. When blood passes capillaries, a part of plasma get out of the gap of the endothelium. Cells can receive nutrients contained in plasma. Capillaries are so small the red blood cells need to pass through them in single file. At this time, cells can receive oxygen from the red blood cells.

Meanwhile, carbon dioxide and waste products produced by cells are dissolved into blood and most of them can diffuse back into the capillaries and remaining fluid also enter the lymph capillaries (described later) to return to the heart.

(3) Vein

A blood vessel continued from a capillary is called the vein that carries blood from the whole body toward the heart.

A vein consists of three membranes including intima, media, and tunica externa just as in the artery. However, the media is not developed as an artery.

Blood in arteries become obstructed by the pumping function of the heart while the blood flow slows in the veins. Therefore, the number of blood vessels is greater than arteries. Additionally, blood flows through another route because veins are connected to one another if one vein becomes obstructed. In particular, veins in the lower extremities have one-way flaps that prevent blood from flowing backward. The return of blood to the heart is assisted by the action of the muscle surrounding the veins. Muscular contractions press veins to help the blood flow.

3. Heart

The heart is a fist-sized muscular organ developed from a part of blood vessel. The heart is situated in the left anterior part of the thorax between left and right lung. The heart contraction and relaxation repeats approximately 70 times per minute. This is called the cardiac pulsation. This motions pump out blood and return blood from veins to the heart. The heart pumps out approximately 70 mL of blood by a single heart stroke. This heart stroke can be palpated at slightly medially to the milk line on the fifth rib of left anterior thoracic part. This is called the apical impulse.

(1) Inner structure of heart

A heart has four chambers: the right atrium, right ventricle, left atrium, and left ventricle.

- 1) Right atrium: This is a chamber situated in the upper right part of the heart. Venous blood throughout the body returns to this chamber. It connects to the right ventricle via the atrioventricular orifice.
- 2) Right ventricle: This is a chamber situated in the right lower part of the heart, from which a pulmonary artery projects. The atrioventricular valves (tricuspidal valve) are in the atrioventricular canal between the right ventricle and the right atrium. The pulmonary valve is between the pulmonary artery and right ventricle. They prevent blood from flowing backward.
- 3) Left atrium: This chamber is situated in the left upper part of the heart, into which blood from the lungs flow. The bottom is connected to the left ventricle via the atrioventricular orifice.
- 4) Left ventricle: A chamber situated in the left under part of the heart, from which an aorta projects. The atrioventricular valves (mitral valve) is between the left ventricle and left atrium. The aortic valve is between the left ventricle and the aorta. They prevent blood from flowing backward.

(2) Structure of cardiac tissue

The heart is formed by endocardium, myocardium, and epicardium.

- 1) Endocardium: Endocardium is a membrane to cover the interior surface of each chamber of the heart. It forms atrioventricular valves and arterial valve.
- 2) Myocardium: The muscle layer is well developed. Specially, the ventricle has thicker muscle layer than the atrium. The muscle layer is the thickest around the left ventricle. The myocardium contracts to pump out blood. It has special muscles called the excitation conducting system. The excitation conducting system has four parts, including the sinoatrial node, atrioventricular node, bundle of His, and the Purkinje fiber.
- 3) Epicardium: A membrane covers the surface of the myocardia. The epicardium turns around where the origin of blood vessels enter and leave the heart and wraps the heart again. The membrane outside of the epicardium is called the pericardium (pericardial membrane). There is a little liquid between the epicardium and pericardium to smooth the surface of the membrane so that

the heart can contract without too much affected by surrounding organs.

(a) Sinoauricular node: It is situated above the right atrium, which automatically issues periodical commands to myocardial to move. This cycle is affected by automatic nerve and chemicals.

(b) Atrioventricular node; It is situated below the right atrium. It detects the muscular contraction widespread throughout the atrium and transfers it to the bundle of His.

(c) Bundle of His: This is a muscle fiber which starts from the atrioventricular node and passes through the atrioventricular orifice. It transfers the muscular contraction of the atrium to ventricle.

(d) Purkinje fiber: It connects to bundle of His and branches into many fibers to diffuse stimuli to the whole ventricle.

This excitation conducting system diffuses the muscular contraction occurring in the upper part of the right atrium to the entire heart and pumps out blood periodically in a timely fashion.

4. Circulation of blood

Blood flows: the left ventricle → arteries → systemic capillaries → veins → the right atrium → the right ventricle → pulmonary artery → the left and right lungs → the left atrium → the left ventricle.

This circulation from the left ventricle to the right atrium via the whole body is called the greater circulation (systemic circulation). The circulation starting from the right ventricle to the left atrium via the left and right lungs is called the lesser circulation (pulmonary circulation).

(1) Greater circulation

1) Artery

The artery originating from the left ventricle is called the aorta because the diameter is as large as 3 cm. First, the aorta goes up right (ascending aorta), then bends to posteriorly (aortic arch) and descends in front of the vertebral column to the abdomen (descending aorta). The aorta gives off many arterial branches during the course. The branches diverge in various directions in the entire body.

(1) Coronary arteries: They are two arterial branches first diverging from the aorta. They are called the coronary arteries because they travel around the heart like a crown around the heart. These arteries furnish nutrients to the heart.

(2) Subclavian veins: These arteries arise from the left and right side of the aortic arch. They diverge into the radial artery and ulnar artery via axilla and upper arm to reach the hand. During the travel, they give off many branches to nourish the upper extremities. Pulses can be felt at medial side of the arm (humeral artery) and at the radial side of anterior surface of hand joint (radial

artery).

(3) Common carotid arteries: Each diverges from the left and right side of the aortic arch. They ascend along both sides of pharynx to supply. Soon they diverge in the internal carotid artery and external carotid artery. The internal carotid artery and the vertebral artery ascending from backside nourish the brain and eyes. The external carotid artery furnishes nutriment for face and the portion of the head near the body surface. Pulses can be felt on the left and right of the pharyngeal prominence (common carotid artery), the center of inferior border of mandible (facial artery) and the region in front of the ear (superficial temporal artery). The right subclavian artery and right common carotid artery join together to be a brachiocephalic artery for several centimeters when they come out from the aortic arch.

(4) Thoracoabdominal arteries: The travel of the descending aorta gives off the intercostal artery, bronchial arteries, celiac artery, renal artery and mesenteric artery to nourish the body surface and organs of thoracoabdominal region.

(5) Common iliac artery: The descending aorta diverges into left and right common iliac artery before the fourth lumbar vertebra. They soon diverge into the internal iliac artery nourishing pelvic viscera and external iliac artery nourishing the lower extremities.

The external iliac artery passes the inguinal area, medial thigh, and the popliteal fossa and diverges into the anterior tibial artery and the posterior tibial artery to reach the feet. Pulses can be felt at the center of the inguinal area (femoral artery), the center of the popliteal fossa (popliteal artery), and backside of the condyle (posterior tibial artery).

2) Vein

Blood that has passed through capillary blood vessels is gathered into veins to return to the heart. Typically, a vein travels in parallel with an artery. In many cases, blood flows in two veins in the opposite direction of the artery. This is called the accompanying vein. Meanwhile, the superficial veins that travel subcutaneously have developed.

Before long, veins of the entire body are integrated into the superior vena cava, inferior vena cava, and coronary sinus to return to the right atrium.

(1) Superior vena cava: The left and right internal jugular vein gathering veins in the head and neck and the left and right subclavian vein gathering blood in the upper extremities and breast region join together at the backside of the sternoclavicular joint. They soon join together to form a single superior vena cava and flow into the right atrium.

(2) Inferior vena cava: The left and right common iliac vein join together in front of L4 and on the right side of the aorta to be a single inferior vena cava ascend upward while gathering blood from abdominal region and breast region to return to the right atrium.

(3) Coronary sinus: Coronary sinus gathers blood from the heart to return to the right atrium.

(2) Lesser circulation

The blood pumped out from the right ventricle through a single pulmonary artery is soon divided into the left and right to enter the left and right lung respectively. The pulmonary artery changes into capillary blood vessels at the alveolar wall to take up oxygen in the air into the blood while discharge carbon dioxide in the blood into the air in the lung alveoli. This is called the gas exchange. Soon, blood is gathered to pass two left pulmonary veins and two right pulmonary veins to return to the left atrium. Therefore, venous blood having less oxygen flows through the right atrium and right ventricle and the arterial blood rich in oxygen flows through the left atrium and left ventricle.

(Appendix) Blood pressure

Blood pressure refers to the force exerted by circulating blood on the walls of blood vessels. Blood pressure is the highest in the aorta, which is near the heart. Blood pressure drops as blood vessels get smaller. Blood pressure in the vena cava is zero or negative.

Blood pressure becomes largest when the heart is constricted. This is called the systolic arterial pressure or the maximum pressure. Blood pressure becomes low when the heart is relaxed. This is called the diastolic arterial pressure or the minimum pressure. The pulse pressure reflects the difference between the maximum and minimum pressures measured.

Blood pressure rises when blood vessels constrict due to coldness, get thin when cholesterol is deposited on the lumen, or the artery wall gets hard and blood vessels do not dilate sufficiently.

As a general rule, blood pressure is measured at arteries of the brachial region. If the maximum blood pressure is 140 mmHg or more or the minimum blood pressure is 90 mmHg or more, it is hyperpiesia. If this condition is left untreated, the blood vessel wall gets hardened resulting in cerebral vascular disturbances.

5. Lymphatic circulation

Most liquid from capillary blood vessel is absorbed by the capillary blood vessel again. However, some quantities of liquid remain in the gaps of the cells. This is called the tissue fluid. This fluid soon enters the lymph capillaries between cells. The capillaries gradually form into larger lymphatic vessels. Finally, they become the thoracic duct and right lymphatic duct. The fluid in the lymph ducts is called lymph. There are lymph nodes as large as an adzuki bean or pea where lymph ducts collect. There are reticular tissues in a lymph node. Foreign substances are filtered when lymph pass this tissues to prevent foreign substances from spreading throughout the body. Lymph nodes produce lymphocytes and are related to immunity.

(1) Thoracic duct: A thick lymphatic vessel that gathers lymph in the lower body, left cephalic region, upper extremities and breast region. It joins together with left brachiocephalic vein.

(2) Right lymphatic duct: A thick lymphatic vessel that gathers lymph in the right cephalic region, upper extremities, and breast region. It joins together with the right branchicephalic vein.

(Appendix) Spleen

The spleen is a fist-sized organ located left posterior to the stomach. The inside is constituted with reticular tissue as lymph nodes. It functions in the storage of blood, the destruction of old red blood cells and leukocytes, eliminations of pathogens and foreign objects and production of lymphocytes.

Section 4. Structure and function of the nervous system

1. Nerve

The living body has an organ (receptor) for receiving changes (stimuli) outside the body and an organ (effector) affect the inside and outside of the body. An organ between them, which purposely passes on information to and adjusts the living body is called the nervous system. The nervous system is divided into the central nervous system and the peripheral nervous system. The central nervous system includes the brain and spinal cord. The peripheral nervous system includes the cerebrospinal nerve and automatic nervous system.

(1) Nerve cell: Usually, several dendrites and one nerve process (axon) project out from a nerve cell. A dendrite has pronged tips and transmits impulses to the tip of other dendrites and then transmits received stimuli to the neuron cell body. A nerve process transmits the excitant of a neuronal cell body. A neuron consists of one nerve cell and two processes projected from it. A peripheral nerve always transmits a stimulus to the central nervous system via multiple neurons. The part constituted by a neuron and junctional region of a neuron, i.e., the tip of a nerve process and the tip of another dendrite is called the synapse. The synapse has characteristics different from nerve fibers (e.g., It takes much time for a synapse to transmit information in one direction or transmit information. A synapse is exhausted easily). (2) Nerve fiber: An integration of axons is called the nerve fiber. The outermost layer of a nerve fiber is wound by Schwann cells. The one with a myelin sheath inside is called the myelinated nerve fiber. The one with no myelin sheath inside is called the nonmedullated nerve.

(3) Glial tissue: The supporting tissue between a nerve cell and nerve fiber.

2. Brain and spinal cord

The central nervous system can be divided into the brain and spinal cord.

(1) Spinal cord: The spinal cord is a tube in a vertebral canal. The length is approximately 40-45 cm. The upper part connects to the brain at the height of the superior edge of the first cervical vertebra. The inferior division is conically shaped at the height of L1-L2. The filum terminale adheres to posterior surface of the coccygeal bone. The parts from which peripheral nerves project for upper extremities and lower extremities are thicker than other parts, which are called the cervical enlargement and lumbar enlargement.

The surface of the spinal cord has six longitudinal grooves. There is the deep anterior median fissure on the median line of the anterior surface. There is the shallow posterior median sulcus on the median line of the posterior surface. They divide the spinal cord into the left and right half. The

left and right halves have anterior lateral sulcus and posterior lateral sulcus respectively. They divide each half into anterior funiculus, lateral funiculus, and posterior funiculus from anterior to posterior. The posterior intermediate groove divides the posterior funiculus of the cervical spinal cord into the medial gracile fasciculus and lateral cuneate fasciculus. The motile ventral root exits the anterior lateral sulcus. The sensory posterior nerve root exits the posterior lateral sulcus.

The spinal cord is divided into the cervical spinal cord, thoracic spinal cord, lumbar spinal cord, and sacral cord by the spinal nerve which enters and leaves.

A cross-section of a spinal cord shows nerve cells and glial tissue in ash color and are located deep to the spinal cord. So, they are called gray matter. Meanwhile, the nerve fibers are mainly located shallow to the spinal cord. So, they are called white matter.

The gray matter is H-shaped. The protruding part is called the anterior horn (anterior column) and the posteriorly projected part is called the posterior horn (posterior column). There are lateral horns (lateral column) from the lower cervical cord to the superior division of the lumbar cord. The part connecting the left to right is called the central gray matter. The central canal penetrates the center through which cerebral spinal fluid flows.

The superficial layer or the white matter consists of myelinated nerve fibers. It is divided into the anterior funiculus, lateral funiculus, and dorsal funiculus from front to rear. The dorsal funiculus is formed with the ascending nerve fibers mainly to transmit tactual sensations, baresthesia, and bathyesthesia. The lateral funiculus has the spinal thalamic tract that transmits temperature and pain sensations, and the pyramidal tract that transmits voluntary movement.

(2) Brain: The brain is contained in the cranial bone and is the most developed part of the nervous system. The brain can be divided into the brain stem, which is essential for supporting life, the medulla oblongata, pons, mesencephalon and diencephalon, metencephalon, and cerebrum.

(Note) Some researcher say the brain stem includes the diencephalon.

There is a dimple called the rhomboidal fossa on the dorsal surface of the medulla oblongata and pons forming the base of the fourth ventricle. The medulla oblongata is a part contacting the spinal cord. The medulla oblongata has a sulcus having the same name as the spinal cord, nucleus olivaris, dorsal column nucleus, inferior cerebellar peduncle, petrosa related to voluntary movements, and decussatio pyramidum. The pons is continued from the medulla oblongata. The anterior part of the pons continues to the cerebral peduncle of the mesencephalon. The middle cerebellar peduncle continues to the metencephalon.

The mesencephalon is a part continued to the anterior region of the pons. The mesencephalon consists of the cerebral peduncle located in the ventral part, centrally located tegmentum, quadrigeminal bodies located dorsal. The aqueduct of midbrain passes through the internal part. The superior cerebellar peduncle exits and continues to the metencephalon. The cerebral peduncle consists of conducting paths, such as pyramidal tract that descends from the cerebral cortex to the

spinal cord. The tegmentum has the extrapyramidal nerves such as the red nucleus and substantia nigra. The quadrigeminal bodies consist of the superior colliculi related to the visual reflex action and the inferior colliculi related to the auditory reflex action.

The metencephalon continues to the mesencephalon antero-superiorly, to pons anterolaterally, to the medulla oblongata antero-inferiorly and forms the fourth ventricle among them. The cerebellum consists of the left and right hemisphere and the narrow vermis between them. There are fissures called the cerebellar fissures and a prominence called the cerebellar folia formed by the fissures on the cerebellar hemisphere. The cerebellar hemisphere is divided into the cortex and marrow. The cortex consists of trilaminar nerve cells. The marrow consists of nerve fibers. There are the cerebellar nuclei consisting of nerve cells among them. For the metencephalon, the superior cerebellar peduncle continues to the mesencephalon, the middle cerebellar peduncle continues to the pons, and the inferior cerebellar peduncle continues to the medulla oblongata.

The posterior side of the diencephalon continues to the mesencephalon. The anterolateral part continues to the cerebral hemisphere. The third brain ventricle is inside of them. It can be divided into the superior optic thalamus and hypothalamus in the lower part. Epiphysis projects postero-superiorly. The optic thalamus forms the side wall of the third brain ventricle and has a relay nucleus of sensory nerves. The hypothalamus forms the side wall and base of the third brain ventricle and has the highest nerves of the automatic nervous system. The inferior posterior part is accompanied by the pituitarium.

The cerebral hemisphere is divided into a right and a left half by the longitudinal cleavage. The surface is divided into the frontal lobe, parietal lobe, occipital lobe and occipital lobe by the lateral fissure, parieto-occipital sulcus. The cortical layer of the hemisphere consists of six-layered nerve cells, which is called the cortex. The inner layer consists of nerve fibers, which is called the marrow. There are aggregations of nerve cells called the basal ganglion in the marrow.

The cerebral cortex has the archipallium, which performs instinctive behaviors, and the neopallium, which has developed especially in human beings. The archipallium is located medial to the cerebral hemisphere around the brain stem. The archipallium in association with amygdalae constitute the limbic cortex. It is an important part related to memory and emotion. The neocortex accounts for approximately 90% of the cerebral cortex of human beings. The neocortex includes the highest nerve for motor and sensation and functions for controlling sophisticated mental functions such as consciousness and thinking. Thus, each region of the cerebral cortex has a specific function. This is called the local existence of functions. Major examples of local existences include the motor area in frontal lobe, the somatosensory association cortex and gustatory cortex in the parietal lobe, the visual cortex in the occipital lobe, and the auditory area and olfactory area in the temporal lobe.

Most people have a language center in the left hemisphere. The language center includes Broca's area in the frontal lobe and Wernicke's area in the temporal lobe. If Broca's area is damaged, the

patient can understand language; however, he cannot speak with meaning (i.e., motor aphasia). If Wernicke's area is damaged, the patient does not understand the spoken word though he hears the word as sounds (i.e., sensory aphasia).

The cerebral medulla is produced by the cortex. Or, it consists of fibers communicating with others in the same hemisphere (i.e., association fiber), fibers connecting the left hemisphere to right (i.e., commissural fibers) and fibers communicating with inferior center (i.e., projection fibers). The callosum at the bottom of the cerebrum interhemispheric fissure is made of commissural fibers connecting the left hemisphere to the right. For projection fibers, the internal capsule gathering ascending and descending projection fibers is important. The internal capsule is among the nucleus of the thalamus between the brain, caudate nucleus, and lenticular nucleus. The arteries here are prone to bleeding resulting in a damaged internal capsule and hemiplegia.

The brain has the brain ventricular system filled with cerebral spinal fluid. The upper part is a pair of lateral cerebral ventricles in the cerebral hemisphere. The lateral cerebral ventricles communicate with the third brain ventricle in the diencephalon via the interventricular foramen and further communicate with the fourth brain ventricle surrounded by the metencephalon, pons, and medulla oblongata via the cerebral aqueduct. The inferior end of the fourth brain ventricle is communicated with the subarachnoid space via the three holes and the central canal of spinal cord.

3. Structure and function of peripheral nervous system

The peripheral nervous system is divided into the cerebrospinal nerve, which controls animal functions, and the automatic nervous system, which controls vegetative functions. Among the cerebrospinal nervous system, the sensory nerves are ascending nerves and motor nerves are descending nerves.

Structure

The cerebrospinal nerves are divided into 12 pairs of cranial nerves and 31 pairs of spinal nerves.

(1) Cranial nerves

- 1) Olfactory nerve (olfactory sensation): Originated in the olfactory bulb and continued to the olfactory cells in the nasal cavity
- 2) Optic nerve (optical sensation): Originated in the optic chiasm of the diencephalon and distributed on retinas of eyeballs
- 3) Oculomotor nerve (motor): Originated in the mesencephalon, passes the superior orbital fissure, and distributed in the external eye muscle. Parasympathetic nerve governing the pupillary sphincter muscle and muscle of accommodation is included.
- 4) Trochlear nerve (motor): Originated in the mesencephalon, passes the superior orbital fissure,

and distributed in the external eye muscle.

- 5) Trigeminal nerve (mixed): Originated in the pons and distributed in the muscles of facial expression and chewing muscles.
- 6) Abducens nerve (motor): Originated in the pons, passes the superior orbital fissure, and distributed in the external eye muscle.
- 7) Facial nerve (mixed): It emerges from the brainstem between the pons and the medulla, and controls the muscles of facial expression and taste to the anterior two-thirds of the tongue. It also supplies preganglionic parasympathetic fibers governing the submaxillary gland, sublingual gland, and lacrimal gland.
- 8) Vestibulocochlear nerve (auditory sensation and sensation of equilibrium): It emerges from between the pons and the medulla and then enters the internal auditory meatus. The nerve splits into two large divisions - the cochlear nerve and the vestibular nerve. The vestibular nerve is distributed in the vestibule and semicircular canal to govern equilibrium. The cochlear nerve goes to the cochlear canal to govern hearing.
- 9) Glossopharyngeal nerve (mixed): The glossopharyngeal nerve exits the medulla and passes the jugular foramen to govern the pharyngeal muscle, mucous membrane, sensory perception, and gustatory sensation of the posterior one-third of the tongue. It supplies parasympathetic fibers to the parotid gland.
- 10) Vagus nerve (mixed): It exits the medulla oblongata, passes the jugular foramen, distributed in the muscle of pharynx and mucous membrane of the pharynx, and includes the parasympathetic nerve going to organs such as the neck region, breast region, and abdominal region.
- 11) Accessory nerve (motor): Exits the medulla oblongata, passes the jugular foramen. The accessory nerve provides innervation to the sternocleidomastoid muscle and the trapezius muscle.

12) Hypoglossal nerve (motor): The nerve emerges from the medulla oblongata, then, passes through the hypoglossal canal, supplies motor fibers to all of the muscles of the tongue.

(2) Spinal nerve

The ventral root (motor) of the spinal cord exits the anterolateral groove. The dorsal root (sensory) of the spinal cord exits the posterolateral groove. They join together to be a single neural tube at the intervertebral foramen. There are a total of 31 bilaterally paired spinal nerves from above: 8 cervical nerves (C1-C8), 12 thoracic nerves (T1-T12), 5 lumbar nerves (L1-L5), 5 sacral nerves (S1-S5) and 1 coccygeal nerve (Co).

After the neural tubes pass through the intervertebral foramen, they bifurcate into mixed anterior ramus and posterior ramus. Generally, the anterior ramus is thicker and innervates the anterior part of the body trunk and upper and lower extremities. The posterior ramus is thin and innervates the skin of posterior part of the body trunk and proper muscles of the back. Meanwhile, the posterior ramus of C1 and C2 is thicker than the anterior ramus. The posterior ramus of C2 is called the greater occipital nerve and innervates the occipital region and the skin of the parietal region.

The anterior rami, other than the most thoracic spinal nerves, give rise to the nervous plexuses. Major nervous plexuses and major rami generated from them are as follows:

1) Plexus cervicalis (C1-4)

The phrenic nerve which provides motor innervation for lesser occipital nerve, great auricular nerve, and diaphragm arises from the plexus cervicalis.

2) Brachial plexus (C4-Th1)

- (1) Pectoral nerve: The pectoral nerve innervates the greater pectoral muscle and smaller pectoral muscle.
- (2) Dorsal scapular nerve: The dorsal scapular nerve innervates the rhomboideus muscle and the levator scapulae.
- (3) Long thoracic nerve: The long thoracic nerve innervates the anterior serratus muscle.
- (4) Suprascapular nerve: The suprascapular nerve innervates the supraspinatus muscle and infraspinous muscle.
- (5) Subscapular nerves: The subscapular nerves innervate the teres major muscle, the subscapularis muscle, and latissimus dorsi muscle (the thoracodorsal nerve which is a ramus of subscapular nerves innervates the latissimus dorsi muscle).
- (6) Axillary nerve: The axillary nerve innervates the skin of the lateral and posterior side of the upper arm, deltoid, and teres minor muscle.
- (7) Musculocutaneous nerve: The musculocutaneous nerve innervates the skin of the lateral side of the forearm, biceps brachii muscle, brachial muscle, and coracobrachial muscle.
- (8) Radial nerve: The radial nerve innervates the skin of the posterior side of the upper arm and forearm and the radial side of the dorsal surface of the hand and muscles of the posterior side of the upper arm and lateral side and posterior side of the forearm.
- (9) Median nerve: The median nerve innervates the skin of the radial side of the palm, most muscles of the flexor muscles of the forearm, and most thenar muscles.
- (10) Thoracic spinal nerves: The thoracic spinal nerves innervate the skin of the ulnar side of palm and the dorsal surface of the hand, the flexor of ulnar side of the wrist, and hypothenar muscle.

3) Thoracic spinal nerves (intercostal nerve Th1-12): The thoracic spinal nerves innervate the skin of chest wall and abdominal wall, internal intercostal muscle, external intercostal muscle, abdominal rectus muscle, internal abdominal oblique muscle, and external abdominal oblique muscle.

4) Lumbar plexus (Th12-L4)

(1) Lateral cutaneous nerve of thigh: The lateral cutaneous nerve of thigh innervates the skin of the lateral side of the thigh.

(2) Femoral nerve: The skin and end of the anterior side of the thigh become a saphenous nerve and innervate the skin of the medial side of the lower leg and dorsum of the foot, ilium, iliopsoas muscle, pectineal muscle, quadriceps femoris muscle, and sartorius muscle.

(3) Obturator nerve: The obturator nerve innervates the skin of the medial side of the thigh and adductor muscles of the thigh.

5) Sacral plexus (L4-S3)

(1) Superior gluteal nerve: The superior gluteal nerve innervates the gluteus medius muscle, gluteus minimus muscle and tensor fascia lata muscle.

(2) Inferior gluteal nerve: The inferior gluteal nerve innervates the gluteus maximus muscle.

(3) Ischiadic nerve: The ischiadic nerve is the largest peripheral nerve. The ischiadic nerve gives off rami into the long head of biceps femoris muscle, semitendinosus muscle and semimembranosus muscle. Then, the ischiadic nerve bifurcates into the common fibular nerve and tibial nerve. The common fibular nerve gives off ramus into the short head of biceps femoris muscle and then bifurcates into the superficial peroneal nerve and deep peroneal nerve. The superficial peroneal nerve innervates the skin of the dorsum of the foot and long and short fibular muscle. The deep peroneal nerve innervates the anterior tibial muscle, extensor pollicis longus, and the extensor digitorum longus muscle.

(4) Pudendal nerve: The pudendal innervates the skin of the external genitals and external anal sphincter muscle.

Function

Perceptions include superficial perceptions, such as temperature and pain sensation, deep sensations such as motor perception, and special sensations such as the optical sensation. Sensory nerves transfers sensory stimuli received by the acceptors to central nerves.

Motor nerves include the pyramidal tract and extrapyramidal tract. The pyramidal tract is a route to conduct a movement intentionally. The pyramidal tract consists of two neurons. Meanwhile, the extrapyramidal tract has the central nerves in the cerebral cortex, basal ganglion, metencephalon and brain stem. The conduction pathway is complicated. The extrapyramidal tract is related to the muscular strain and maintenance of a posture.

4. Structure and function of automatic nervous system

The automatic nervous system is a nervous system for governing the vegetality of living bodies including the sympathetic nerve and parasympathetic nerve.

Structure

The nerve of the automatic nerve exists in a specific nerve nucleus in the brain and spinal cord. The peripheral part passes one ganglion before it reaches each organ. Therefore, the peripheral nerve fiber is divided into the preganglionic fiber (myelinated) and postganglionic fiber (unmyelinated).

(1) Sympathetic nervous system

The sympathetic nerve trunk bilaterally located anterolateral to the vertebral column has 20 and several pairs of sympathetic trunk ganglion. Each ganglion connects to opposite ganglion via interganglionic rami and connects to adjacent spinal nerves via communicating rami.

An automatic nerve that travels from a sympathetic trunk ganglion to peripheral travels with blood vessels to reach a target organ. The spinal cord nerve of a sympathetic nerve exists in the lateral horn from thoracic spinal cord to the upper lumbar spinal cord.

(2) Parasympathetic nervous system

The parasympathetic nerves travel with four cranial nerves and sacral nerves. The parasympathetic nerves included in the oculomotor nerve enter the eyeballs and innervate the muscle of accommodation and pupillary sphincter muscle to adjust the thickness of the crystalline lenses and constrict the pupils. The parasympathetic nerves included in the facial nerve innervate the lacrimal gland, submaxillary gland, and sublingual gland to excrete tears and saliva.

The parasympathetic nerves, specifically the glossopharyngeal nerve, innervate the parotid gland to secrete saliva.

The parasympathetic nerves, specifically the vagus nerve, innervate abdominal viscera other than the neck region, breast region, and pelvis to govern the motions and secretions.

The parasympathetic nerves, specifically the sacral nerves, innervate the pelvis and external genitals to control the vesica (emission), rectum (bowel movement), and the penis (erection).

Function

The sympathetic nerve makes living bodies active and the parasympathetic nervous system makes living bodies stand ready to act. Generally, both nerves govern a single organ (double control). The functions are antagonistic to each other (competitive control). The sympathetic nerve transmits the

visceral nociceptions and the parasympathetic nerve transmits organ sensations.

Chapter 3: Fundamentals of Oriental Medicine

Section 1: The Concept of Oriental Medicine

Practical medicine that is specific to the East is broadly referred to as “Oriental Medicine” and contrasts with Western medicine. Oriental medicine includes the traditional medicines of China, India, Korea, and Japan. In Japan, however, Oriental medicine nowadays refers to acupuncture, massage, traditional Chinese medicine (drug therapy), and Qigong. This document will make use of these ideas of Oriental medicine. Oriental medicine began in various regions in the large country of China, and has developed in both Japan and the Korean Peninsula to the climate, culture, history, and other aspects of each region. The foundation of Oriental medicine lies in natural philosophy.

In ancient times, people thought of the human body as a microcosm governed by the same workings as the macrocosm that is nature. Therefore, they attached an overriding importance to natural providence based on the belief that it is important for one’s health to adapt to nature rather than resisting nature, which was considered unhealthy.

In Western medicine, once a person becomes sick, they are administered drugs and injections or undergo surgery, for example.

In contrast, in Oriental medicine, it is believed that these treatments do not directly cure illnesses and that drugs only help to bring out our natural healing abilities, because in Oriental medicine it is believed that the natural healing abilities of our bodies can cure illnesses. The fundamental feature of Oriental medicine is the harmonization of mind and body (unity of mind and body). Diseases do not originate only from extrinsic causes, and there are many intrinsic (psychological) causes as well.

More specifically, stresses such as anxiety and shock lead to dysfunctions within the body, resulting in organic diseases. For these reasons, Oriental medicine attaches a great importance not only to the conditions of the body but also the conditions of the mind. Based on this concept, Oriental medicine developed a philosophy of uniting the mind and body and living in harmony with nature.

1. Physiological concepts of Oriental medicine

1-1. Yin and Yang

This is the most fundamental concept in learning Oriental medicine.

1-1-1. Yin and Yang categories of all things

All things in the natural world can be categorized between Yin and Yang. Yang refers to the dynamic aspects of things and is a symbol of heat and activity represented by Fire, while Yin refers to the static aspects of things and is a symbol of cold and stillness represented by Water. The following table shows the categorizations between Yin and Yang of all the elements in the natural world.

Yin	Water, Earth, Moon, Sea, Fall and Winter, Night, Moistness, Frigidity and Cold, Darkness, Slowness, Entering, Inward, Downward
Yang	Fire, Sun, Sky, Spring and Summer, Day, Dryness, Heat, Brightness, Fast, Exiting, Outward, Upward

The following figure shows the Yin and Yang categories of the human body.

Yin	Woman, Flesh and Body, Lower Body, Abdomen, Internal body, Nutrition, Remission, Rest, Sleep, Trunk
Yang	Man, Spirit, Upper Body, Back, Surface of the body, Vivacity, Excitement, Consumption, Activity, Limbs

1-1-2. Principles of Yin and Yang

Interdependence of Yin and Yang

Yin and Yang have characteristics that counter each other, and generally they are in relationships in which they control one other so that no single force can surpass the other (relationships such as water extinguishing fire while fire dries up water). For example, a person needs to rest if they work too much. This can be explained by the power of Yin having become greater so that it can control the power of Yang.

However, this does not mean that the relationship between Yin and Yang is not good, and in fact, the relationship is one of mutual cultivation. In other words, Yang is necessary for making Yin useful just as Yin is necessary for making Yang useful. This relationship can be explained as follows: taking enough rest makes you more active while sufficient exercise helps you sleep well. Yin and Yang maintain their balance by supplementing one other's excesses and deficiencies. People are in good health when their Yin and Yang are balanced.

Relativity of Yin and Yang

Yin and Yang are positioned relative to one another and are completely flexible, so a single element can become either Yin or Yang depending on one's perspective. This means that each Yin has a Yang therein and each Yang has a Yin therein as well. For example, in terms of a single day, the day can be divided into two so that morning is Yang and the afternoon is Yin to constitute the whole day.

In terms of the afternoon, however, the period of time until nightfall is considered to be Yang because it is still bright, while the time after sunset is considered to be Yin. One's viewpoint on the relationship between Yin and Yang differs depending on the criteria. This is also true in life.

1-2. Wu Xing

1-2-1. Five elements (attributes)

Aside from Yin and Yang, the underlying the concepts of Oriental medicine also include Wu Xing. Wu Xing is a method that divides all things in the natural world and the human body into five categories (Wood, Fire, Earth, Metal, and Water) and examines the interrelationships of those categories.

Wood represents timber, and it symbolizes a sense of being unconstrained and flexible because timber can develop into trunks, branches, and leaves very quickly. Fire represents flame and heat and is a symbol of hotness, representing characteristics of strong force and upward mobility. Earth represents the richness and density of soil as well as its thick properties. Earth is a symbol of genesis and creation. Metal represents the properties of metals and minerals that are acute, dry, and clear. Metal is a symbol of smoothness and purity. Water is heavy and runs downwards, solidifying the earth and hydrating all things, and has properties of heaviness. It is a symbol of coldness and chill. All things in nature can be classified into the five elements according to these characteristics.

1-2-2. Five Element categorization of all things

All things in nature and human activities can be categorized into the five attributes (Wood, Fire, Earth, Metal, Water) as shown in the following table.

Natural world

	Wood	Fire	Earth	Metal	Water
Grain	Wheat	Millet	Barnyard grass	Rice	Beans
Livestock	Chicken	Sheep	Cattle	Horse	Pig
Taste	Sourness	Bitterness	Sweetness	Pungency	Saltiness
Color	Blue	Red	Yellow	White	Black
Climate	Windy	Hot	Damp	Dry	Cold
Direction	East	South	Zenith	West	North
Season	Spring	Summer	Long Summer	Autumn	Winter

Saltiness means salty.

Human body

	Wood	Fire	Earth	Metal	Water
Five yin organs	Liver	Heart	Spleen	Lung	Kidney
Five yang organs	Gall bladder	Small intestine	Stomach	Large intestine	Urinary bladder
Sensory organs	Eyes	Tongue	Lips	Nose	Ears
Body parts	Tendon/ligament	Blood vessel	Muscle	Skin and hair	Bone
Emotion	Anger	Joy	Pensive	Depression	Fear
Five Sounds	Call	Laugh	Sing	Cry	Groan

1-2-3. Interrelationships of the Five Elements

Creative-Destructive relationship that maintains the balance of the Five Elements

The five factors of the Five Elements are in a fine balance with each other in their relationships, and the representative example of these relationships is Creation and Destruction. Creation means a relationship that generates and nurtures others, and it circulates as Wood → Fire, Fire → Earth, Earth → Metal, Metal → Water, and finally Water → Wood (→ represents “generate”) (See figure below).

The following is a more specific representation of the cycle:

Wood generates Fire, Fire creates ash that feeds the Earth, Earth bears Metal, Metal collects Water, and Water nourishes Wood. In these relationships, Wood is the mother of Fire and Fire is a child of Wood. Fire and Earth are in a parent-child relationship, as are Metal and Water, Water and Wood, and so on.

Destruction

Meanwhile, Destruction is a relationship of overcoming one other, and these relationships circulate as follows:

Wood → Earth → Water → Fire → Metal → Wood (See figure below). Wood absorbs nutrients from the Earth, Earth suppresses the overflowing of Water banks, Water extinguishes Fire, Fire melts and softens Metal, and Metal chops Wood.

When one of the five elements decreases in its strength it is energized through the relationship of creation, and when any one of the five elements has gained excessive strength it is controlled in the

destructive relationship so that all of them are well balanced.

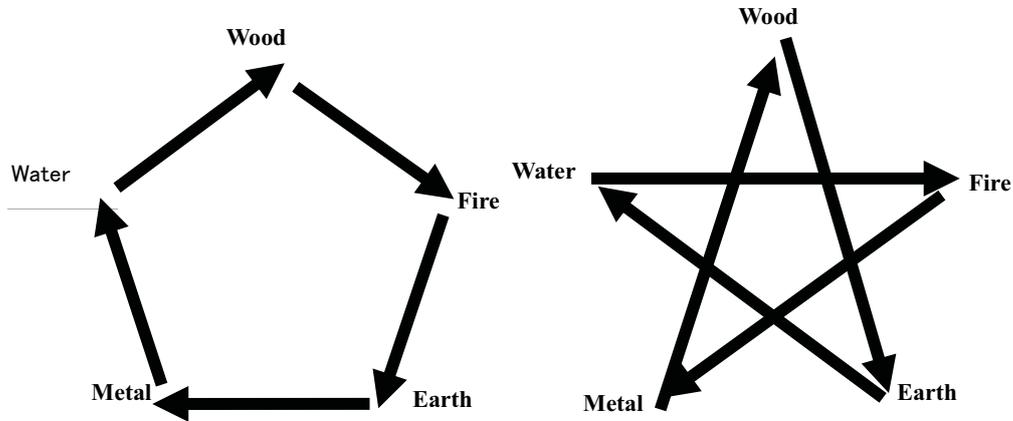


Figure of Creative relationship

Figure of Destructive relationship

Relationship of the Five Elements and bodily mechanisms

In Oriental medicine, it is believed that the functions of the body are the same as those of the natural world. Therefore, the relationships of the Five Elements can be applied to the human body. The five yin organs, which are the heart, liver, spleen, lungs, and kidney, are symbolically corresponded to Wood, Fire, Earth, Metal, and Water. It should be noted that the five yin organs in Oriental medicine indicate not only the organs themselves but also bodily functions as described below.

Liver/Wood: Liver functions to ensure the smooth flow of *Qi* (spiritual energy) and blood. The liver is most likely to be affected by stresses related to emotion and the autonomic nerves.

Heart/Fire: The heart is the pulse. It is believed to be the nerve center of blood circulation in both Oriental medicine and in modern medicine. In Oriental medicine, the function of the heart is considered to be relevant to the brain because it is related to mental activities, such as consciousness, thought, and sleep. In other words, the heart acts as a central command station governing the entire body.

Spleen/Earth: The spleen provides vitality through its digestive functions. The spleen is especially important as a raw material of *Qi*, blood and bodily fluids and a driving force of *Qi* functions. In terms of modern medicine, the Spleen has the functions of the digestive system and pancreas.

Lungs/Metal: The lungs are related to water metabolism, physiological action of the skin, and immune function as well as respiration. Lungs in Oriental medicine have a greater number of functions than in modern medicine.

Kidney/Water: The kidney is related to the most important functions such as growth, development, and reproduction as well as water metabolism in modern medicine. The kidney affects the conditions of the body over its lifetime by taking in the body's inherent vital energy.

These Five yin organs play supporting functions of the body through mutual collaborations in accordance with the Creative-Destructive relationship. For example, when actions of the body are activated by exercise, the functions of the spleen as a child in the Creative relationship is intensified to increase one's appetite.

Clinical applications of the rules of the Five Elements

For the treatment of some diseases that are difficult to cure with modern medicine, the effects of the rules of the Five Elements can be applied. For example, the Five Elements can be applied to the treatment of asthma, a lung disease. Asthma can be cured by improving the spleen, which is the mother of the lungs, specifically by improving gastrointestinal activity. Meanwhile, improving the functions of the kidneys, which are the children of the lungs, by taking advantage of the Destructive relationship, can cure the lungs.

2. Pathological perspective of Oriental medicine

Balance of the Five Elements

The Five Elements should be well balanced within the range in which they can be controlled well. When these elements have significantly different levels of strength, the situation causes diseases. Cases include such as when one element may be suppressed by another that it is supposed to control, or when the power of control is too strong in suppressing the normal functions of another, or when a child suppresses a parent who is supposed to nurture the child.

We lose our appetite and experience stomachaches and diarrhea because of pathological stresses that increase the strength of the liver and unilaterally suppresses the spleen that is in a destructive relationship. The reason why we become irritable when we are deprived of sleep can be explained by the excessively enhanced strength of the mind reaching the liver, which is the parent of the mind in the Creative relationship.

As mentioned above, if the strength of each element becomes excessively stronger than others, the mechanisms of the Creative-Destructive relationship that produces a proper balance of the body adversely becomes a diseased mechanism. Therefore, it is necessary to adjust conditions in the stages of minor abnormality before each element goes beyond its limits. Theory of the Five Elements tells us that many factors of the human body are intertwined and affect one another, just as in natural phenomena. Things may sometimes not go well despite our own efforts while other times everything runs smoothly through luck. It is important to understand that the rule of the Five Elements will lead us to the direction we should go instead of struggling to solve our problems by controlling everything. However, we should not be overwhelmed by inertia either.

3. Diagnoses and therapeutic systems of Oriental medicine

One specific characteristic of Oriental medicine is that it is a “medical science of observing the body surface.” From the ancient days and up to now, without depending on the testing equipment of Western medicine, Oriental medicine has been used to decide courses of treatment (*Sho*) by observing information that appears on the surface of the body of patients to understand their physical conditions and symptoms. Color, complexion, moistness, and elastic force of the skin, changes in muscles, oppressive pain, and reddening are observed.

Diagnoses are conducted using “*Shi-shin* (Four Diagnostic Approaches),” involving visual observations of appearance, listening to the body’s sounds and smelling the patient’s body. Medical history is recorded through asking and answering questions. Touch observations involve pulse diagnosis, palpation of the patient’s body (especially the abdomen), and meridian observation of the four limbs. A diagnosis is then given based on theory of Yin-Yang and the five elements. Therapeutic strategy concluded by synthetic judgment based on these information is called the “*Sho*.”

Section 2: Concept of Meridian and Acupuncture points

1. Meridians and acupuncture points

A meridian is a path of vital energy and blood, which are essential forms of energy for living in Oriental medicine. The existence of the meridians is described in Huangdi Neijing, the sourcebook

of Oriental medicine. An acupuncture point (*Tsubo*) is a point where *Qi* flows in and out on these meridians. The relationship of the meridians and the acupuncture points can be visually exemplified as railway and stations. Human life is maintained by fully circulating vital energy and blood through channels; therefore, it causes health problems if this circulation is blocked. As a result, muscle stiffness and tension in these channels and acupuncture points may occur.

(1) Meridians

Meridians consist of vessels that are running vertically through the body and collaterals that connect vessels and vessels horizontally and askew. The vessels are the main stems, consisting of Twelve Regular Meridians corresponding to three Yin and three Yang for each set of limbs and the supplemental Eight Extraordinary Meridians (Tables 1 and 2). There are no acupuncture points on the collaterals; therefore, their clinical significance is low. Thus, they are omitted here.

Table 1: Twelve Regular Meridians

Three Yin Meridians of the Hands	Taiyin Lung Meridians of the Hands	Shaoyin Heart Meridians of the Hands	Jueyin Pericardium Meridians of the Hands
Three Yin Meridians of the Feet	Taiyin Spleen Meridians of the Feet	Shaoyin Kidney Meridians of the Feet	Jueyin Liver Meridians of the Feet
Three Yang Meridians of the Hands	Yangming Large Intestine Meridians of the Hands	Taiyang Small Intestine Meridians of the Hands	Triple Heater Meridians
Three Yang Meridians of the Feet	Yangming Stomach Meridians of the Feet	Taiyang Bladder Meridians of the Feet	Shaoyang Gallbladder Meridians of the Feet

Table 2: Eight Extraordinary Meridians

Eight Extraordinary Meridians	The Ren Meridian, The Du Meridian, Inimiyaku, Youimiyaku, Inkyoumyaku, Youkyoumyaku, Youkyoumyaku, Shoumyaku, Taimiyaku
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(2) Acupuncture points

Acupuncture points are gateways for *Qi* on the vessels and are also called the specific points or acupoints. Changes in vital energy and clogging of vessels appear on acupuncture points, and therefore acupuncture points are clinically significant as they are points for clinical examination/diagnosis. The name of each acupuncture point reflects its characteristics and also indicates the relevant body regions, its vessel routes, and curative effects; therefore, it is clinically important to know the meaning of the names of these acupuncture points.

Based on the bone-length measurement of the Lingshu, the positions are decided according to the size of the body parts and the length of the maniphalanx of the patient. In bone measurement, the standard body height is decided set as 225 cm and the length of each part of body is decided. Generally, in maniphalanx measurement, the width of the middle phalanx of the thumb is decided to be about 3 cm and the width of the four fingers is decided to be about 9 cm. Acupuncture points that are often used clinically are called the major points; this is believed to be described in classical writings based on clinical experiences. They can be listed as follows: Yuan-Source acupoints that are likely to reflect changes in Zang-fu viscera and channels; *Gekiketsu* (acupoints) that are commonly used for acute symptoms; arm and leg *Gogyoketsu* (*Goyuketsu*) located on the upper and lower extremities, which are important as points for diagnosis/ treatment; and Back-shu acupoints and Front-mu acupoints that gather a lot of *Qi* of Zang-fu viscera and channels. The major curative effects of acupuncture points include effects on the actual acupuncture points themselves and their surrounding regions and effects on the symptoms of remote sites through channels.

2. Fourteen meridians and their routes

(1) Overview of the Fourteen meridians

The collective term of the Ren Meridian and the Du Meridian of the Twelve Regular Meridians and the Eight Extraordinary Meridians is the Fourteen Meridians, and each of these vessels has its own specific acupuncture points, and these are clinically very important. The Twelve Regular Meridians belong to the six zang viscera and six fu viscera, connect to the limbs, and Yin meridians travel upward while Yang meridians travels downward in the body. The Eight Extraordinary Meridians are not directly related to Zang-fu viscera but control vital energy and blood. Among them, the Ren Meridian and the Du Meridian travel upward on the anterior and posterior median lines,

respectively, and the Ren Meridian controls all Yin meridians while the Du Meridian controls all Yang meridians. Among the Twelve Regular Meridians, the vessels of the Ang-fu viscera that are on either side of the Yin-Yang relationship are closely connected to each other. Furthermore, all vessels are connected to one another, thus vital energy and blood are continuously circulating in the Twelve Regular Meridians in the order as shown in below.

→ Taiyin Lung Channel of the Hand → Yangming Large Intestine Channel of the Hand → Yangming Stomach Channel of the Foot → Shaoyin Kidney Meridian of the Foot → Shaoyin Heart Channel of the Hand → Taiyang Small Intestine Channel of the Hand → Taiyang Bladder Channel of the Foot → Shaoyin Kidney Channel of the Foot → Jueyin Pericardium Channel of the Hand → Shaoyang Sanjiao Channel of the Hand → Shaoyang Gallbladder Channel of the Foot → Jueyin Liver Channel of the Foot → Lung Channel

(2) Routes of the Fourteen Meridians

The Twelve Regular Meridians belonging to the Zang-fu viscera, the Ren Meridian, and the Du Meridian travel not only in the body surface but also in the deeper parts of the body, but only the flows of the Fourteen Meridians on the body surface will be explained briefly.

- Ren Meridian

The flow starts from the perineal area, going upward along the midline on the anterior surface of the body, and reaches the mandible.

- Du Meridian

The flow starts from the perineal area, going upward along the midline on the posterior surface of the body, passes the parietal region, goes down the facial midline, and reaches the maxilla.

- Taiyin lung Channel of the Hand

The flow starts from the super lateral part of the breast region, goes downward on the anterior surface of the upper extremities, and reaches the end of the thumb.

- Yangming Large Intestine Channel of the Hand

The flow starts from the end of the index finger, goes upward on the lateral part of the upper extremities, passes the shoulder and neck region, and reaches the facial surface.

- Yangming Stomach Channel of the Foot

The flow starts from the face, passes the neck region, goes down the thoracoabdominal region, passes the inguinal region, goes further downward along the anterior surface of the lower

extremities, and reaches the end of the second finger of the foot.

- Taiyin Spleen Channel of the Foot

The flow starts from the first finger of the foot, goes upward on the medial side of the lower extremities, passes the inguinal area, goes further upward on the abdominal region, and reaches the external side of the breast.

- Shaoyin Heart Channel of the Hand

The flow starts from the armpits, goes downward on the medial side of the upper extremities, and reaches the end of the fifth finger.

- Taiyang Small Intestine Channel of the Hand

The flow starts from the fifth finger, goes upward on the posterior surface of the upper extremities, passes the shoulder-neck region, and reaches the facial surface.

- Taiyang Bladder Channel of the Foot

The flow starts from the facial surface, goes upward and passes the parietal region, and goes downward through the occipital region, posterior cervical region, and dorsal region along the vertebral column. It passes the gluteal region, goes further downward on the posterior surface of the lower extremities, passes the posterior side of the lateral malleolus, and reaches the end of the fifth finger of the foot.

- Shaoyin Kidney Channel of the Foot

The flow starts from the sole, goes upward on the medial side of the lower extremities, passes the inguinal area, goes further upward on the abdominal region, and reaches the breast region.

- Jueyin Pericardium Channel of the Hand

The flow starts from the breast, passes the axilla, goes down the medial side of the upper extremities, and reaches the end of the middle finger

- Shaoyang Sanjiao Channel of the Hand

The flow starts from the end of the medicinal finger, goes upward on the posterior surface of the upper extremities, passes the shoulder and cervical region, passes the posterior side of the ears, and reaches the facial surface.

- Shaoyang Gallbladder Channel of the Foot

The flow starts from the facial surface, passes the temporal region and the occipital region, and reaches the superior division of the shoulder, going further down the breast region, abdominal region, and the lateral side of the lower extremities and reaches the end of the fourth finger of the foot.

- Jueyin Liver Channel of the Foot

The flow starts from the end of the first finger of the foot, goes upward on the medial side of the lower extremities, passes the inguinal area, goes further upward on the abdominal region, and reaches the breast region.

3 Names and positions of major acupuncture points

The World Health Organization (WHO) recognized the number of acupuncture points as 361, and the locations of these acupuncture points correspond to each vessel. It is common to learn acupuncture points using the Fourteen Meridians; however, only the major acupuncture points will be introduced and explained with each corresponding body region.

(1) Cephalic region

- Hundred Convergences (the Du Meridian): The intersection of the line connecting the highest point of the earflaps and the median line on the parietal region. The specific point for hemorrhoids.
- *Tianzhu* (the Bladder Meridian): It is located 3.3 cm lateral to the nuchal region of the posterior cervical region. The exterior edge of the trapezius.
- *Feng Chi* (the Gallbladder Meridian): The caved area between the nuchal region and tip of the mastoid process in the posterior cervical region. It is between the trapezius and sternocleidomastoid muscle.
- *Shihaku* (the Stomach Meridian): It located about 3 cm below the pupil, infraorbital region, where the infraorbital nerve comes out from the facial surface.
- *Xiaguan* (the Stomach Meridian): The inferior end of the zygomatic arch. Anterior depressed area. The coronoid process of the mandible area can be touched if the mouth is opened.
- *Touwei* (the Stomach Meridian): The hairline of the temporal region. It is located about 13 cm lateral to the midline, and that is the moving point on the temporal muscle when chewing.
- *Yifeng* (the Triple Energizer Meridian): The point below the attaching part of the earlobe. It is located between the processus mastoideus and mandibular ramus.
- *Renyin* (the Stomach Meridian): It is located about 4.5 cm lateral to the laryngeal prominence, and is a beating point of the common carotid artery.

(2) Thoracoabdominal region

- *Quepen* (the Stomach Meridian): A point on the greater supraclavicular fossa. It is located on the upper border of the clavicle on the mamillary line.
- *Zhongfu* (the Lung Meridian): It is located 18 cm lateral to the medial edge of the coracoids process and the midline in the recessed area external to the infraclavicular fossa.
- *Juque* (the Ren meridian): It is located 18 cm above the umbilicus (Shenque point) on the midline of the upper abdominal region.
- *Zhongwan* (the Ren meridian): It is located 12 cm above the umbilicus (Shenque point) on the midline of the upper abdominal region. It is on the center of the inferior edge of the body of sternum of the umbilicus. This is the specific point for gastric disorders.
- *Shuifen* (the Ren meridian): It is located 3 cm above the umbilicus (Shenque point) on the midline of the upper abdominal region.
- *Burong* (the Stomach Meridian): It is located 18 cm above the Tianshu point and 6 cm lateral to the Juque point.
- *Liangmen* (the Stomach Meridian): It is located 12 cm above the Tianshu point and 6 cm lateral to the Zhongwan hole.
- *Qimen* (the Liver Meridian): It is a cross-point of the mamillary line and the costal arc, and is the site of attachment of the 9th cartilago costalis.
- *Riyue* (the Gallbladder Meridian): It is located 1.5 cm under the *Qimen* point.
- *Tianshu* (the Stomach Meridian): It is located 6 cm lateral to the umbilicus (Shenque point), and is on the abdominal rectus muscle.
- *Daheng* (the Spleen Meridian): It is located 10.5 cm lateral to the umbilicus (Shenque point).
- *Huangshu* (the Kidney Meridian): It is located 1.5 cm lateral to the umbilicus (Shenque point).
- *Quhai* (the Ren meridian): It is located 4.5 cm under the umbilicus (Shenque point) on the midline of the hypogastrium.
- *Guanyuan* (the Ren meridian): It is located 9 cm under the umbilicus (Shenque point) on the midline of the hypogastrium.

- *Zhongji* (the Ren meridian): 12 cm under the umbilicus (Shenque point) on the midline of the hypogastrium.
- *Daju* (the Stomach Meridian): It is located 6 cm under the *Tianshu* point, and is 6 cm under the *Shimen*.

(3) Shoulder, back, lumbar, and gluteal regions

- *Jianjing* (the Gallbladder Meridian): It is on the mamillary line of the upper region of the shulder and is located midway between the *Dazhui* point and *Jianyu* point.
- *Tianzhong* (the Small Intestine Meridian): It is located roughly on the center of the fossa infraspinata and is 4.5 cm under the center of the spina scapulae.
- *Dazhui* (the Du Meridian): It is located under the spinous process of the 7th cervical vertebra (vertebra prominens). The point can be found by anteflexing the neck region. The spinous process of the 7th cervical vertebra (vertebra prominens) is the largest among the cervical vertebra, and it can be used as a landmark of the body surface.
- *Shendao* (the Du Meridian): It is the point under the spinous process of the third thoracic vertebra. The cross-point of the line connecting the medial extremities of the left and right scapular spine and the vertebral column corresponds to the spinous process of the third thoracic vertebra. The point can be found under the cross-point.
- *Mingmen* (the Du Meridian): It is under the spinous process of the second lumbar vertebra and is the cross-point of the line connecting the tip of the left and right twelfth costa, and the vertebral column corresponds to the spinous process of the second lumbar vertebra. The point can be found under the site.
- *Yangguan* (the Du Meridian): It is under the spinous process of the 4th lumbar vertebra. The cross-point of the line (Jacoby line) connecting the uppermost parts of the left and right iliac crest, and the vertebral column corresponds to the spinous process of the 4th lumbar vertebra. The point can be found under the site.
- *Fengmen* (the Bladder Meridian): It is located 4.5 cm inferolateral to the spinous process of the second thoracic vertebra.
- *Feishu* (the Bladder Meridian): It is situated 4.5 cm lateral to the spinous process of the third thoracic vertebra (*Shenzhu* point).
- *Xinshu* (the Bladder Meridian): It is situated 4.5 cm lateral to the spinous process of

the fifth thoracic vertebra.

- *Geshu* (the Bladder Meridian): It is situated 4.5 cm lateral to the spinous process of the 7th thoracic vertebra.
- *Ganshu* (the Bladder Meridian): It is situated 4.5 cm lateral to the spinous process of the 9th thoracic vertebra.
- *Pishu* (the Bladder Meridian): It is situated 4.5 cm lateral to the spinous process of the 11th thoracic vertebra.
- *Weishu* (the Bladder Meridian): It is situated 4.5 cm lateral to the spinous process of the 12th thoracic vertebra.
- *Shenshu* (the Bladder Meridian): It is situated 4.5 cm lateral to the bottom (*MingMen* or Gate of Life) spinous process of the second lumbar vertebrathoracic vertebra.
- *Dachangshu* (the Bladder Meridian): It is situated 4.5 cm lateral to the spinous process of the 4th lumbar vertebrathoracic vertebra (*Yangguan* point).
- *Pangguangshu* (the Bladder Meridian): It is situated 4.5 cm lateral to the spinous process of the 2nd sacral vertebra. The point can be found 1.8–2.1 cm lateral to the 2nd dorsal sacral foramen (*Ciliao* point) in the sacral joint region.
- *Gaohuang* (the Bladder Meridian): It is situated 9 cm lateral to the spinous process of the 4th thoracic vertebra at the medial border of scapula.
- *Zhishi* (the Bladder Meridian): It is situated 9 cm lateral to the spinous process of the 2nd thoracic vertebra (*Mingmen* point).

(4) Upper extremities

- *Naoshu* (the Small Intestine Meridian): The point is above the axillary striation, and is on inferior extremity of the lateral border of the spine of the scapula.
- *Jianyu* (the Large Intestine Meridian): It is situated in the recessed area between the outer end of the acromion and the head of the humerus. The point can be found in the recessed area generated when the upper arm is abducted.
- *Quchi* (the Large Intestine Meridian): It is situated to the outer end of the transverse striation of the cubital fossa and in the anterior region of the lateral epicondyle of humerus.
- *Chize* (the Lung Meridian): It is situated in the recessed area of the outer side of the biceps brachii muscle tendon on the transverse striation of the cubital fossa.

- *Shaohai* (the Heart Meridian): It is situated in the medial extremity of the transverse striation of the cubital fossa and on the anterior side of the medial epicondyle of the humerus.
- *Kongzui* (the Lung Meridian): It is situated lateral to the anterior surface of the forearm and is 9 cm under the *Chize* point toward the *Taiyuan* point.
- *Taiyuan* (the Lung Meridian): It is situated lateral to the transverse striation of the anterior surface of the wrist joint at the radial pulse.
- *ShouSanli* (the Large Intestine Meridian): It is situated lateral to the forearm and is 6 cm under the *Quchi* point toward the *Yangxi* point.
- *Wenliu* (the Large Intestine Meridian): It is situated lateral to the forearm and is located midway between the *Quchi* point and *Yangxi* point.
- *Hegu* (the Large Intestine Meridian): It is situated on the dorsal surface of the hand and is located between the base of the first and second metacarpal bone.
- *Shenmen* (the Heart Meridian): It is situated on the internal side of the hand joint on the frontal side of the striated muscle, and is the point where the ulnar artery can be touched.
- *Gekimon* (the Pericardium Meridian): It is situated on the front-center of the forearm and is midway between the *Qu Chi Xue* and *Da Ling Xue*.
- *Da Ling* (the Pericardium Meridian): It is situated on the center of the hand joint on the frontal side of the striated muscle and is midway between the tendon of the flexor carpi radialis and the tendon of the palmaris longus muscle.

(5) Lower extremities

- *Cheng Fu* (the Bladder Meridian): It is situated on the middle of the gluteal fold lateral to the tendon of the long head of the biceps femoris muscle.
- *Yin Men* (the Bladder Meridian): It is situated on the center of the back side of the thigh and is midway between the *Cheng Fu Xue* and *Wei Zhong Xue*.
- *Liang Qiu* (the Stomach Meridian): It is situated lower lateral to the front thigh and is 6 cm above the outer surangular bone of the patellar.
- *Du Bi* (the Stomach Meridian): It is situated between the patellar and tibial tuberosity and is in the center of the patellar ligament.
- *Zu San Li* (the Stomach Meridian): It is situated 9 cm under the *Wai Xi Yan*

(depressed area of the outer side of the patellar ligament).

- *Yin Ling Quan* (the Spleen Meridian): It is situated directly under the center part of the tibial bone on the internal side. It is the point where your finger stops when caressing the hem of the tibial bone.
- *Yang Ling Quan* (the Gallbladder Meridian): It is situated upper lateral to the lower leg and is on near the anteroinferior region of the caput fibula.
- *Yin Gu* (the Kidney Meridian): It is situated in the inner end of the popliteal transverse striation muscle and is near the bottom of the internal side of the tibial bone, midway between the tendon of the muscles semitendinosus and the tendon of the semimembranosus.
- *Wei Zhong* (the Bladder Meridian): It is situated in the center of the striation muscle of the popliteal fossa and is on the point where the arterial pulsation of the popliteal fossa can be touched.
- *Zhu Bin* (the Kidney Meridian): It is situated on the internal side of the lower thigh and is 15 cm above the *Tai Xi Xue*. It is on the groove between the gastrocnemius muscle and the soleus muscle.
- *San Yin Jiao* (the Spleen Meridian): It is situated on the edge of the internal side of the tibial bone and is 9 cm above the medial malleolus.
- *Fu Liu* (the Kidney Meridian): It is situated on the lower internal side of the lower thigh and is 6 cm above the *Tai Xi Xue* and is on the front of the Achilles' tendon.
- *Tai Bai* (the Spleen Meridian): It is situated on the internal side on the back of the first articulationes metatarsophalangeae. It is the point where your finger stops when caressing the first articulationes metatarsophalangeae.
- *Tai Xi* (the Kidney Meridian): It is situated 1.5 cm on the back of the medial malleolus and is on the front of the Achilles' tendon, and is the point of arterial pulsation of the posterior tibial bone .
- *Yong Quan* (the Kidney Meridian): It is situated in the frontmost depressed part of the center of the sole. It is the part that sinks in the most when the toes are bent.

Chapter 4 Systemic massage method

Section 1 Posture and equipment

1 Patient's posture

It is desirable to determine the posture of the patient depending on the disease and clinical state. Generally, massage is given to the patient in the lateral position (left and right) and a prone position in that order and the finishing massage is performed in the seated position.

In sick patients, for example, we should avoid the prone position for aged persons with a bent lumbar spine and younger persons in their 30s with acute lumbago, because this will reduce the stress on the patient, as well reducing any accompanying clinical risks, providing a safer massage.

As supplementary information - there are many relaxation and foot massage shops in Japan. Some provide 10 minutes of massage and devise combinations of postures considering taking into account of time constraints (e.g., massage only in the prone position prone position, or the massage is given in the prone position at first and finished in the seated position).

2 Operator's posture

Operators should give a massage in the best posture and position depending on the condition of the patient. The condition means that the operator adjusts to the posture of each individual patient. More specifically, operators should be able to apply body weight without pain in a moderate posture. In most practices, the center of the operator i.e., the surface from the lower end of the breastbone to the umbilicus should face the operative field of the patient. For example, if a patient receives a shoulder and back rub in the seated position, the operator should stand at the back of the patient and extend the arm to give the massage and apply body weight (reference drawing 2). (During massaging on the floor, the operator is sometimes in a semi-seated position. reference drawing 1). As a general rule, the operator should hold the operative field with one hand and put gently the other hand on the part distant from the operative field in order to support the patient's body and operative field (reference drawings 3 and 4). If a patient receives a massage on the upper part of the shoulder in the seated position and the operator massages the upper part of the left shoulder with left hand, the assistive hand (right hand) is placed on the upper part or lateral part of the right shoulder (reference drawings 1 and 2). However, the position of the assistive hand sometimes subtly changes depending on the body size of the patient and operator. You should learn each case in clinical training.

3 Equipment required for the massage

(1) Massage with a mat on the floor (a technique without using a bed)

Essential equipment includes a mat on the floor (e.g., futon), sheet (futon cover), cotton blanket, blanket or top cover (chosen depending on region, season and with or without air conditioner), pillow and pillow cover, breast pad, towel for the massage (used for operative fields such as face and neck), hand-washing station, and washcloth (quick-drying scrubbing alcohol formulation for disinfection and disposable paper towel). As a general rule, items that directly contact the skin of the patients should be replaced for each patient.

(2) Massage using a bed

The standard size of bed used is 600 W × 1800 L × 550 or 600 H. The height is the most important factor. Ideally, a hydraulic electrical bed is the optimum selection. However, it is expensive and requires electrical power. So, it cannot be used in some cases.

With a bed of excessive height, the operator will find it difficult to apply body weight, and patients will have difficulty getting on and off the bed. As a general rule, a mat is placed on the bed and covered with a bedcover. The required equipment is similar to that shown in (1) above.

Section 2 Basic procedure of the massage

The massage procedure requires skill accumulated over a number of years. The basic procedures include the effleurage method, kneading method, compression method, tremor method, tapotement method, bent hand, and exercise technique.

1 Effleurage (massage)

Also called the massage method, the operator closely attaches his hands to the operative field, and then rubs and massages while applying moderate strength. The operator massages in a direction away from the heart. This method includes the following techniques.

(1) Palmar effleurage

Slight massage with the palms. This technique is used for relatively wide regions such as the back and abdomen.

(2) Thumb effleurage

Slight massage with the ball of the thumb. This technique is used for narrow regions, such as the

maniphalanx and interosseous metacarpal spaces.

(3) Two finger effleurage

The operative field is slightly pinched between the thumb and index finger and massaged. This technique is mainly indicated for the maniphalanx and toes.

(4) Four finger effleurage

A technique for massage using four fingers other than the thumb. This technique is indicated for the neck and head.

(5) Hand dorsal surface effleurage

A technique for a slight massage using the dorsal surface of the hands. This technique is indicated for regions with thick skin or fascia such as the soles and palms.

(6) Fingertip effleurage (finger end effleurage)

The operative field is scratched with the fingertips. This technique is mainly indicated for the head.

Effleurages mentioned above shall be performed twice or thrice with moderate strength at the beginning and ending of the practice of the each region. Return the hand every time. Never reciprocate the hand. However, fingertip effleurage performed on the head is an exception. In this technique, back-and-forth massage may be sometimes performed rapidly.

2 Kneading method

The hands of the operator are close to the operative field. Muscles are pressurized and held through clothing. Muscles are massaged vertically and horizontally or in an annular manner. This method includes the following techniques.

(1) Thumb kneading technique

Regions are kneaded with the ball of the thumb. This is an important technique that is indicated for whole body. In some cases, the tip of the thumb is used to knead a narrow region firmly.

(2) Two finger kneading technique

The operative field is slightly pinched between the thumb and index finger and massaged. In this technique, muscles are pinched between the thumb and index finger and kneaded. This technique is mainly indicated for the sternocleidomastoid muscle and the Achilles' tendon.

(3) Four finger kneading method

A technique for massage by using four fingers other than the thumb. Hard regions such as the head are kneaded by the tips of the four fingers. Soft regions such as the abdomen wall and interperitoneal are sometimes kneaded by overlapping tips of the four fingers of the both hands.

(4) Palm kneading method

Regions are kneaded by the palms. Generally, the ball of the thumb, hypothenar, or carpal regions are used.

(5) Holding kneading method

Muscles are held as large and deep as possible by applying force with the palm and finger pulp evenly and kneaded in an annular manner. The technique is mainly used for the upper and lower extremities.

(6) Spin kneading method

The extremities (normally, upper extremities) are pinched between both palms and kneaded like drilling a hole with a gimlet.

(7) Paddle kneading method

The operative field is pinched between the thumb and index finger or carpal region and four fingers and kneaded like pulling an oar. This technique is indicated for the abdomen.

(8) Olecranon kneading method (massage by point of the elbow)

Operative field is kneaded by olecranon by bending the cubital joint. This technique is indicated mainly for strongly kneading the upper part of the shoulders, back of the shoulders, and lumbar region.

The kneading methods shown above are most frequently used in massage. The main target is the muscle. The direction of the massage shall be in the direction the muscles travels. Be careful during movement of the hands and watch your strength in order to avoid injury to the tissues or skin.

3 Compression method

In this method, an appropriate amount of the force is applied to the operative field. This method includes the following techniques depending on the parts of the hand used.

(1) Thumb Compression method

Operative fields are pressurized with the thumb pulp or thumb tip. This technique is indicated for both sides of the vertebral column and abdomen.

(2) Four finger Compression method

The operative field is pressed with the four finger pulps or four fingertips. Normally, this technique is indicated for the abdomen.

(3) Palm (heel) Compression method

Normally, this technique is indicated for the carpal region. This technique is used for wide operative regions such as the back, abdomen, and lumbar region.

(4) Olecranon Compression method

The operative region is compressed with the elbow. This technique is indicated for the lumbar region and the shoulders requiring a significantly strong force. The compression methods shown above target the deep tissues. The operator shall compress the operative field by applying force gradually and reduce the force gradually. It is important to apply pressure at right angles to the skin.

4 Tremor method

Hands are attached to the operative field. Then, the hands are vibrated. The vibrations are transmitted to the operative field. This method includes the following techniques:

(1) Palm tremor method

The palm is attached to the operative field and vibrated. This technique is indicated for wide regions such as the abdomen.

(2) Finger tip tremor method

The operative field is vibrated with the thumb tip or four fingertips. This technique is applied to the neck and abdomen, etc.

(3) Grasping tremor method

Muscles are grasped and vibrated or held up and vibrated. This technique is indicated for neck and abdomen, etc.

(4) Fist massaging tremor method

The little finger side of the left fist is attached to the operative field. The second joint is rapidly massaged by the same part of the right fist. This technique is mainly indicated for the head.

(5) Olecranon tremor method

This technique may be used with olecranon compression method.

5 Tapotement method

The operative field is patted by various parts of the hands rhythmically and rapidly with elasticity. This method includes the following techniques:

(1) Fist patting method

Form a loose fist. The operative field is patted with the little finger side of the palm. This technique is used for the shoulders, back, and abdomen. Form a tight fist for strong patting. Form a loose fist for weak patting.

(2) Hand knife strike method

Extend all the metacarpals gently. Pat the operative field with the little finger side rapidly with elasticity. This technique is mainly indicated for the head, neck, shoulders, back, and upper and lower extremities.

(3) Praying hands tapping method

Clasp hands, extend all metacarpals gently, open fingers slightly, and pat the operative field with the little finger side rapidly with elasticity. This technique is mainly indicated for the neck, shoulders, back and lumbar region.

(4) Air tapping method

Cross the palms and contain air between both palms. Pat the operative field with right or left dorsal surface of the hands. This technique is mainly indicated for the shoulders, back, and lumbar region.

(5) Finger tip patting method

The operative field is patted with the fingertips of one or both hands. This technique is mainly indicated for the head.

The tapotement method is normally performed when a procedure is completed.

6 Bent hand

This technique is a combination of the tapotement method and tremor method, or tapotement method, kneading method, tremor method, and effleurage. Normally, this is performed after the tapotement method. This method mainly includes the following techniques:

(1) Wheel hand

First, attach the tips of the four fingers to the operative field. Bend and stretch the distal phalanx and middle phalanx of the finger joint and metacarpophalangeal joint sequentially like rotating a wheel. This technique is normally indicated for the shoulders, back, and lumber region.

(2) Dubbing hand

Hit the tips of the four fingers rapidly on the operative field. At the same time, bend the dorsal surface of the digit. Pat the operative field with the backside of the distal phalanx and middle phalanx of the finger joint. Fingertips hit the operator's palm and generate sound when the four fingers are bent. This technique is mainly indicated for the shoulders and back.

(3) Wrenching hand

This method includes thumb wrenching and four-finger wrenching. In thumb wrenching, hit the thumb tip to the operative field somewhat strongly and bend and stretch the thumb joint rapidly. In four-finger wrenching, like the thumb wrenching, hit the four fingertips on the operative field somewhat strongly and bend and stretch the four finger joints suddenly. Thumb wrenching is indicated for the shoulders. Four-finger wrenching is indicated for the lumbar region in the supine position.

(4) Willowy hand (loose fingers)

Loosen the entire hand and pat the operative field with each finger independently like the branches of a willow tree. This technique is mainly applied to the head region.

(5) Side of the hand (fan hand)

Attach the little finger side or thumb side of the hand to the operative field and move them back and forth. This technique is indicated for the entire body including the shoulders, back, head, neck, and the upper and lower extremities.

(6) Thunder hand

Make a loose left-hand fist and attach the little finger side to the operative field. Insert the index finger of the right hand into it and vibrate the index finger. This technique is indicated for the head region.

7 Exercise technique

Body parts are moved within their physiologic (normal) range of movement in accordance with articular structure. Exercises include flexion, extension, and rotation, depending on the types of joints. In massage, passive exercise techniques are mainly used. Normally, they are performed every time a massage technique is finished. It is desirable to move body parts as largely and widely as possible by observing the direction of the movement of the joints when performing the exercise technique. However, move body parts gently. Never move them roughly. Extension is used in combination with the exercise technique. In this method, joints are extended after performing the exercise technique on each joint.

Section 3 Massage of the body parts

Massage methods of body parts are classified into the seated position massage method, lateral position massage method, prone position, and dorsal position massage method depending on the basic posture of the patient. In this section, lateral position massage method will be explained. The procedure is explained assuming a patient in the lateral position (left side of the body is turned up).

The terms, front, rear, upside, and downside are used in explanations of the method are based on the anatomic positions of the extremities. As a general rule, the patient protracts a foot in the same side as the operator. Pressure is applied to the patient by shifting the weight when kneading or pressurizing.

Massage methods are performed on body parts in the order of the effleurage, kneading method, compression method, tapotement method, and bent hand. The compression method is performed on the same region as the kneading method. Therefore, explanations of the compression method will be omitted in the procedures for body parts.

As a general rule, the kneading method shall be performed four times on a single point (quadruple time). Thumb kneading includes linear kneading and annular kneading. Normally, linear kneading

is performed. Operation time indicated for each region does not include applied procedure and the compression method.

1. Shoulders, back, and lumbar region

Estimated operation time: 9-10 minutes

Posture of the patient: Lateral position with left side up (right hip joint and knee joint are bent. Left lower extremity extends naturally).

【effleurage】

Position of the operator: Faces the head of the patient from the back of the patient.

(1) Effleurage of the dorsal region and precordial region (3 times)

Attach both palms to the upper part of the shoulders from the back and forth of the patient (left hand is front, right hand behind, fingertips are directed upward). Palm effleurage method for left and right side are at the same time. Perform the method up to the seventh rib in the precordial region (perform the method toward the brachial region for females). Perform the method up to the height of the subscapular region for the dorsal region.

(2) Effleurage of the back and lumbar region (3 times)

Upturn the fingertips and attach the palm to the upper part of the shoulders. Perform alternating palm effleurage on the erector spinae muscle from the upper part of the shoulder to the lumbar region (the 1st, right hand, next, left hand).

【Grasping extension and kneading method】

Operator's position: Face the head from the behind the dorsal region of the patient for both (1) and (2)

(1) Bilateral palm grasping extension on upper trapezius (three points from the medial side to the lateral side)

Attach four fingers of the bilateral hands to the front border of the trapezius at the upper part of the shoulder. Attach the thumb to the dorsal region (higher than scapular spine). Grasp and exert traction on the trapezius with the palm.

(2) Upper four finger kneading method (3 points from the medial side to the lateral side)

Knead the front border of the trapezius with the right hand. In the lateral side, knead up to the medial border acromion along the posterior border of the collarbone.

(3) Thumb kneading method for the upper part of the shoulders (the 1st line- third line)

Position of the fixation: Acromion

Operator's position: Face the lower extremities from the positioned cephalad to the patient.

The 1st line (6 points from the cervical region to the medial extremity of the acromion): Perform the method up to the medial border of the acromion along the front border of the trapezius at the upper part of the shoulder with the left hand. Slightly contact the thumb tip to the front border of the trapezius.

The second line (6 points from the cervical region to the acromion medial extremity): In the back side of the 1st line, knead through the trapezius at the upper part of the shoulders, cervical region side, superior border of the angulus superior scapulae, and acromion medial border with the left hand (mainly trapezius belly).

The third line (4 points): Knead with the right hand from the proximal to the seventh cervical vertebra to the medial side border of the angulus superior scapulae.

(4) Thumb kneading method for interscapular region (the 1st line, the second line)

Operator's position: Positioned almost at right angles to the interscapular part from (4) to(6), behind the patient.

Position of the fixation: acromion region

The 1st line (5 points): Knead on the medial border of the erector spinae muscle from the 5th dorsal vertebra to the 7th cervical vertebra with the right hand.

The second line (5 points): Knead the belly muscles of the erector spinae muscles lateral side of the 1st line with a right hand.

(5) Thumb kneading method for the scapular medial upper border (4 points)

Knead with the right hand from the height of the center of the scapular medial border to the medial side of the angulus superior scapulae.

(6) Thumb kneading method for the lower part of the scapular medial border (3 points) and heel kneading for the scapular exterior edge (4 points)

Perform thumb kneading with the left hand from the height of the center of the scapular medial border to the angulus superior scapulae. Furthermore, perform heel kneading along the scapular exterior edge up to the acromion with left hand.

※Points to the consider

Perform thumb kneading along the spinal column for the interscapular part and scapular medial border.

Perform thumb kneading with the left upper extremities of the patient lowered in front and interscapular part opened.

(7)Thumb kneading method for back and lumbar region (the 1st line-the third line)

Operator's position: Positioned at almost right angles to the dorsal region behind the patient.

Position of the fixation: Acromial region

The 1st line (12 points): Knead with the left hand along the rector spinae muscle from the 5th

dorsal vertebra to the height of the sacral hiatus. Knead parallel to the spinal column.

The second line (10 points): Knead with the left hand on the erector spinae belly muscle at the lateral side of the 1st line from the height of the 5th dorsal vertebra to the fifth lumbar region vertebra. Attach the thumb tip to the medial border of the erector spinae muscle and move it in the direction at right angles to the spinal column.

The third line (6 points): Knead with the left hand on the erector spinae muscle exterior edge from the 9th thoracic vertebra to the iliac crest superior border. Move in a direction at right angles to the direction of travel of the muscle.

※Points to be considered

Perform the third line watching the ribs in the beginning. You can start from the lower edge of the 12th rib.

(8)Hypothenar kneading method for the iliac crest superior border (4 points)

Knead with the right hand along the iliac crest superior border from the lumbar region spine side to the anterior superior iliac spine.

(9)Heel kneading method for the upper part of the shoulders and back and lumbar region (upper part of the shoulder 3 points, back and lumbar region 6 points)

Position of the fixation: Acromial region

Operator's position: Face the head of the patient from behind the lumbar region of the patient from (9) to (10).

Perform annular kneading with the right hand on the trapezius at the upper part of the shoulder and interscapular part of the back and lumbar region from the height of the 5th lumbar region vertebra to the spinal column.

(10)Palm grasping kneading method for latissimus dorsi muscle (4 points) and heel kneading method for scapular lateral edge side (3 points)

Perform annular palm grasping kneading with the left hand from the iliac crest superior border to the angulus inferior scapulae. Furthermore, perform annular heel kneading on the scapular lateral side edge (axillary posterior wall) up to the acromial lateral side.

(11)Bilateral palm grasping extension for the upper part of the shoulder trapezius

Operator's position: Face the head of the patient from behind the dorsal region of the patient from (11)to (13).

Perform the procedures as shown above. .

【Tapotement method】

Perform the hand knife strike method and fix patting method to the upper part of the shoulders, back and lumbar region.

【Effleurage】

Perform the procedures in the order of (2) and (1) shown above.

2. Superior limb

Approximate operation time: 8 minutes up to the Upper limbs

Operator's position: Face the head from behind the dorsal region of the patient

Fixation: Acromial region.

【Effleurage】

(1)Effleurage for the lower part of the collarbone and scapular region (3 times)

Put the left palm on the lower part of the collarbone and the right palm on the scapular region with fingertips toward the upper side. Perform palm effleurage laterally below at the same time. The left hand proceeds through the deltoid muscle anterior fibra and the deltoid muscle arrest site. The right hand proceeds up to the angulus inferior scapulae.

【Kneading method】

(1)Heel kneading method for the infraspinous region (the 1st line to the third line)

Knead along the infraspinatus muscle, teres minor muscle, and teres minor muscle with the right hand.

The 1st line (4 points): Perform annular kneading along the scapular spine inferior border from the scapular spine base to the acromion.

The second line (4 points): Perform annular kneading under the 1st line on the center of the infraspinous region up to the acromion.

The third line (4 points): Perform annular kneading along the scapular exterior edge from the subscapular to the acromion.

(2)Four finger kneading method for the lower part of the collarbone (4 points)

Perform annular kneading with the four fingers of the left hand on the lower part of the collarbone from the exterior edge of the breastbone to the head of the humerus.

※Applied procedure

(1) Heel kneading method for the greater pectoral muscle (the 1st line-the third line)

Divide the greater pectoral muscle part into upper, middle, and under part. Perform annular kneading with the left hand from the breastbone exterior edge to the head of the humerus part.

(2)Grasping kneading method for the breast muscle tendon of the insertion

Perform grasping kneading with the left hand palm or two fingers from the greater pectoral muscle exterior edge to the axillary anterior wall as required.

※Points to be considered

As a general rule, don't knead female breasts.

【Effleurage】

Perform effleurage as shown above.

3. Upper limb

Operator's position: Face the head from behind of dorsal region of the patient.

Fixation: Cubital joint for operation of the brachial region. Wrist joint for massaging of the forearms.

【Effleurage】

(1) Alternating palm effleurage for the entire upper limbs (3 times)

Put the left hand on the shoulder joint and right hand on the posterior side. Perform effleurage on the upper limbs with the left and right palms, so that the upper limbs are enclosed.

【Kneading method】

(1) Thumb kneading method for shoulder joints

Divide the shoulder joint line into front and posterior parts.

Posterior part (3 points): Knead along the joint line with the right hand from the shoulder joint posterior side to the acromion lateral side. Anterior part (3 points): Knead along the joint line with the right hand from between the scapular coracoid process and the head of the humerus to the acromion lateral side.

(2) Thumb kneading method for deltoid muscles (anterior part, middle part, posterior part, 4 points respectively)

Divide the deltoid muscles into anterior, middle, and posterior parts. Knead at right angles to the direction of travel of the muscle from the origin part to the arrest site. Use the right hand for the anterior and middle parts. Use the left hand for the posterior part.

(3) Palm grasping kneading method for deltoid muscles (3 points)

Perform annular kneading with the right palm for the deltoid muscles from the origin part to the arrest site.

(4) Four finger kneading method and palm grasping kneading method for the biceps brachii muscle (4 points respectively)

Perform annular kneading with the left hand from the upper part to the arrest site of the biceps brachii muscle.

(5) Thumb kneading method and palm grasping kneading method for the triceps brachii muscle

Thumb kneading method (6 points): The operator is positioned at right angles to the upper limbs of the patient at the posterior part of the dorsal region of the patient. Perform inner rotation of the upper limbs of the patient. Knead with the right hand from the posterior surface of the shoulder joint to the olecranon. Knead at a right angle to the travel of the triceps brachii muscle.

Palm grasping kneading (4 points): Perform annular kneading with the right palm from the upper part to the arrest site of the triceps brachii muscle.

(6) Thumb kneading method for the posterior surface of the forearm (6 points)

Knead with the right hand on the center of the posterior side of the forearm from the immediately beneath the posterior surface of the radial head to the posterior surface of the wrist joint. Knead at a right angle in the direction of travel of the muscle.

(7) Two fingers kneading method for the brachioradial muscle (6 points)

Perform annular kneading with the left hand from immediately above the lateral epicondyle of the humerus to the styloid process of the radius.

(8) Thumb kneading method for the anterior surface of the forearm

The operator is positioned at right angles to the forearm from behind the dorsal region of the patient. Perform inner rotation of the upper limbs. Perform operation with the right hand to the radial side and ulnar side.

The radial side (6 points): Knead along the round pronator muscle and the radial side heel flexor muscle from immediately beneath the medial epicondyle of the humerus to the wrist joint anterior radial side. Knead at right angles in the direction of travel of the muscle.

The ulnar side (6 points): Knead along the ulnar side main root flexor muscle from immediately beneath the groove for the ulnar nerve to the wrist joint anterior surface. Knead at right angles to the travel of the muscle.

(9) Bilateral palm grasping kneading method for the hands (3 points)

Return the upper limb to the cadaveric position. Grasp the radial side of the hand by the left palm. Grasp the ulnar side of the hand by the right palm. Perform annular kneading from the proximal part to the distal part.

(10) Bilateral thumb alternating compression method for the palm (middle part: 4 points, the radial side and the ulnar side: 3 points)

Put the forearm in the pronated position. The operator inserts the left little finger between the little finger and annular finger of the patient and inserts his right little finger between thumb and index finger to spread out the palm of the patient's hand. Knead from the center of the anterior surface of the wrist joint toward the midline, ball of the thumb and little finger in a radial pattern.

(11) Two-finger kneading method and haulage for the maniphalanxes (finger pulling)

Perform two-finger kneading from the thumb to the little finger in sequence. Pull all fingers gently.

* Applied procedure

- (1) Bilateral palm grasping and compression from the shoulder joint to the carpal region
- (2) Spinning kneading method from the shoulder joint to the carpal region (spinning kneading method)
- (3) Bending and stretching exercises for the wrist joint
Fix the forearm with the right hand. Support hands with the left hand. Then, perform this technique.
- (4) Pronation and supination of the forearm and bending and stretching exercise of the cubital joint
Fix the elbow with the right hand. Support the forearm with the left hand. Then, perform this technique.
- (5) Exercise of the shoulder joint
Fix the shoulder with the right hand. Support the patient's hand with the left hand. Then, perform circumnutation of the shoulder joint. Finally, lift up and pull the upper limb. Return it to the original position by unlinking hands while shaking.

【Tapotement method and bent hand】

Perform the hand knife beating method, clasped hands beating method and hand edge rubbing. Perform the hand cup beating method on and deltoid muscle.

【Effleurage】

Perform the technique as shown in (1).

4. Cervical region

Tilt the pillow by moving the backside of the pillow upward. Anteflex the head of the patient slightly.

Approximate operation time: 4-5 minutes.

Operator's position: Face the head of the patient at the posterior part of the interscapular region

Fixation: frontal region of the head

【Effleurage】

- (1) Effleurage on the posterior cervical region (3 times)

Put the left palm on the center of the occipital region with fingertips pointing upward. Perform palm effleurage from the external occipital protuberance to the height of the 7th cervical vertebra.

- (2) Effleurage on the cervical region (3 times)

Put the left palm with the fingertips up on lateral side of the occipital region. Perform palm

effleurage from the mastoid to the sterncleidomastoid origin.

【Kneading method】

(1) Thumb kneading method for the posterior cervical region and lateral region of the neck (the 1st line-4th line)

Knead with the right hand.

The 1st line (6 points): Knead with the right hand from the nuchal fossa to the height of the 7th cervical vertebra. Knead at right angles to the travel on the nuchal ligament.

The second line (6 points): Knead with the right hand on the trapezius just proximal to the cervical spine at the outer side of the 1st line. Knead in a direction at right angles to the travel of the muscle.

The third line (6 points): Knead with the right hand around the splenius muscle up to the upper part of the shoulder at the lateral side of the second line. Knead in a direction at right angles to the travel of the muscle.

The 4th line (6 points): Knead with the right hand from the mastoid posterior border to immediately above the supraclavicular fossa. Knead along the cervical transverse process in a direction at right angles to the travel of the muscle.

(2) Four finger kneading method for the sterncleidomastoid (4 points)

Perform annular kneading with the left hand from the tip of the mastoid process to the region immediately above the sternoclavicular joint.

(3) Two finger kneading method for the sterncleidomastoid (4 points)

Pinch the sterncleidomastoid with two fingers and perform annular kneading with the left hand from the tip of the mastoid process to immediately above the sternoclavicular joint.

※Applied procedure

In some cases, procedures such as two-finger compression method for the sterncleidomastoid and the two-finger extension method are performed.

(4) Thumb kneading method for the superior nuchal line (6 points)

Knead with the right hand along the superior nuchal line from the nuchal fossa to the tip of the mastoid process. Knead in the direction at right angles to the travel of the muscle.

【Compression method】

(5) Thumb compression method for the superior nuchal line region (6 points)

Perform this technique on the region shown in (4) above.

【Effleurage】

Perform effleurage in the order of (2) through (1) as shown above.

※Points to the consider

In the thumb kneading method and thumb compression method for the superior nuchal line region,

if it is difficult to determine the direction of the compression, you may perform the technique with the left hand. In the thumb kneading for the lateral region of the neck, take care that the cephalic region may not rotate.

5. Cephalic region

Attach a washcloth to the temporal region of the head, forehead, and occipital region. Insert the washcloth between the right temporal region of the head and the pillow so that it may not move.

Operator's position: Face the head of the patient from behind the cervical region of the patient.

Fixation: Perform fixation at the forehead or occipital region respectively depending on the procedure.

【Effleurage】

(1) Palm effleurage from the forehead to the occipital region (3 times)

Perform effleurage with the left or right hand.

(2) Bilateral thumb effleurage over the ears, the forehead, parietal region through the occipital region (3 times)

Place the thumbs on the ears and place four fingers from each hand on the frontal region of the head through the parietal region. Move the four fingers in the direction of the occipital region while performing effleurage with the thumbs moving rapidly.

【Kneading method】

(1) Radial thumb kneading method for the temporal region of the head, the frontal region of the head through the parietal region

Fix the occipital region with the right hand. Perform this technique around the region over the ear with the left hand.

(2) Radial thumb kneading method for the temporal region of the head, parietal region through the occipital region

Fix the frontal region of the head with the left hand. Perform this technique around the region over the ear with the right hand.

【Tapotement method and bent hand】

Perform chipping, whipping and fist shaking, etc.

【Effleurage】

(1) Four-finger tip effleurage for the frontal region of the head, the temporal region of the head, and

the occipital region.

Perform this technique around the region over the ear with the left or right hand in a radial pattern.

(2) Perform this technique in the same way as in (1) shown above.

6. Gluteal region (10 minutes up to the lower extremities)

Operator's position: Face the head of the patient from behind the femoral region of the patient.

Fixation: Fix at the great trochanter region.

【Effleurage】

Effleurage the entire area of the gluteal region (3 times)

Place the fingertips of the right hand on the great trochanter pointing towards the head. Perform palm effleurage on the iliac crest, posterior superior iliac spine through to the lower part of the exterior edge of the sacrum in C-shape.

【Kneading method】

Heel kneading method for the entire gluteal region (the 1st line-the 4th line)

Perform this procedure with the right hand around the great trochanter.

The 1st line (4 points): Perform annular kneading from the great trochanter to the iliac crest.

The second line (4 points): Perform annular kneading from the great trochanter to the superior posterior iliac spine.

The third line (4 points): Perform annular kneading from the great trochanter to the lower region of the exterior edge of the sacrum

The 4th line (3 points): Perform annular kneading on the great trochanter, ischial tuberosity and lateral side of the ischial tuberosity through the gluteal fold.

※Applied procedure

Perform thumb kneading and thumb compression on the region of the line 1-line 4 shown above as required.

【Tapotement method】

Perform the chopping method, fist beating method and hand cup beating method, etc.

【Effleurage】

Effleurage for the whole gluteal region (3 times)

Perform the technique in the same way as shown above.

7. Lower extremities

Operator's position: Basically, the operator faces the head of the patient behind the lower extremities of the patient. The operator can move back and forth or turn around as required.

Fixation: Knee joint for the femoral region procedure. Ankle joint for lower thigh massage.

【Effleurage】

Effleurage for all the lower extremities (3 times)

Place the left hand on the great trochanter. Place the right hand on the ischial tuberosity. Perform palm effleurage on the back and front side of the lower extremities at the same time.

【Kneading method and Compression method】

(1) Thumb kneading method for the back of the thigh (the 1st line-the third line)

The operator stands at right angles to the operative field from behind the patient. Knead with the right hand.

The 1st line (7 points): Knead with the right from immediately beneath the ischial tuberosity to the center of the popliteal fossa. Knead along the route of the ischiadic nerve at right angles to the travel of the muscle.

The second line (7 points): Knead with the right hand from the region immediately beneath the ischial tuberosity to the posterior surface of the medial condyle of the tibia. Knead in a direction at right angles to the travel of the muscle along the semitendinosus semimembranosus muscle. .

The third line (7 points): Knead with the right hand from the region immediately beneath the ischial tuberosity to the posterior surface of the head of the fibula. Knead in a direction at right angles to the travel of the muscle along the biceps femoris muscle.

(2) Heel kneading method for the outside of the thigh (5 points)

The operator is positioned at right angles to the patient, facing the femoral region at the rear of the femoral region of the patient.

Perform annular kneading with left heel on the tensor fasciae latae muscle from the region immediately beneath the great trochanter to the lateral femoral tuberosity.

(3) Grasping-kneading method for the triceps surae muscle (belly muscle 4 points, Achilles' tendon 3 points)

Face the cephalic region of the patient in a posterior direction to the legs of the patient.

Perform annular palm grasping kneading with the right hand from the upper part of the lower thigh to the insertion point of the Achilles tendon. Perform two-finger annular kneading on the Achilles' tendon.

【Effleurage】

Effleurage all the lower extremities (3 times)

Perform the procedure in the same way as shown above.

For the procedures shown below, the patient shall be in the supine position (dorsal position).

【Effleurage】

Effleurage the entire part of the front surface of the lower extremities (3 times)

Operator's position: Face the patient's cephalic region on the left side of the patient.

Put the right hand on the great trochanter region. Put the left hand on the lower part of the anterior superior iliac spine. Perform palm effleurage on the anterior surface of the lower limbs up to the toes at the same time.

【Kneading method】

(1) Grasping-kneading method for the center of the anterior surface of the thigh (5 points)

Operator's position: Face the legs of the patient from the left side of the patient.

Perform annular palm grasping kneading on the rectus femoris muscle from the lower part of the anterior superior iliac spine to the patella region.

(2) Palm kneading method on the outer side of the anterior surface of the thigh (5 points)

Operator's position: Return to the original position.

Perform annular palm kneading with the right hand on the lateral great muscle from the front of the great trochanter to the patella.

(3) Palm grasping kneading method for the inner aspect of the thigh (4 points)

Perform annular palm grasping kneading with the left hand from the center of the inner aspect of the thigh to the interior side of the knee joint (pes anserinus).

(4) Kneading method on the patella

Perform the bilateral thumb kneading method around the patella, palm grasping kneading method for the patellar region and patella transfer technique as required. Perform linearly bilateral thumb kneading method on the region around the patella from the upper edge to the lower edge of the patella along the joint line of the patellofemoral joint. Perform the palm grasping kneading method on the patellar region while grasping the patella with the left palm in a circular manner.

(5) Thumb kneading method for the anterior tibial muscle (8 points)

Face the cephalic region of the patient. Knead with the right hand from the height of the region immediately beneath the tibial tuberosity to the ankle joint with the right hand. Knead in a direction at right angles to the travel of the muscle.

(6) Thumb kneading method for the peroneal muscle group (8 points)

Face the lower thigh of the patient. Knead with the right hand from the height of the region

immediately beneath the head of the fibula to the height of the external condyle. Knead in a direction at right angles to the travel of the peroneal muscle group.

(7) Heel kneading method for the extensor muscle group of the legs

Face the cephalic region of the patient. Perform annular kneading on the extensor muscle group of the leg from a height immediately beneath the tibial tuberosity to the ankle joint with the heel of the right hand.

(8) Compression method along the medial border of the tibia and anterior border of the tibia (8 points)

Face the lower thigh of the patient. Place four fingers of each hand on the upper region of the margo medialis tibiae and put both thumbs on the upper region of the lateral edge of the tibia. Compress them at the same time up to the height of the medial malleolus and lateral malleolus.

(9) Four-finger kneading method for the interosseous metatarsal spaces

Face the cephalic region of the patient. Place four fingers of the right hand in each space of the bones. Perform linear kneading with the right hand from the proximal part to the distal part of the acrotarsium.

(10) Palm grasping kneading method for the feet (3 points)

Face the cephalic region of the patient. Grasp the medial side of the foot with left palm and wrap right hand around the outside of the foot. Knead from the proximal part to the distal part in a circular manner. Put the left hand on the medial side of the foot, right hand on the outside and thumb on acrotarsium during this procedure.

【Tapotement method and bent hand】

Perform the chopping method, hand cup beating method, hand edge rubbing, etc. as required.

Take care to not hit the patella and shinbone.

【Effleurage】

Effleurage the entire part of the lower extremities

Put the left hand on the anterior superior iliac spine. Put the right hand on the great trochanter region. Perform palm effleurage up to the feet at the same time. Finally, support the ankle joint gently. Pull it while applying vibration.

*Applied procedure

(a) Thumb kneading method for the external side of the posterior surface of the thigh

Perform the practice to the lateral side of the biceps femoris muscle.

(b) Kneading method for the knee joint

Face the knee joint of the patient. Put both thumbs on the popliteal fossa. Put four fingers of each hand on the patella region. Knead simultaneously or alternately.

(c) Thumb kneading method for the center of the anterior surface of the thigh

(d) Two finger kneading method around the patella

Pinch the patella between the thumb and index finger of each hand. Knead the region around the left and right patella simultaneously.

(e) Thumb ball kneading method for the upper and lower region of the patella

Pinch upper and lower side of the patella with the balls of each thumb. Perform bilateral rotary kneading.

(f) Exercise technique

Circumnutation of the ankle joint

Fix the Achilles' tendon with the left hand and support the metatarsal bones by gripping the plantar surface with the right hand to perform circumnutation of the ankle joint.

Extension of the knee joint and stretching of the triceps surae muscle

Fix the lower region of the anterior aspect of the thigh with the right hand. Support the tarsal region with the left hand. Further, dorsiflex the plantar surface and ankle joint with the forearm of the left hand while extending the knee joint.

8. Finishing massage method (8 minutes)

Set the patient in prone position. Put a semi-circular pillow on the forehead. Make the patient bend the upper limbs and put hands lateral on the head. The operator faces the head of the patient from the left side of the patient. As a general rule, perform each procedure twice bilaterally at the same time. You can perform this method one side after the other for the gluteal region through lower extremities.

(1) Palm grasping extension for the upper part of the shoulders

Simultaneously perform this technique on the left and right trapezius in the upper part of the shoulder from the inside to the outside.

(2) Effleurage the shoulders, back and posterior surface of the lower limbs

Place both palms on the upper part of the left and right shoulder. Perform palm effleurage up to the calcus pedis while applying light compression to both sides simultaneously.

(3) Effleurage and compression tremor method for the shoulders, back and lumbar region

Perform palm effleurage up to the lumbar region in the same manner shown in (2) above. Perform effleurage up to the lateral region with pointing fingertips toward the lateral side. Then, squeeze the lateral region. Return to both sides of the lumbar region spine. Perform palm compression shaking gently.

(4) Thumb kneading method for the upper part of the shoulders

The operator stands at the side of the head of the patient and faces the lower extremities. Knead the region just proximal to the 7th cervical vertebra, immediately above the angulus superior scapulae,

supraspinal region through the acromion medial border in a bilateral manner.

(5) Thumb kneading method for the erector spinae muscle in the back and lumbar region

Return again to the original position. Perform this practice on the stomach muscles of the erector spinae muscle from the 1st thoracic vertebra to the height of the sacral hiatus in a bilateral manner. Put both thumbs on the medial border of the erector spinae muscle. Knead on the left and right side simultaneously at right angles to the travel of the muscle.

If you perform this technique on the left and right side separately, perform from (6) to (11) without a break and perform the same technique on the opposite side.

(6) Heel kneading method for the gluteal region (the first and the second line)

The 1st line: Perform heel kneading in a circular manner from the outside of the coccyx to the upper edge of the great trochanter along the exterior edge of the sacrum and inferior border of the iliac crest bilaterally.

The second line: Perform annular palm kneading from the region immediately beneath the center of the iliac crest to the gluteal fold bilaterally.

* Points to the consider

Fix the outside of the gluteal region not receiving the massage when you perform the practice one side after the other.

(7) Thumb kneading method for the posterior region of the thigh

Knead the center of the posterior region of the left and right thigh simultaneously from the region immediately beneath the ischial tuberosity to the popliteal fossa at right angles to the travel of the muscle.

※Points to the consider

If you perform this technique on one side at a time, overlap both thumbs or put them abreast. At this time, take care that the four fingers on the inner aspect of the thigh may not make the patient uncomfortable.

(8) Heel kneading method for the posterolateral region of the thigh

Perform heel kneading on the left and right biceps femoris muscles simultaneously from the region immediately beneath the ischial tuberosity to the popliteal fossa in a circular manner.

As shown below, perform the procedure from (9) to (11) on one side at a time.

(9) Bent hand rubbing for the popliteal fossa

Make the patient bend the knee joint slightly. Perform bent hand rubbing.

(10) Grasp the triceps surae muscle of the left lower thigh with the right palm. Grasp the triceps

surae muscle of the left lower thigh with the left palm. Perform grasping kneading from the upper region to the insertion of the Achilles tendon. Perform two fingers kneading for the Achilles tendon.

(11) Compression method for the planta pedis

Compress the center, medial margin, and lateral margin of the planta pedis with both thumbs from the calcar pedis to the base of the toes.

(12) Tapotement method and bent hand for the shoulder, dorsal region, lumbar region, gluteal region, and posterior region of the thigh

(a) Fist beating all regions (do not beat the interscapular region, side chest, and regio lateralis strongly.)

(b) Chopping all regions

(c) Bent finger method for the posterior region of the thigh, gluteal region, and lumbar region

(d) Cupped palm beating for the lumbar and gluteal regions

(13) Effleurage for the shoulders, dorsal region, and facies posterior membri inferioris

Perform the techniques in the same way as shown in (2) above.

9. Massage method for the abdomen

Take care of the following items when you perform a massage on the abdominal region of patients.

(1) Do not perform procedures immediately after eating food.

(2) Make patients pass a bowel movement and urinate in advance.

(3) Remove cinch, string, and bands, etc.

(4) Keep patients at rest and make them control their breathing. Operators should not have a chat with patients during practice.

Set a patient in the dorsal position. Make the patient settle into a comfortable position. The operator stands on the left side of the patient. Extend lower extremities of the patient when you perform effleurage. Bend lower extremities of the patient slightly when you use a kneading method. Do not touch bones around the abdomen during massage.

【Effleurage】

(1) Palm effleurage for the center of the abdomen

Put the left and right palm on the region below the heart. Stroke the abdominal rectus muscle up to the hypogastrium bilaterally.

(2) Effleurage along the arcus costalis

Put the left and right palms on the region below the heart. Stroke the left and right costal arch simultaneously up to the lateral region.

(3) Palm effleurage for the lateral region

The operator stands facing the direction of the lower extremities of the patient. Places both palms on the region below the left and right papilla of the breast. Rotates hands and promote hands to both sides of the lumbar region spine. Further, squeeze the lateral region up to both sides of the umbilicus.

【Kneading method】

(1) Rowing-kneading method for the abdomen

The operator stands on the left side of the patient. The operator faces the opposite side. Places both palms abreast on the anterior abdominal wall of the patient. Places both thumbs on the left side. Places four fingers on the right side. Knead from the upper abdominal region to the hypogastrium, as if the operator is pulling an oar.

(2) Bilateral palm annular grasping kneading method for the abdomen

This technique is performed on the central line of the abdomen and border of the rectus abdominis. Overlap both palms. Knead from the upper abdominal region to the lower abdominal region.

(3) Palm kneading method for the umbilical region

Put both palm overlapped on the umbilical region. Knead in a circular manner.

(4) Palm grasping kneading method for the lateral region

The operator faces the cephalic region of the patient. Perform this technique by using both palms on the left and right lateral region alternately.

【Compression method and tremor method】

(1) Four-finger compression method along the costal arch

The operator places four fingertips of each hand on the region below the heart of the patient. Compress slightly and vibrate the region below the heart, costal arch through lateral region.

(2) Heel compression method for the border of the rectus abdominis

Perform this practice on the border of the rectus abdominis from the upper abdominal region to the lower abdominal region. Perform this technique while applying vibrations to the left and right side alternately by using both heels of the hands.

(3) Tremor method for the central line of the abdomen

Compress slightly with the thumb and four fingers of the left hand the central line of the abdomen, umbilicus through to the lower part of the abdomen while applying vibrations.

(4) Grasping tremor method for the rectus abdominis muscle

The operator stands on the left side of the patient and faces the opposite side. Perform this technique with both palms on the rectus abdominis muscle from the upper part of the abdomen to the lower part of the abdomen.

【Bent hand and effleurage】

(1) Sweeping method

The operator stands facing the direction of the cephalic region of the patient. Get his hands around the lumbar region. Squeezes the lateral region using the palms. Simultaneously, perform effleurage by compressing up to the umbilicus.

(2)Knuckle effleurage for the abdomen

Put the left palm on the cardiac space. Perform this technique with the backside of the finger joints of the right hand up to the lower part of the abdomen.

【Effleurage】

Perform the practice in the same way as shown in (1) above.

CHAPTER 5 Major symptoms and Anma therapy
—Summary of their concept, clinical condition, examination and
therapies(including Self-care)—

Massage therapy for stiff shoulder

(1) How many people suffer from stiff shoulders?

Stiff shoulders are considered to be less prevalent among Caucasians, more common among Mongolians, and most common among Japanese. In 1910, katakori (stiff shoulder) first appeared in the novel *Mon (Gate)* written by Soseki Natsume.

In 1998, the Japanese Ministry of Health, Labour and Welfare conducted a survey on the symptom that Japanese people were most concerned about. According to the results, back pain and stiff shoulder ranked first and second among men, respectively, while stiff shoulder ranked first among women. Additionally, the survey revealed that younger people from 15 to 25 years of age also experienced stiff shoulders. As for people in their 30s, the prime of life, or older, the number of people suffering from stiff shoulder increases explosively whereas it decreases for generations over 65 years old. Thus, stiff shoulder can be regarded as the most prevalent symptom among those in their most productive years as well as a very familiar medical condition.

(2) Causes of stiff shoulders

We understand stiff shoulder as stiffness, pain, numbness, cold sensations, tiredness, and fatigue in the shoulders, neck, arms, and fingers. These symptoms are caused by prolonged work with a static posture, poor posture, lack of exercise, or bad life habits. Stiff shoulders are most likely to be developed by continuous muscle strain due to prolonged use of the same muscle without exercising the whole body. Prolonged use of a computer is a good example representing such a condition.

(3) Pathological and non-pathological stiff shoulder (Differential diagnosis of stiff shoulder)

These two kinds of stiff shoulders are classified by the presence or absence of underlying disease that cause pain. Pathological stiff shoulder is attributed to the following medical conditions: (1) orthopedic disorders of vertebral bones and scapulas, (2) internal disorders (lungs, heart, liver, kidneys etc.), (3) ophthalmologic, dental and otorhinological disorders, (4) depression (mental disorders) If these disorders are present, stiff shoulder can not be cured without their elimination. In cases where stiff shoulder is suspected to be attributable to these disorders, the professional consultation appropriate for each case should be encouraged and sought. However, the most cases of stiff shoulder are non-pathological. This corresponds to the cases in which the accumulated fatigue of any specific muscle causes pain, stiffness, numbness, cold sensation, heavy feeling of the

neck, shoulders, arms and fingers. These symptoms are collectively referred to as “cervico - omo - brachial syndrome”.

<Body structures helping the understanding of the causes of stiff shoulder (cervico-brachial syndrome)>

(1) Cervical vertebrae and discs

The adult skull weighs as much as about 3 to 4 kg, and this heavy skull is supported by the cervical vertebrae. There are seven in total, stacked on top of each other and make up the cervical part of the vertebral column. A cervical vertebra has processes. The one projecting out backward is the spinous process and those pointing to the side are the transverse processes. The intervertebral discs, columnar solid cushions, are located between each pair of vertebrae. They connect the vertebrae together and serve as the spine's shock absorber to protect the brain as well as to provide impact relief. The water content of the intervertebral disc is higher during youth and decreases gradually with age after the age of 20. Thus, it is one of the tissues that age most rapidly. Eight pairs of nerves (cervical spinal nerves) emerge from each tunnel on the left and right side of each vertebra (the intervertebral foramina). With age, bone spurs form around the foramen and can project into the tunnel, pinching the nerve causing pain.

(2) Scapula

The scapula is the bone that forms the posterior part of the shoulder girdle and is an inverted triangle with one angle pointed downward. It laterally connects to the arm bone (humerus). The muscles attached to this bone not only help to suspend the arm but also play an important role when the shoulder is moved in any direction. Thus, these muscles are likely to cause a stiff shoulder. These muscles are explained below.

(3) Cervical nerves

The cervical nerves are eight pairs of spinal nerves passing outward between each vertebra, one

on the left and one on the right. These nerves run through the skin and muscles of the neck, shoulders, arms, and fingers and are responsible for sensory perception and motion control. The lower four cervical nerves out of eight unite into three major cords to form the plexus. The plexus extends from the anterior to the inferior side of the neck, passes between the muscle and crosses the blood vessels (the subclavian artery/vein) to reach all the way down to the hands. The plexus next passes behind the clavicle between the ribs to the upper limbs. As just described, the cervical nerves and blood vessels distributed to the upper limbs descend through the space between the muscles and bones to the arms and finally to the fingers.

(4) Muscles involved in the stiff shoulder

The major muscles involved in a stiff shoulder are listed below:

1) Cervical muscles

- Sternomastoid muscle: Passes obliquely across the side of the neck, almost in the middle of it, in the direction from anterior inferior to posterior superior and act to rotate the head and tilt it to the side.

- Scalene muscle: Lies to the anterior lateral side of the neck, behind the sternomastoid muscle and acts to tilt the neck to the side.

2) Superficial muscles of the shoulder and the back

- Trapezius muscle: Covers the wide area of the upper back area from the neck, shoulders to the back. It acts to move the scapula and tilt the head backward.

- Supraspinatus muscle: Occupies about the upper one-third of the scapula as covered with the trapezius muscle and attached to the arm bone (the humerus). It acts to twist the arm inward and outward.

- Infraspinatus muscle: Occupies about the lower two-thirds of the scapula and is inserted into the arm bone (the humerus) It acts to twist the arm outward.

- Deltoid muscle: Covers the shoulder laterally and forms its rounded contour. It plays an important role in moving the arms in any direction.

3)Deep muscles of the shoulders and the back

- Levator scapulae muscle: Covered with the trapezius, arises from the transverse processes of the upper four cervical vertebrae out of seven and inserted into the scapula. It acts to raise the scapula and help moving the neck.

- Rhomboids: Covered with the trapezium. It arises from the lowest cervical and the following upper thoracic vertebrae and is inserted to the medial border of the scapula. It acts to retract the scapula medially or upward.

(5) Major disorders causing stiff shoulders (the neck-shoulder-arm syndrome)

Here two disorders are explained briefly.

1) Cervical spondylosis

This disease occurs with aging. The cervical vertebra are seven in total and the intervertebral discs, cushions containing ample water, exist between the vertebrae. The water content decreases gradually after the age of 20, which result in the concurrent loss of flexibility. Then, the cervical vertebrae lying between the degenerated disks lose their stability, followed by the formation of the spine of the bone (the osteophyte) around each cervical vertebra. The osteophyte easily impinge or compress the cervical nerves passing through the intervertebral foramina. As the cervical nerves responsible for the sensory perception and motor control of the neck and arms as well as the vasomotor function, the compression causes symptoms of pain, stiffness and numbness in the corresponding area.

2) Thoracic outlet syndrome

This syndrome consists of a group of signs/symptoms including stiffness, pain, numbness, and circulatory deficits in the neck, shoulders, arms, and hands attributed to compressed nerves (the brachial plexus) and blood vessels, which pass into the arms and hands, in the thoracic outlet region (around the base of the neck). The area where the nerves and vessels are prone to compression includes the small passageway bordered by two scalene muscles, which the nerves and vessels emerging from the inferior lateral side of neck behind the clavicle pass through. The second passageway is the lateral inferior area of the clavicle where the strains on adjacent muscles easily cause the compression of the bundles of nerves and blood vessels. As they course through the narrow passageways, the nerves and blood vessels descending to the arms are compressed to produce the signs/symptoms listed above.

The treatment of the two disorders include the relief of muscle strain to improve or minimize the stiff shoulder or symptoms in the arms because they are caused by the strain on the muscles that surround the passageway of the bundles of nerves and blood vessels or located around the outlet of the cervical nerves emerging from the intervertebral foramina of cervical vertebrae

(6) Treatment of stiff shoulder with Japanese Anma

Japanese *anma* is performed through the clothing and started from the medial area to the distal area (from the shoulders to the fingers and from the buttock to the toes).

Basic techniques of *anma* are almost the same as those for massage except it lacks the *kyousatu ho* (rotation and stroking with heavy pressure) that massage employs. In addition, the same word, *haakujyunen* (gripping and kneading) is the same word as employed in massage but used differently in Japanese *anma*. In *anma*, it implies the gripping and kneading as pushing the muscle down to the bone, whereas in massage, it means drawing the muscle from the bone.

Moreover, *anma* has a unique technique called *kyokute*, a special percussion technique in which the percussion such as *tsukite*, *yokote*, *aoite*, *kurumate*, *yanagite* and vibration are combined.

1) Treatment with the patient in a prone position (on the stomach)

A. Light simultaneous stroking of the head with both hands

Simultaneously strokes with both the right and left side of the patient's head covered by a towel from the front, the parietal to the occipital areas with both hands several times. Be careful not to displace the towel.

B. Kneading over the whole head with the palm (this is done two or three times for each three of the frontal, temporal, occipital regions.)

Standing on the left side of the patient, first knead the right side of the parietal region by dividing the region vertically with two to three lines. Then do the same for the left side of the parietal region.

When massaging the right side, place the left hand at the left lateral region gently, while using the right hand to do the same when massaging the left side. Subsequently, knead the temporal region from the back to the front by dividing it with two to three lines. This region should be massaged strongly with the base of the palm and lightly with the four fingers. Place the opposite hand at the temporal region to hold the head similarly as done with the parietal region. Finally, knead each right and left side of the occipital region from the area adjacent to the midline by dividing it with two to three lines. This region may be massaged with the base of the palm.

C. Pressing the head with the thumb

For patients with headache and insomnia, apply soft pressure on the *baihui* (the parietal notch) with the finger pad of the thumb for 1-2 minutes. Several cavities are located around the hair margin in the temporal region, and thus the temporal muscles easily become strained. For headache and eye strain, press this area intermittently from the

back to the front in two or three lines using the root of the palm. This can be done simultaneously on both sides or alternately on each side.

D. Light stroking of the neck, shoulders, back, and the buttocks with the palm

Standing on the left side of the patient, place the right and left four fingers on the side of the neck and stroke lightly downward to the root of the neck, and from the root of neck to the acromion, stroke lightly with the palm. Then return to the root of the neck, stroke down lightly on the both sides of the vertebral column with the palms. Reaching to the lower back and buttocks, stroke lightly from the medial sacrum to either the right side or the left side of the hip separately. Repeat this a few times.

E. Pressing and kneading with the thumb along the superior nuchal line (hair line behind the neck)

Standing on the left side of the patient, first press several points along the right half of the superior nuchal line moving from the center to the lateral side and then knead with the thumb. Repeat this 2-3 times before proceeding to the left side. Do the same on the left side.

F. Gripping and kneading of the neck

Standing on the left side of the patient, open the right palm wide to grip the muscles in the posterior cervical area (trapezius muscle etc.) and knead at several points moving from the upper part of the neck to the root. This should also be repeated 2-3 times.

G. Pressing and kneading of the neck and the upper part of the shoulders with the thumb(Fig.2-1)

Use the right hand for anma on the patient's right side and use the left hand for the patient's left side. Press several points with the thumb moving from the lateral side of the seventh cervical vertebra toward the supraclavicular fossa and then knead with the thumb. After performing on the right side, do the same on the left side. This technique is effective for relaxing the muscles and ligaments in the neck and shoulder area as well as relieving stiff shoulder.

H. Gripping and kneading of the upper part of the shoulder

Standing on the left side of the patient, grip the muscles in the upper part of the right shoulder with the widely opened right palm and those of the left shoulder with the left palm to knead in the circular motion. Repeat this on the right side a few times and then move to the left side to do the same.

I. Pressing and kneading on the both sides of the spine with the thumb

Standing on the left side of the patient, press the erector muscles on each side of the

spine alternately from the top to the bottom (on the lateral side of the seventh cervical vertebra to the fifth lumbar vertebra) with the thumb twice and then knead the right and left sides with the right and left thumb respectively 2-3 times. Repeat this more times when a strong strain is present.

J. Pressing and kneading on the medial margin of the scapula with the thumb(Fig. 2-2)

Standing on the left side of the patient, press with the thumb along the medial margin of the scapula from the branched root area to the inferior angle alternately on the right and the left sides. Then knead on the right side with the right thumb a few times and do the same on the left side. This technique is effective for a stiff shoulder and fatigue in the arms.

K. Kneading of the infraspinous area with the root of the palm

Standing on the left side of the patient, knead from the medial margin to the lateral margin of the scapula dividing with two or three lines as softly as possible. The thumb and the remaining four fingers should be placed some distance from the affected site to knead. After performing on the right side, move on to the left to do the same. This is also effective for a frozen shoulder, pain, and fatigue in the arms.

2. Eyestrain • blurred vision (Asthenopia)

(1) Concept

After visually intense tasks, symptoms of fatigue and a heavy feeling in the eyes, blurred and decreased vision, headache, double vision (a condition the image is seen as being overlapped), pain in or around the eyes, stiff shoulders, and occasional nausea and vomiting occur. Such conditions are generally called asthenopia and classified into accommodative asthenopia and symptomatic asthenopia according to their causes.

Accommodative asthenopia is due to the fatigue of eyes caused by excessive effort to accommodate visions and further classified into two categories: refractive error, the cause of myopia, hyperopia and astigmatism, and accommodation disorders, the cause of presbyopia and accommodative insufficiency. Furthermore, VDT syndromes and dry eye (which is described in detail below) may be developed by the repetition of prolonged computer use.

Whereas, symptomatic asthenopia correspond to asthenopia due to mild eye disorders including conjunctivitis, keratitis, and early glaucoma,

Manipulative therapy is effective against asthenopia to a certain degree, but professional medical treatment is required in case of the clearly established causal disorders including conjunctivitis, trachoma, and glaucoma. Therefore, a clear understanding by medical interview and examination is essential.

(2) Clinical conditions

(1) Accommodative asthenopia

A. Refractive errors

Refractive errors include myopia and hyperopia where the image may be focused anterior or posterior to the retina, and astigmatism in which separate focal points exist within the eye due to the non-spherical cornea. In either case, the image of an object is not clearly focused on the retina to cause poor vision. All kinds of things to make blurry vision clearer such as the approximation of objects to eyes or the effort to see objects in odd postures lead to the development of various symptoms.

B. Accommodation disorder

Accommodation disorder refers to the eye's lowered ability to change the lens shape. The lens changes thickness by the action of ciliary muscles to adapt itself so that the image is focused on the retina. In short, the thickness of lens changes according to the distance to the object. For example, to see at near, the ciliary muscle is constricted and the lens is expanded. The other way around, the ciliary muscle is relaxed to flatten the lens to see distant objects.

Meanwhile, presbyopia is a condition in which the lens of the eye loses the ability to focus. These age-related changes make the lens harder to expand and consequently cause the blurred vision at near points, whereas the accommodation insufficiency is a condition in which the ciliary muscles get so tired to cause abnormal accommodation.

(2) VDT syndrome and dry eyes

The recent expanded use of computers has increased the frequency of prolonged keyboard operation with the eyes fixed on VDTs. The work of keyboard operation with the eyes staring into VDTs and the body maintaining the same posture for hours puts a heavy strain on the eyes, neck,

shoulders and arms to cause symptoms including eye strains and stiff shoulders. In addition, neurological symptoms such as insomnia, mental instability, and irritation may also be developed. Such symptoms of the eyes and nerves attributable to the operation with computers is called VDT syndrome. The close relationship between dry eyes and VDT operation has been indicated. The reason of the decreased blink rate while working makes the surface of the eyes dry. The known symptoms include eye fatigue, blurred vision, pain in eyes, watery eyes, headache and stiff shoulders.

(3) Keys to the examination

Patients who visit the clinic with complaints of symptoms, such as the eye fatigue and blurred vision must be examined whether they have any refractive errors. In the case of myopia, hyperopia, astigmatism, or presbyopia, they are often the cause.

Then, they should be asked about their work environments and job descriptions. As doing so, whether the patient works in dry environment such as air conditioned rooms or whether engaged in visually demanding and prolonged work should be confirmed. Eye fatigue and blurred vision may sometimes be attributed to disorders of glaucoma and cataracts. In particular, potentially serious diseases like glaucoma should always be considered.

(4) Treatment

It is important to advise patients complaining of symptoms of eye fatigue and blurred vision to refrain from the work that strains the eyes. In addition, the examination as to whether the patient is wearing the proper glasses for their visual condition should not be neglected.

(1) Manipulative therapy

Basically the treatment for the patients with VDT syndrome does not simply include therapy around the eyes. Additional careful massage to the head, neck, shoulders, upper arms, and back is also important.

A. Anma therapy around the eyes

Knead and press with four fingers along the bone rim of the orbit as well as the temporal area. It is especially effective to apply continuous pressure at the outlet of the nerves on the frontal notch on the supraorbital margin and the infraorbital foramen, the opening of the maxilla.

* Frontal notch: The notch located at the medial end of the eyebrow, above the inner corner of the eye and sensitive to Shiatsu.

* Infraorbital foramen: The dent a little below the inner corner of the eye and sensitive to Shiatsu.

B. Anma therapy to the head, the upper parts of shoulders, upper arms, and the upper and lower back

With the patients in lateral position, massage as mainly using kneading techniques with the thumb. Perform Anma carefully as intended to relieve the pain and stiffness of the backside of the neck (around superior nuchal line), posterior triangle of neck (lateral cervical groove), the interscapular area.

(5) Instructions for self-care

A. Points to consider during VDT works

- (1) Try not to work continuously for more than 1 hour.
- (2) Take a rest for 10 to 15 minutes after any continuous work.
- (3) Take breaks once or twice during continuous work periods.

B. General considerations

- (1) In winter, use a humidifier to keep the room humid. Stay away from direct wind blowing from the air conditioner.
- (2) Pay attention to the size of the characters displayed on the monitor and screen brightness when viewing a monitor for a long time.
- (3) Check the lighting to eliminate glare on the screen.
- (4) Keep the screen below eye level to prevent the face from being turned upward

C. Self stimulation Anma techniques

- (1) Kneading and pressing with four fingers around the orbit
- (2) Kneading and pressing with four fingers on the temporal area

3. Neck pain and pain/numbness of the arms

(1) Concept

Pain and numbness of the neck, shoulders, and arms are attributed to aging, prolonged use of hands and computers, physical stress, heart disease, traffic accidents, and trauma. However, spondylosis and thoracic outlet syndrome are among the disorders most frequently seen in the clinic of manipulative therapy and thus explained here.

Besides the disorders mentioned above, most cases can be treated as well, but for patients demonstrating the symptoms described below, Anma therapy should not be performed or referral

to a professional doctor should be encouraged.

- (1) Patients with rapidly developed and intense symptoms
- (2) Patients with systemic conditions including a fever
- (3) Patients affected by tumor and complaining strongly of spontaneous and/or night pains
- (4) Patients with urinary and/or bowel problems or gait disorder

A Concept of spondylosis

Cervical spondylosis is a degeneration or aging of the bones (vertebrae) of the neck (cervical spine) and the disks causing pains, numbness, disorders of movements and abnormal sensation in the shoulders, arms, hands, and fingers and usually appears in middle-aged men and women. In severe cases, loss of bladder or bowel control and gait disorder may also develop.

B Concept of thoracic outlet syndrome

Thoracic outlet syndrome is a group of complicated disorders (a syndrome) that occur when the blood vessels or nerves that emerge from the cervical spine and run into the arms become compressed by the surrounding bones and muscles. This can cause pain, stiffness in the shoulders and neck, pain and weakness in the arms, pain, numbness and hypoesthesia in your fingers, back pain, headache, and cold sensation. In today's society, those engaged in work demanding excessive use of the arms, mainly office workers who operate VDTs, frequently develop this syndrome. It is more commonly seen in women in their 20s and 30s with sloping shoulders and middle-aged and older men with square shoulders.

(2) Clinical condition

(1) Clinical condition of cervical spondylosis

The ability of diverse and extensive head movement, for example the ability to rotate the head from side to side and to bend forward and backward is required for the cervical spine. Therefore cervical joints have many complex systems that work together to perform demanding tasks and are surrounded by many fine muscles enabling delicate movements in any direction. Meanwhile, the structures enabling such delicate and dynamic movement is achieved with a price of sacrificing stability; consequently, joints and muscles involved are more or less subjected to changes induced by over-use (degeneration).

With aging and overuse, the disks get harder and thinner to narrow the space of intervertebral foramen located between the vertebrae, a passageway of spinal nerves. The unstable vertebrae may

irritate the capsule of the intervertebral joints and develop inflammation causing pain and wear of joint cartilages. The vertebrae exposed to such stimulation may induce the unnecessary proliferation of osteocyte to develop “bone spurs” (osteophytes). Abnormal growths of bone spurs can lead to pressure on the spinal nerves running through the intervertebral foramen to cause pain and numbness in the arms and hands and, sometimes, may compress the spinal cord itself to cause severer symptoms including movement disorders and urinary problems.

A Clinical condition of thoracic outlet syndrome

Among eight pairs of cervical nerves (C1-C8) passing outward between each cervical vertebra, one on the left and another on the right, the roots of the lower half (below C4) are merge to form the bundles (the brachial plexus) proceeding between the muscles of the neck (the interscalene space) to the thoracic outlet (around the greater supraclavicular fossa). The plexus passes through the narrow space between the clavicle and the first rib as encompassing the subclavian artery and vein, reaches to anterior chest wall and then proceeds to the armpit as surrounded by the greater and smaller pectoral muscle

As just described, cervical nerves pass through the narrow spaces and are surrounded by muscles around the thoracic outlet area. The subclavian artery and vein also accompany the brachial plexus in the thoracic outlet area. Therefore, the brachial plexus and subclavian artery and vein are easily compressed by the surrounding bones (cervical rib, clavicles, or first rib) and muscles (anterior and middle scalene muscle and smaller pectoral muscle). Furthermore, they are prone to be affected by the traction force due to the arm weight. In addition, as the complicated network the brachial plexus is closely linked to the sympathetic nerves (autonomous nerves), symptoms like those associated with automatic neuropathy are frequently experienced.

(3)Symptoms

Besides pain and stiffness in the neck and shoulder, symptoms of the cervical spondylosis include the pain that radiates to the arms and hypoesthesia in the area innervated by the compressed nerves, weakness and numbness in hands and fingers. If the compression progresses and affects the spinal cord, difficulty in walking and loss of bladder or bowel control develop.

On the other hand, symptoms of pain, cold sensation, numbness, weakness and fatigue in the arms are observed in patients with thoracic outlet syndrome. Especially the worsening of symptoms with the arm in the elevated position is characteristic.

(4) Keys to the examination

Patients with pain in the neck and arms and/or numbness in fingers need to be diagnosed whether it is caused by spondylosis or thoracic outlet syndrome. However, the interview concerning the patient's age, occupation, and job description, and provocation tests designed to reproduce these symptoms will more or less facilitate the diagnosis.

Generally speaking the pain and numbness are severer in patients with cervical spondylosis whereas the cold sensation is more strongly experienced by patients with thoracic outlet syndrome. The important thing to remember is that pain and numbness in the region of the neck, shoulders, arms, and hands may be attributed to disorders including tumors of the spinal cord, spinal deformation, abnormal bone morphology (cervical ribs), cervical disc hernia, carpal canal syndrome, and cubital tunnel syndrome. Therefore, patients with prolonged or severe symptoms are encouraged to seek the advice of professional doctors. The major compression tests of nerves and blood vessels that help differential diagnosis between cervical spondylosis and thoracic outlet syndrome are listed below.

【Table 1 Major tests for the differentiation diagnosis concerning spondylosis and thoracic outlet syndrome】

1. Allen's test

Technique: Turn the neck toward unaffected side with the affected arm abducted to 90° and the elbow flexed to 90° .

Positive findings: Decreased radial pulse and reproduced symptoms in the affected arm.

Anatomical basis: Subclavian artery and cervical plexus become compressed at the scalene hiatus (interscalene triangle).

2. Adson's test

Technique: Breathe deeply and hold while the affected arm is lowered and the neck is turned toward either the affected side or the unaffected side and tilted backward.

Positive findings: Decreased radial pulse and reproduced/worsened pain in the affected arm
Anatomical basis: subclavian artery and Cervical plexus become compressed at the scalene hiatus (interscalene triangle).

3. Morley test

Technique: Press the scalene muscle lateral to the origin of the sternocleidomastoid muscle in the supraclavicular fossa.

Positive findings: Pain at the pressed point that radiates to the affected arm.

Anatomical basis: The strained scalene muscle compresses the subclavian artery and the brachial plexus.

4. Costoclavicular test (Stand upright test)

Technique: From a standing position with the shoulders thrown back, draw the shoulders inferiorly as much as possible.

Positive findings: Decreased radial pulse and reproduced/worsened symptoms in the affected arm.

Anatomical basis: Subclavian artery and cervical plexus become compressed at the costoclavicular space.

5. Wright test

Technique: Hold the patient's arm up in front to 90° at the shoulder joint with the elbow flexed to 90° and then rotate it outward at the shoulder joint.

Positive findings: Before the affected arm is abducted to 90°, decreased radial pulse and reproduced/worsened symptoms are observed in the affected arm.

Anatomical basis: Subclavian artery and brachial plexus is compressed by the smaller pectoral muscle

6. Spurling test

Technique: Place the patient's cervical spine in extension and rotate the head toward the affected shoulder. Then place an axial load on the spine.

Positive findings: Pain that radiate to the affected arm.

Anatomical basis: Provocation by the cervical nerve root compression.

【Evaluation】

* The negative results of all tests from 1 to 5 may suggest the absence of thoracic outlet syndrome.

* The positive results of test 1 to 3 may suggest the possibility of scalenus syndrome.

* The positive result of test 4 indicates the suspected presence of a cervical rib.

* The positive result of test 5 may suggest the presence of smaller pectoral muscle syndrome.

* The positive results of test 6 indicate the suspected presence of cervical osteoarthritis or cervical disc hernia.

(5) Treatments

A. Treatments for spondylosis

(1) Thermotherapy

First, warm the strained muscle of the neck and shoulders with pain by applying warm packs for about 10 minutes.

(2) manipulative therapy

Next, Perform anma strokes on the warmed muscles using techniques that stimulate them lightly (mainly applying the light stroking techniques and kneading techniques with four fingers) for 5-10 minutes.

(3) Manual traction of the cervical spine

With the patient in the supine position without a pillow, the therapist sits on the chair above his/her head. Place one forearm at the nuchal region (behind the neck) and the opposite forearm or the palm under the mandible. Lift the forearm placed at the nuchal region so that the head is bent slightly forward. Keeping the same arm position, tract the cervical vertebrae with both forearms. The cervical spine should be bended to 10-20°, which allow the intervertebral foramen to open. A single traction lasts for 5-10 seconds and repeat this for several times.

B. Treatment for thoracic outlet syndrome

(1) Thermotherapy

Follow the procedures in the section of cervical spondylosis

(2) Manipulative therapy

After providing careful anma for the muscles of the neck, the upper part of the scapula and the interscapular area, perform the following techniques.

The infraclavicular • breast region: Knead along the inferior border of the clavicle from the medial to the lateral part and the fiber of the clavicular part pectoralis major muscle and the adhesion of the smaller pectoral muscle with the pads of four fingers. Then perform anma for the greater and smaller pectoral muscles from the sternal border toward the coracoid process.

The scalene area: Knead the lateral side of the neck with four fingers. This part is so sensitive to the stimuli that the soft massage with four fingers should be performed.

The scapular area: With the arm abducted to 90 degrees, press the posterior border of deltoid muscle and the crossover site of the teres major muscle and the teres minor muscle toward the humerus with the finger tip.

(3) Manual traction of the cervical spine

Follow the procedures in the section of cervical spondylosis

(6) Instructions for self-care

A. 1-minute neck stretch

Sit up straight with the both hands clasped behind the lower back and throw out the chest. First, tilt the head to one side for a count of 6. With the head tilted to the same side, let the head drop forward for a count of 6 and then drop backward for a count of 6. Next, tilt the head to the other side and repeat the same. Lastly, Roll the head counterclockwise for a count of 6 and the clockwise for a count of 6 to finish exercise.

B. 1-minute relaxation of the shoulder

When the muscle repeatedly get strained and relaxed in turns, the muscle itself work as a pump to enhance the blood circulation. Especially, relaxing the muscle after its good constriction will produce the significant relaxation, which is very effective.

First, sit up straight with the arms at the side of the body.

The first exercise is to shrug. First, elevate the shoulder straight up with the neck slightly tilted behind for a count of 6. Then “suddenly” relax by breathing in for the count of 6. When doing this exercise, try to contract the muscle at maximum for the first shrug and then relax it also at maximum. Do the following exercise 2 to 5 in the same matter.

The second exercise is shoulders obliquely back. Elevate both shoulders obliquely to the posterior and upward. The third exercise is “shoulders posteriorly back. Pull the elbows back to squeeze the right and left scapula close together.

The fourth exercise is the anterior shoulder roll. The fifth exercise is the posterior shoulder roll.

Slowly move the shoulders in the circular motion so that the every muscle of the scapular arch constrict in sequence at maximum

4 . Back pain and pain/numbness of the legs

(1) Concept

The causes of lower back pain can be roughly classified into three categories.

- (1) Lower back pain due to the musculoskeletal injury (further classified into acute and chronic ones)
- (2) Lower back pain due to the internal or systemic disorders
- (3) Lower back pain due to the psychological problems

Meanwhile, the pain and numbness of the leg are not only attributed to the sciatic neuralgia due to the lumbar disc hernia but also the piriform syndrome due to the compression of sciatic neurons in the gluteal area and, less frequently, spinal canal stenosis due to compression of the nerves and blood vessels caused by the narrowed vertebral canal.

Many of the disorders causing pain and numbness in the lower back and legs are successfully treated by manipulative therapy except those in the acute period. Indeed, some patients certainly need professional medical treatment. If the patient has consistent symptoms that changed for the worse after therapy or has not improved as expected potentially due to the other internal disorders, he/she should be encouraged to seek medical advice.

(2) Clinical condition

1) Acute back pain

Acute back pain would develop rapidly as a strained back. Inflammatory signs include tenderness, pain, and swelling found locally which are present even through ordinary daily movement like coughing and sneezing besides the loading activities of poor posture and quick motions. Two underlying disorders listed below are supposed to cause a strained back.

A. Muscular-fascial lumbago

This is a disorder affecting the soft tissue of the muscles, fascies, and ligaments in which acute and severe back pain occurs from strained or partially torn soft tissues after sudden awkward movement. Symptoms are localized and less commonly appears in the legs with radiating pain.

B. Lumbar disc hernia

This is a medical condition affecting the spine, in which damage to the intervertebral disc allows the soft, central portion to bulge out, compress the spinal nerve root, and cause severe acute back pain. Commonly, the pain and numbness extends from the buttocks down the back side of the leg to the toe.

According to a study by the Japanese Ministry of Health, Labour and Welfare, about 60% of strained backs was triggered by an awkward posture and the remaining 25% was by sudden strong

movement. As for the time of the incidence, it tends to occur most frequently on Monday or during the morning when one is not well prepared to work. Additionally, for people in their thirties or older, it seems to be more associated with a lack of exercise than the workload.

2)Chronic back pain

Chronic back pain is classified into two categories depending on the cause: one due to damage of soft tissue including muscles and ligaments, and back pain due to the degeneration of bone and ligaments in the vertebral joint area. In either case, besides the age-related changes in local tissues and circulatory failure, which are common, the accumulated fatigue due to overuse may be the primary cause.

Pathological conditions causing chronic back pain include the following:

A. Spondylosis deformans (lumbar spondylosis)

It is a medical condition affecting the intervertebral disc to become gradually thinner due to aging and heavy work. Deteriorated disc will cause wear on the marginal vertebrae or the joints between the vertebrae (the intervertebral joint), and projections of bone (bone spurs/osteophyte) may develop on the vertebrae or the bone around the joint to narrow the spaces of the spinal canal and/or the intervertebral foramen. All of these changes can cause symptoms of pain and numbness in the lower back area. This appears more commonly in middle aged and older men.

B. Spinal canal stenosis(lumber spinal canal stenosis)

The spinal cord runs through the vertebral canal and extends to the second lumbar vertebra in your lower back. Where the spinal cord ends, the cauda equina (a bundle of nerves proceeding into the legs) continues. The compressed cauda equine by the deformation of the lumbar vertebrae and/or the degeneration of disks and ligaments causes back pain and pain and numbness in the legs when walking.

This appears more commonly in middle aged and older men.

C. Spondylolysis/spondylolisthesis

Spondylolysis is a defect between the superior and the inferior articular processes of the vertebral arch. The great majority of cases occur in the fifth lumbar vertebrae. It do not always produce symptoms of back pain, but patients with back pain sometimes have spondylolysis after an x-ray

detects the bone defect. People who play sports are more likely to be affected. Some people with spondylolysis have unstable alignment of the vertebrae that cause anterior displacement of one vertebral body over another and thus develop spondylolisthesis. In these cases, stronger pain in the back and legs is evident.

3) Piriformis syndrome

This is a medical condition affecting the proximal sciatic nerve emerging from the pelvis (hip) in which the piriformis muscle compresses the proximal sciatic nerve to cause the pain and numbness extending from the buttock to the leg. This appears relatively common in middle aged and older women and those who are engaged in the work demanding heavy walking and joggers are supposed to be more likely to develop this syndrome.

(3) Symptoms

Patients with the muscular· fascial lumbago present symptoms including the significant tenderness, muscle strain, and a bulging appearance around the lateral borders of the erector muscle of spine at the level of the third lumbar vertebra. In the legs, no significant symptoms are observed besides the radiating pain.

Lumbar disc hernia and piriformis syndrome are similar in part as they share sciatica as a common symptom. However, lumbar disc hernia occurs relatively clearly and causes severe tenderness around the lower lumbar vertebrae and strong constriction of erector muscles of spine in addition to the back pain and the symptoms in legs.

Meanwhile, piriformis syndrome does not generally cause the back pain but the marked tenderness and muscle strains along the course of the piriform muscle (from the lateral margin of the sacral to the great trochanter).

In patients with back pain associated with the chronic diseases, pain and numbness in legs, weakness of legs (difficulties in walking), difficulty in continuous walking due to pain (caudicatio intermittens) are present in addition to the lower back pain.

(4)Keys to the examination

1) For acute back pain

A. The presence of significant tenderness and a bulging appearance around the lateral borders of the erector muscle of spine at the level of the third lumbar vertebra is suspicious of the muscular· fascial lumbago. Whereas the lumbar disc hernia causes the significant tenderness around the lower lumbar vertebrae and the intense stiffness of the whole back as if it is felt like a plate.

B. The limited range of flexion to the unaffected side is present in patients with muscular-fascial lumbago, while that to the affected side is apparent in patients with the lumbar disc hernia.

C. Back pain that radiates to the legs, associated with numbness in the legs and gets worse when coughing and sneezing is suggestive of a lumbar disc hernia.

2) In case of chronic back pain

A. If the symptoms become more obvious as the work proceeds than at the beginning, soft tissues are suspected to be causal. Conversely, when back pain attributable to bones and joints are suspected, the symptoms are strongest at the beginning of the work and become less obvious as the work proceeds.

B. The deformity of the intervertebral joint is suspected if the tenderness is present around the area of one finger width apart from the lateral border of spinous process of the lower lumbar vertebrae or if tenderness and the radiating pain are present in the area between the iliac crest and the buttocks.

C. Pain is likely to be provoked by the forward flexion and torsion in facet joint syndrome, whereas by the backward flexion in spondylolysis/spondylolisthesis

D. If a hump back and/or the lumbar lordosis or kyphosis are present, osteoarthritis of the lumbar spine is suspected. If the staircase phenomenon is present in the patient with experience in sports activities, spondylolysis/spondylolisthesis is suspected.

E. If the caudicatio intermittens and associated symptoms including numbness and abnormal sensation of the legs are present, spinal canal stenosis is suspected.

3) Orthopedic test for the diagnosis of pain in back and legs

A. Lasegue test

Procedure: With the patient lying on the spine, the examiner stands at the bedside for examination. Hold the thigh and knee of the affected leg slightly flexed and then slowly extend the knee.

Positive test finding: the lower back pain or a numbness is elicited before the hip joint is flexed over 70 degrees. (This is suggestive of lumbar disc hernia • Piriformis syndrome • osteoarthritis of the lumbar spine • sciatica)

B. Piriformis muscle test

Procedure: With the patient supine, the examiner elicits pain with the Lasegue maneuver and then

passively abduct/rotate inward at the hip joint with the knee flexed until it produces no sciatic pain, the sign is present.

Positive findings: Reproduced pain and numbness in the gluteal area(piriformis syndrome).

C. Femoral nerve extension test

Procedure: With the patient lying prone, the examiner places him/herself at the bedside for examination, flexes the leg upon the thigh and passively makes the heel touch the buttock.

Positive findings: Provoked pain in the lumbar vertebrae (lumbar disc problems), in the gluteal area (troubles in the sacroiliac joint), in the quadriceps femoris muscle (contracture of the quadriceps femoris muscle) and the pelvis rising from the table (problems in hip joints/ contracture of the quadriceps femoris muscle and iliopsoas muscle).

(5)Treatment

Right after development of the acute back pain, start treatment principally by resting and apply cold to the affected area. Manipulative therapies should not be performed on the affected area; but if necessary, then limit it to the gluteal area and leg using mild techniques such as the light stroking or light acupressure. Chronic back pain that presents a strong muscle spasm should be treated with manipulative therapy aiming for relief. Massaging the tender points along the lateral borders of the erector muscle of spine and those on the sacral bone is especially effective.

6) Instructions for self-care

To prevent low back pain, provide instruction in exercises for back pain. They are not only effective for chronic back pain but also for improvement and prevention of a recurrence of disc hernia and a strained back in the post-acute phase.

(1)Strengthening of abdominal muscles.

Lie on the back with the knees bent and feet on the floor. Place the palms on the face holding the face between the palms. Raising the upper body until the shoulder is lifted up from the floor Contract the abdominal muscles, slowly raising the shoulders. Keep the posture and count to 6. Then lower the shoulder to the original position. Repeat this 5-10 times.

(2)straightening of the spine

Lie on the back with the knees bent and both heels on the floor. While keeping the neck bent, place

both hands over the knees and bring them to the chest so that the knees come beneath the armpit. Hold for a count of 6. Slowly lower that leg and return to the original posture. Repeat this 10-20 times.

(3)circummutating of the pelvis

Press the small of the back against the floor; contract the buttocks, raising only the pelvis from the floor. Raise the neck slightly up from the floor as if you look at the umbilicus. Repeat 10-20 times.

(4)Strengthening of the muscles of the legs

Stand with feet shoulder-width apart. With both heels on the floor, straighten the back, slowly bend the knees, and return to the original posture. Repeat 5-10 times.

5. Knee pain

(1)Concept

Diseases causing knee pain can roughly be classified into two categories: traumatic and non-traumatic. The indication of the manipulative therapy is mostly indicated for the non-traumatic ones but traumatic disorders with symptoms that are chronic can also be treated by manipulative therapy.

Among the non-traumatic disorders, osteoarthritis of the knee is most frequently encountered. This disease is one of the most common joint disorders and develops due to the loss and wear of the joint cartilage and the meniscus located between the femoral bone and the tibia bone attributed to long use of the knees. This appears more frequently in obese people in their 40s and older. Women predominate from age 40 to 70, after which men and women are equally affected.

(2) Clinical condition

Osteoarthritis of the knee begins with the wear of the joint cartilage of the knee attributed to the decreased load bearing resistance of the knee joint due to overweight, aging, and insufficient exercise, followed by the serious changes including osteophyte formation, the enervation of the meniscus and ligaments, the thickening of the joint capsule, inflammation of the synovium, atrophy, and finally deformity of the joint and pain. The patients' reluctance to move their knees because of

the pain result in weakness of the quadriceps femoris muscle locating at the anterior side of the thigh and thus the knee joint is less supportive allowing the joint deformity to progress, leading to a vicious circle.

(3)Symptoms

In the early stages, light pain occurs at the knee joint only at the beginning of the movement such as standing, sitting, going upstairs or downstairs or walking. As it progresses, strong pain continuously experienced at the knee during activities that load stress on the knee. In cases where the inflammation of the knee is especially severe, the joints may be filled with fluid (joint fluid) to get swollen. Under such medical condition, the movements are considerably limited to cause trouble walking.

(4)Keys to the examination

The exclusion of the contraindications during the examination is very important.

Patients with strong spontaneous pain or night pain that gradually gets worse or significant swelling, redness, and heat sensation in the knee joint area should be encouraged to seek professional help.

The following are orthopedic tests the massage therapist may easily perform.

【Table2 Differentiation test for knee joint disorders】

(1) McMurray test

Procedure: As the patient lies supine, the examiner places one hand on the anterior side of the knee and the other on the lower leg to stabilize it. From the position with knee fully flexed, extend the knee while the leg rotated externally or internally.

Positive findings: Pain or a click at the lateral and medial sides provoked by internal and external rotation of the knee respectively.

Significance: Positive test with the internal rotation indicate a suspected damage of the lateral meniscus, whereas positive test with the external rotation indicates a suspected damage of medial meniscus.

(2)Apley test:

Procedure: With the patient placed prone, the knee is flexed 90 degrees. Compress the knee or with the knee flexed, the tibia is then compressed onto the knee joint (compression Apley) or pulled (traction Apley) while being externally or internally rotated.

Positive findings: Pain provoked by the internal and external rotation at the lateral and medial side respectively.

Significance: Rotating internally and externally, observe the lateral and medial sides. The compression and the traction of the Aplay tests elicit the disorders of meniscus and the collateral ligament, respectively. Thus, the positive traction Aplay test with the internal rotation indicates suspected disorders of the lateral collateral ligament, while the positive compression Aplay test with external rotation indicate the suspected disorders of the meniscus.

(3) Stress Test

Procedure: As the patient lies supine, hold the knee joint with one hand and place the foot in both internal and external rotation with another hand.

Positive findings: Pain evoked on the lateral side with internal rotation or on the medial side with external rotation.

Significance: Positive test with the internal rotation indicate a suspected damage of the lateral collateral ligament, whereas the positive test with the external rotation indicates a suspected medial collateral ligament.

(4) Anterior/posterior drawer test

Procedure: With the patient placed supine and the knee flexed to 90 degrees, pull the proximal tibia forward or push it backward with both hands.

Positive findings: Excessive anterior or posterior motion of tibia.

Significance: With the positive test with the anterior traction and posterior traction, the damage of anterior and posterior cruciate ligament is suspected.

(5) Patellar compression test

Procedure: With the patient placed spine, move the patella from side to side and up and down.

Positive findings: Pain evoked in the patella area.

Significance: Positive test is suggestive of the disorder of the patellofemoral joint.

(6) Patellar tap

Procedure: With the patient placed supine, hold the distal femur with one hand and then slide the hand down toward the patella. Keep the hand there and push the patella downward using the index and middle fingers.

Positive findings: “Tic-toc” tapping sound attributed to the contact between the patella and the distal end of femur.

Significance: Positive test is suggestive of the presence of an effusion in the knee joint cavity.

(6) Treatment

Before providing therapy, inform your patients that this disease is not expected to be cured completely and may require prolonged time before full recovery as it is mainly attributable to degeneration caused by aging and overuse. Furthermore, the goal of anma therapy is the pain relief,

functional improvement, and prevention from progression, which should also be explained and fully understood. Perform amna mainly intended for the knee joint as well as for the surrounding muscles, tendons, ligaments and tender points (Liangqiu, Xuehai, Nei/Xiyan, Weizhong, Zusanli) For patients with high heat sensitivity, Anma should mildly performed.

(6) Instruction for self-care

Provide patients with instructions for the method of the muscle setting (strengthening of quadriceps femoris muscle) as encouraging them to pay attention to the followings.

- (1) Counteract the obesity.
- (2) Overcome the physical inactivity.
- (3) Choose footwear that's appropriate for the foot.
- (4) Facilitate the flow of blood by taking a bath every day etc.
- (5) Keep the knees warm by means of splints or supports etc.

【The method of the Muscle setting exercise】

The patients is placed in a supine position with the knee extended. Instruct the patient to push the bed downward by knees independently. When this exercise is first performed, it is better done if a small pillow or the rolled towel is positioned under the knee and the patient is instructed to compress them. After being familiarized with the technique, this will be done without difficulty without them. Raise awareness of the firmly constructed muscles of the anterior part of the thigh(the quadriceps femoris muscle).

As the excess construction may cause twitching of the quadriceps femoris muscle, instruct to apply about 70%-80% force of the maximum construction.

One cycle consists of 3-second constriction followed by 2-second rest. Repeat this 30 times. To exercise twice a day (as lying on bed)on rising and at bedtime.

6. Shoulder pain(so-called frozen shoulder)

(1)Concept

After middle age or older, one might experience the joint becoming so painful and sickening with no obvious causes that the arms are nearly impossible to move. Limited motion disables the patients to lift their arm above their head or reaching behind their back. Generally, these conditions are inclusively called “Frozen shoulder.”

Pain and loss of motion or stiffness in the shoulder arises spontaneously

Frozen shoulder is known as “a disorder characterized by pain and loss of motion, basically attributable to the degenerative change of the tissues surrounding the shoulder joint without any definite cause, appearing in middle-aged or older people and spontaneously cured within a certain period of time.

Frozen shoulder commonly affects people over 40 years of age or older and especially those in their 50s. There is no clear predisposition based on arm dominance and it can be appeared in both right and left shoulders. It may appear in one shoulder at a time, followed by the opposite shoulder, although few people may eventually develop it in both shoulders at the same time.

(2)Clinical condition

Frozen shoulder is professionally referred to as “scapulohumeral periartthritis” This is an inflammatory syndrome involving the soft tissues surrounding the shoulder joint and the causes are not fully understood

The shoulder joint has all the more complex formation to provides a great range of motion.

The shoulder has a joint where the humerus fits into the scapula, many muscles and tendons (tissue connecting muscle to bone) originate and attached to and “the bursa” which help the smooth movement of the joint. This makes the joint subject to inflammation. The inflammation around the shoulder joint attributable to aging directly causes the pain and the disorder of movement. Aging causes various changes in the tissues surrounding the shoulder joint. For example, the tendon holding the humerus to the scapula becomes thick and stiff and tends to be easily worn. Thus, rubbing and friction occur in the region that should allow the smooth movement causing pain and inflammation.

The rotator cuff surrounding the shoulder joints is the most easily inflamed. This is formed by the tendons of a group of short muscles called the rotator cuff muscles fusing together. Generally two bones forming an articulation are stabilized by a joint capsule with ligaments that work collectively as support. However, by requiring a great range of motion, the shoulder joint is surrounded only loosely by the capsule. Moreover, the ligaments simply reinforce only anterior and upper part of the capsule not to limit the movement. Instead, the rotator cuff holds the head of the humerus firmly in the socket of the scapula

By the way, when the humerus is elevated or externally rotated to about 60 degrees from the position at the side, it hits the coracoacromial arch (formed by coracoid process, acromion, and coracoacromial ligament), which covers the head, greater tubercle and lesser tubercle like the roof. Not the humerus bone itself but the rotator cuff hits the arch and comes into direct contact.

Attempting to elevate or abduct the shoulder over 60 degrees or more, the head spontaneously rotates externally and pushes the arch upward to increase the range of movement. Around the time when the shoulder is abducted greater than about 110 degrees, the greater tubercle slips behind the arch. Therefore, the rotator cuff covering the greater tubercle is exposed to the intense friction as being wedged between the greater tubercle and the arch while the arm is moved in the range between 60 to 110 degrees. Being exposed to such frictions and contact, the rotator cuff first is thick and stiff but gradually becomes thinner and worn. Some severe cases can develop eventually tearing or even rupturing.

(3) Symptoms

Commonly, it is first noticed as pain occurring with any movement of the shoulder (pain on motion). As the muscles and ligaments surrounding the joint get stiff (contraction), the shoulder's range of shoulder motion starts to become limited. The abduction and rotation of the shoulder joint is the most restricted among the shoulder's movements and thus performing activities such as combing your hair and tying the OBI (a Japanese band for kimono) in the back often becomes difficult or impossible. Not a few people complain of the pain worsening at night and disrupting normal sleep patterns.

(4) Keys to the examination

During the medical interview, some details such as whether the pain occurred spontaneously without a known cause, the presence of any injuries, the arm and the elbow were hit, or the shoulder was twisted following an awkward posture should be asked about.

During palpation, observe areas of tenderness. Note that signs of tenderness are commonly observed in the soft tissues (muscles, tendons, and the capsule) surrounding the shoulder joint, subacromial bursa, rotator cuff, tendon of long head of biceps brachii muscle, or the infraspinatus muscle.

Then, check the range of motion as below:

- (1) Difficulty in tying behind: As the patient's hands is placed behind his/her back or lower back, observe whether the pain occurs in the shoulder joint area.
- (2) Difficulty in combing behind: As the patient's hands are placed on the top of the head, observe whether the pain occurs in the shoulder joint area.
- (3) Disorder of movement: As the arms are moved upward (shoulder abduction and flexion), brought toward the center, or moved away from the center shoulder internal and external rotation),

assess whether the range of shoulder movement is limited.

(5) Treatment

Among the different treatment choices available for frozen shoulder, manipulative therapy and physical therapy are the main choices. Depending on the symptoms, thermotherapy may also be combined.

A. Manipulative therapy

Manipulative therapy should not be performed during the acute period when the affected site has fever or is extremely painful. When the patient complains of such acute symptoms, resting should be the priority. The affected shoulder should be immobilized in a sling. The shoulder with intensive fever and pain should be iced using ice or cold towels. The symptoms should be followed for 3-4 days to assure the disappearance of swelling before beginning any manipulative therapy. The procedure of the therapy are explained as below:

- (1) Allowing the patient to take a comfortable posture, palpate to examine the spontaneous pain, tenderness, swelling, and depression.
- (2) Lightly stroke shoulder joints, the neck, the back, the upper chest, and the upper arms.
- (3) Then proceed to kneading. Do not go straight to the affected area or the painful area, but first knead the surrounding muscles along their course with four fingers and subsequently knead the same area with the thumb.
- (4) Knead with the thumb or grip and knead toward the deep muscles. Because pain might be reported by patients when some muscles, the subscapularis muscle and teres minor muscle are simply touched, and temperate pressure should be applied.
- (5) When the circulation recovers and the pain decreases, the origins and insertions of muscles can be pressed with the thumbs. Note that this might be too strong a stimuli for some patients.
- (6) Lightly stroke the shoulder joint and the surrounding area in the same way as (2).

B. Physical therapy

Physical therapy should be avoided during the acute period of frozen shoulder. Once pain has lessened, physical therapy can be started to recover the shoulder's normal range of motion. It is more effective when practiced twice a day for 10 minutes or less. During the chronic period, physical therapy is performed to improve circulation to prevent the progress of constriction and maintain or enhance the flexibility of the muscles. Positive effort to provide physical therapy during this period is important. Prolonged inhibition of movement will further decrease the range of

motion. Physical therapy is started with passive exercises and then proceeds to active exercises.

(1) Passive exercises

Passive exercise is started with elbow flexion, extension, pronation, and supination followed by shoulder flexion, extension, abduction, adduction, external rotation, and internal rotation. Remember that severe pain may be experienced with abduction or external rotation. The key points of these exercises is to move within the range where no pain is evoked.

(2) Active physical therapy

It is important to stay with the exercise of each movement listed above and carry them out gently, comfortably, and everyday without haste. The most popular exercise for frozen shoulder is Codman's exercise with a weight. This exercise can be performed even by persons with pain and relatively limited range of motion. A plastic bottle of water can be a substitute for the weight. Roughly, it is advisable to select a weight of 1-2 kg.

As the condition of the shoulder improves, the exercise of pushing against wall is added. This exercise is expected to give flexibility to the shoulder and the elbow joints and enhance the blood circulation. The exercise using the fingers creeping on the wall to raise the arm slowly is also effective. The continued exercise allow the arm to be lifted higher which further encourage the patients to stay on the exercise

C. Thermotherapy

Thermotherapy, heating affected areas and increasing blood flow, is anticipated to relieve pain. In the clinic, hot packs, ultrasound, or devices utilizing ultrasound are used to warm the shoulders, while at home, a moist heating pad or hot towels can be used, or a hot bath is also preferable. when using hot towels, note that they should be kept warm and covered with plastic sheets or a scarf placed over the shoulder.

(5) Instructions for self-care

These self-care exercises listed below should be performed 10 to 15 times everyday.

(1) Shoulder rotation

Hold the wrist or the elbow of the affected arm with the good arm, swing both arms clockwise in a large circle. Holding both ends of the stick which is about the shoulder-width long with both respective hands, lift the stick by the hand of the good arm or swing both arm to rotate the shoulder joint.

(2) Arm lift with finger walk

From a standing position, facing a wall about 15 cm away, let the fingers walk on the wall upward to raise the arm higher. Doing this, the shoulder is flexed and the arms are lifted in the "Banzai"

position.

(3) Tying behind exercise

The affected arm is moved backwards behind the back and abducted with the help of the good arm.

(4) Codman's exercise

Hold the weight of 1 kg in the affected hand and let it hang limp. At this time, other muscles except those involved in holding the weight should be relaxed. Stand in front of the table, bend forward at the waist and hold onto it with the opposite arm. Use body motion to swing the weight slowly right and left, forward and back. Relaxing the muscles of the shoulder and letting it drop by gravity enlarges the shoulder joint space and stretches the muscles also.

7. Headache

(1) Concept

Headache is a very common and prevalent medical problem and experienced by everyone more than once over a lifetime. Therefore, various disorders with the different severities from those unrelated with life to seriously life-threatening ones cause headaches. Importantly when providing the therapy, you should establish the cause of the headache, carefully consider the indication of the therapy, and select the techniques and sites most appropriate for the clinical condition.

[Headache classification]

According to the 2nd Edition of *The International Headache Classification* (2004), headaches are classified as follows:

1) The Primary Headaches

Headaches that are not caused by any identifiable underlying disorders.

(1) Migraine

(2) Tension-type headache (TTH)

2) The Secondary Headaches

Headaches that are caused by any definite underlying disorders.

(1) Headache attributed to inflammation

- (2) Headache or facial pain attributed to disorder of cranium, neck, eyes, ears, nose, sinuses, teeth, mouth, or other facial or cranial structures
 - (3) Headache attributed to psychiatric disorders
- 3) Cranial Neuralgias, Central and Primary Facial Pain, and Other Headaches
- (1) Cranial neuralgias and central causes of facial pain
 - (2) Other headache, cranial neuralgia, central or primary facial pain
- (2) Clinical conditions

Some types of headaches that are common and frequently observed are explained here.

1) Tension-type headache

Headaches are caused by reduced circulation of the blood in the area where the blood vessels and/or nerves are compressed due to excess tightening or tensing of the surrounding muscles of the neck, shoulders, and the head. The reduced circulation interferes with the removal of pain producing substances and the metabolic substance related to fatigue as well as the supply of nutrients to the muscle to result in the increased pain.

2) Migraines

It occurs when arteries to the brain become transiently dilated. The dilation is thought to activate surrounding tissues and nerves and induce the pain producing substances such as serotonin causing the pain.

3) Headache attributed to disorder of eyes, ears and nose

This refers to headaches caused by the underlying disorders including middle otitis, sinusitis, and an accommodation disorder of the eyes. They do not directly cause the headaches but possibly cause the inflammation in vicinity of the brain by such disorders and cause the pain that radiates to it.

4) Various neuralgic pain

Trigeminal neuralgia (pain in the frontal area) and occipital neuralgia, (pain in the occipital area) are included.

5) Psychogenic headache

They are headaches without specific causes and show no responses to any treatment.

(3) Diagnosis

To diagnose the headache, careful interviews allow the approximate perception of the cause. However, various modern medical examinations and tests (including radiological examination) are required to establish a definite diagnosis.

1) Whether the headache is attributable cranial or extracranial problems

First of all, the cause of the headache should be determined as to whether it is due to cranial or extracranial problems. Generally, headaches attributable to extracranial problems are likely to be an indication of manipulative therapy.

Differences between headaches attributable to cranial problems and those attributable to extracranial problems are summarized below.

	Intracranial	Extracranial
Painful area	Not specified	Relatively specific
Characteristic of pain	Dull pain	Episodic sharp pain
Pain after the head movement	Unchanged	Increasing

2) Cases excluded as intended patients for manipulation therapy

Patients listed below may develop serious conditions. Therefore, manipulation therapy should be suspended and a referral to medical professionals is recommended.

- (1) Patient with hypertension who present higher blood pressure than usual: Potential incidence of a brain hemorrhage.
- (2) Patients with disturbed consciousness, hemiplegia, language and speech disorders: Potential incidence of a brain hemorrhage.
- (3) Patients with mild headaches that gradually become severe: Potential incidence of cranial tumors.
- (4) Patients with acute pain behind the eyes: Suspected glaucoma.
- (5) Patients with fever: Possible infection.

3) Tension-type headache or Migraines

If the anma therapy is appropriate for the patients after the diagnosis according to the above

(1) and (2), further examination should be performed to establish the course of treatment. Most headaches indicated for anma therapy are the tension-type headache and migraines but they should be treated in greatly different ways. Therefore, the points to differentiating tension-type headaches and migraines are explained here.

(1) Tension-type headache

This is commonly known as the headache accompanied by a severe stiff shoulder. Headaches are experienced most frequently in the occipital area during the evening.

(2) Migraines

This appears more commonly in women and affects one side or the both sides. Obese people in their 40s and older. Women predominate from age 40 to 70, after which men and women are equally affected. Often, attacks are triggered by light, noise, and smells and sometimes preceded by a sensation of vomiting, nausea, buzzing in the ears, and photopsia (heightened sensitivity to bright lights).

Other characteristic differences between these headaches (1) and (2) are summarized as follows.

	Tension-type headache	Migraines
Painful site	Often felt in the occipital area	Usually unilaterally (sometimes bilaterally) felt in the temporal area
Characteristics of the pain	Tightening band-like Pain	Sharp throbbing pain
Pain-relieving factors	Heat stimulation	Mild compression on the pulsating blood vessel

(4) Anma therapy

[Indications]

Tension-type headache and migraines are among the indication for anma therapy. Some headaches attributable to the neuralgia and disorders of eyes, ears and the nose may also be treated depend on their severity.

1) Tension-type headache

[goal of therapy]

Relieve the muscle strains in the neck, shoulder, and head and improve blood circulation.

As relieving the muscle strain in the area mentioned above, promote vascular dilation and elimination of metabolic substances causing fatigue in conjunction with the thermotherapy.

[Sites and techniques of Anma therapy]

(1) The upper part of the shoulder: The upper trapezius muscle

(2) The neck: Sternocleidomastoid muscle, superior nuchal line, the area adjacent to the cervical spine

(3) The interscapular area: rhomboideus muscle

(4) The upper arm 上肢: deltoid muscle, brachioradial muscle

Knead and press the muscles listed above because they are strained.

[combined therapy]

(1) Thermotherapy

Warm the area presenting the severe muscle strain with warm packs, hot towels to alleviate the excessive muscular tone. Additional implementation of this therapy at home may effectively allow the prevention of headaches.

(2) Moderate exercise

Encourage mild exercise of the neck, shoulders, and arms with the intent to prevent stiff shoulders.

2) Migraines

[goal of Anma therapy]

(1) To normalize the activities of the autonomous nerves and regulate the vasomotion.

(2) Promote the blood circulation to other parts of the body (arms) than the cranial area to avoid concentrated blood distribution to the head.

[Sites and techniques of Anma therapy]

(1) During an attack, principally keep patients at rest, avoid stimuli from the outside, and promote rest. By providing Anma therapy, apply light pressure on the painful areas in the temporal region (where the artery pulsates) with the second, third, fourth, and fifth fingers to relieve the pain.

(2) Stroke lightly and knead the arms to decrease the circulation in the head.

(3) The preventive effect against an attack may be expected from general anma therapy aimed at the recuperation from fatigue and the regulation of the autonomous nervous function.

[Cautions]

During a migraine, thermal stimulus should not be applied to the head and the neck as the blood vessels in the head region are dilated.

8. Toothaches

(1) Summary

Toothaches are caused by pain in the trigeminal innervation area due to diseases in the teeth and tissues surrounding the teeth. The causes of toothaches mainly include dental caries (cavities), periodontal diseases such as alveolar pyorrhea and gingivitis, temporomandibular arthrosis, stiff shoulders, and trigeminal neuralgia. Because not only the tooth itself but also the surrounding diseased tissues are involved, extensive research and palpations not limited to the location of the pain are required.

(2) Indication and contraindication

When implementation of Anma massage is considered, it is impossible to cure diseases of the tooth itself such as dental caries, so it is believed that this method is more for pain caused by diseases in the surrounding tissues rather than pain caused by the tooth itself.

However, such palliation of the pain is not intended to be a sufficient treatment with Anma massage sufficiently practical, so it is difficult to say that it is a contraindication depending on the situation. However, if there is strong inflammation caused by dental caries, periodontitis and

gingivitis, direct implementation may exacerbate inflammation and induce more pain; therefore, the patient should be immediately referred to a dentist without forcing treatment.

If the gum is inflamed, bleeds or gleans, a tooth is loose, periodontal disease is possible and if the symptoms are mild, anma massage can be considered. If it is a spontaneous pain that hurts from something hot or cold, an increasing pain, it is likely dental caries (cavities). This can also be treated by anma massage if relieving the pain is taken into consideration. Toothaches caused by trigeminal neuralgia, stiff shoulders, eyestrain and headaches can be sufficiently indicated.

(3) Treatment

[1] Basic policy

First, the location of the toothache is identified and the presence or absence of inflammation is confirmed to differentiate whether it is an indication or not. If not, it should be immediately referred to a dentist. If the toothache is caused by the tooth itself such as with dental caries and the symptoms are mild, treatment to control the pain should be considered. If it is an indication, the cause should be identified again by research, palpations and the like.

The nerve associated with toothaches is the trigeminal nerve as described before, with the upper teeth being controlled by the first branch and the lower teeth being controlled by the second branch. If the location of the pain is clear, it is possible to specify which branch is targeted to perform any treatment. In addition, it is necessary to make sure to check the tension of the muscles of the neck and around the shoulders.

According to Oriental medical philosophies, teeth are the remainder of bones and related to the kidney from among the five main organs, and tenderness, reaction points, etc. may be found in the Kidney Meridian. In addition, the infiltration of cold among the external evils is one of the main causes. It passes through the lower teeth, so stimulating this is also very effective.

Considering the flow of meridians, it is also effective to stimulate the Stomach Meridian and Large Intestine Meridian for the upper teeth.

[2] Actual practice

First, treatment is carried out to eliminate tension in the neck, shoulders, and back from the toothache. In particular, the sternocleidomastoid has reflexively strong tension, so treatment should be firmly performed by two-finger kneading or the like. In addition, friction at pressure points known as *Tianzhu* (Bladder Meridian), *Fuchi* (Gallbladder Meridian), *Fengfu* (Governor Vessel) or the like located near the dividing nuchal line along with stronger thumb pressure may preferably be performed. Toothaches caused by stiff shoulders and eyestrain may be improved at this point.

It is necessary to tranquilize the excited trigeminal nerve to control toothaches. At the meridian points, thumb pressure or the like is applied to *Yifeng* (Triple Energizer Meridian: great auricular nerve), *Sibai* (Stomach Meridian: second branch of the trigeminal nerve), *Jiache* (Stomach

Meridian: third branch of the trigeminal nerve), and *Daying* (Stomach Meridian: third branch of the trigeminal nerve) or the like. Particularly in a local manner, pressing *Xiaguan* (Stomach Meridian), *Juliao* (same) and *Shangguan* (Gallbladder Meridian) for upper toothaches, and pressing *Jiache* (Stomach Meridian), *Daying* (same), and the mental foramen or the like, four-finger kneading and light pressure on the masticatory muscle for lower toothaches may preferably be performed.

When carrying out treatment taking the flow of meridian into consideration, it is believed that *Hegu* in the Large Intestine Meridian is effective for the face (facial diseases) and is highly valuable. Patients may strongly knead it themselves in an emergency when there is pain. It is also effective to carry out treatment observing the reactions of *Quchi* and *ShouSanli*. In the Lung Meridian in the front-back relationship with the Large Intestine Meridian, reactions may appear at *Kongzui*, stronger continuous pressure and kneading should be performed for each. Also at *Laogong* in the Pericardium Meridian, effect can be expected for toothaches by applying continuous pressure.

It is important to carry out treatment while checking the reaction of the meridian points and condition of the toothache.

9. Constipation and diarrhea

1. Constipation

(1) Concept

Constipation is a condition of reduced stool frequency or stool output due to unusually long stagnation of the stool in the large intestine. The causes of long stagnation of the stool in the large intestine include diminished intestinal motility, convulsive contractions of the intestine, abnormal defecation reflex, fecal transit obstruction in the intestine, or the like. Constipation is broadly classified into functional constipation and organic constipation from its causes, and many cases are functional constipation. That caused by impaired defecation function is called functional constipation and that caused by organic lesions of the intestine is called organic constipation. In addition, constipation that occurs as an accompanying symptom of other diseases may be distinguished as symptomatic constipation and constipation caused by drugs used for treating other diseases may be distinguished as drug-induced constipation.

(2) Pathological condition

[1] Functional constipation

Functional constipation due to an abnormal defecation mechanism is classified as flaccid constipation, spastic constipation, and rectal constipation. Flaccid constipation is caused by diminished intestinal motility (diminished peristalsis) and involves great stagnation of the stool in

the rectum and left colon, and the stool is dark in color and thick and long in shape. Spastic constipation is caused by psychological stress or the like, which is a condition in which intestinal motility is increased (increased segmentation movement) and spasmodic contraction of the intestine occurs. It is characteristic in that there is a particularly great stagnation of the stool between the descending colon and the sigmoid colon and the stool becomes scybalum-shaped. Rectal constipation is constipation caused by hypesthesia of the rectum due to anal disorders (e.g. hemorrhoids and anal fissures) and intentionally suppressed bowel movement or impaired muscles involved with stool excretion. Additionally, transient functional constipation may occur due to travel, changes in diet, and fluid restriction.

[2] Organic constipation

Organic constipation can be classified into the congenital type and the acquired type. The congenital type includes Hirschsprung's disease due to the congenital absence of the intramural plexus of the colon and elongation of the sigmoid colon. The acquired type is caused by transit obstruction of the bowel contents due to cancer of the large intestine, pelvic viscera tumors, ileus, inflammation or the like, and abnormal intestinal motility due to intestinal circulatory deficits. In addition, constipation occurs due to diseases other than intestinal ones such as spinal cord damage, cerebrovascular damage, Parkinson's disease, endocrine disease, diabetes, collagen disease, gynecological and urological diseases, and infection (symptomatic constipation).

(3) Consultation

During the inquiry, questions are asked about when it occurred, the course (acute, chronic, and transient), stool frequency and regularity, diet and lifestyle, routinely used drugs or the like, as well as the nature of the stool (color, size and shape), presence or absence of hematochezia, hemorrhoids, or the like. In addition, detailed questions are asked about the presence or absence of accompanying symptoms other than constipation (e.g., abdominal pain, pyrexia and anorexia), the presence or absence of underlying diseases, or the like. In abdominal palpations, tenderness, muscle tone or the like are checked and in auscultations, gurgling sounds, peristalsis condition or the like are checked. Also, body temperature and weight are measured as needed. If significant abdominal pain and abdominal bloating, pyrexia, significant weight loss, or the like are found upon consultation, appropriate responses such as referral to a physician are required. Functional constipation is the main target of treatment.

(4) anma massage treatment method

[1] Flaccid constipation

For flaccid constipation, treatment improves intestinal motility. It is also necessary to instruct patients to strengthen their abdominal muscles and ingest food with a lot cellulose in daily life.

Treatment is performed mainly for the abdomen as well as the lower back. For the abdomen, kneading (e.g., four-finger kneading and oar-rowing kneading) along the course of the large intestine is performed so that intestinal motility will be improved. If there is a chill in the abdomen and lower back, treatment is combined with thermotherapy.

[2] Spastic constipation

Spastic constipation is associated with psychological factors, as typified by irritable bowel syndrome, so treatment is performed including physical and mental relaxation.

For the purpose of improving physical and mental tension and depressed moods, comfortable treatment for the entire body is performed. In this case, treatment of the abdomen is limited to mild effleuraging and continuous pressing, avoiding strong treatment. Mild continuous pressure from the shoulders to the interscapular region and lumbar region is also added to control hypersensitivity of the intestine.

[3] Rectal constipation

Patients should be instructed to become accustomed to correct bowel habits and remember to regulate their daily lives so that awareness by the patients themselves is encouraged. Treatment is performed on the abdomen and lumbosacral region to encourage the recovery of a normal defecation reflex. Slightly stronger stimulation is effective particularly for the reaction point in the sacral region.

2. Diarrhea

(1) Concept

Diarrhea is a condition in which liquid stool with a high water content is frequently excreted. The normal water content in stool is 100 to 200 ml/day, but it is more than 200 ml/day in the case of diarrhea. Causes indicating diarrhea include increased intestinal peristalsis and secretion, increased osmotic pressure in the intestine due to impaired absorption or nonabsorbent substances, or the like. Diarrhea is broadly classified into acute diarrhea and chronic diarrhea, and representative examples of acute diarrhea are acute enteric infections such as bacterial diarrhea, cholera, food poisoning and enteritis, chemical substance poisoning, toadstool poisoning, intemperateness, allergic diarrhea, functional diarrhea (e.g., psychological diarrhea). Representative examples of diseases that develop chronic diarrhea are essential malabsorption syndrome (spure syndrome), maldigestive malabsorption syndrome, ulcerative colitis, Crohn's disease, and irritable bowel syndrome.

(2) Pathological condition

In the mechanism by which diarrhea occurs, impaired absorption of water content, increased secretory fluids of the intestine itself, and an increased amount of water flowing into the intestine

occur independently or in combination.

[1] Acute diarrhea

In acute enteric infection, severe diarrhea symptoms accompany pyrexia and digestive symptoms such as abdominal pain, nausea and emesis, and there is a causal correlation with the dietary content in food poisoning or the like. In allergic diarrhea, digestive symptoms develop due to ingestion of particular foods. In functional diarrhea, there is no organic failure but it occurs due to psychological stress or the like, and diarrhea is mild and transient. In addition, transient diarrhea may occur due to ingestion of something cold or a chilled abdomen, but the symptoms are mild.

[2] Chronic diarrhea

Malabsorption syndrome accompanies deficiency of various substances, such as anemia and malnutrition, along with diarrhea, steatorrhea, proteinous stool, or the like due to metabolic disorders of the small intestinal mucosa. Essential malabsorption syndrome (spure syndrome) develops in early childhood and is intractable. In addition, a secondary type of diarrhea may occur after gastrointestinal resection or may occur as abnormal digestion due to pancreatic disease, and gallbladder and liver diseases. Ulcerative colitis has hematochezia or mucous and bloody stool and mild dyschezia, repeating remission and exacerbation. Systemic exhaustion is strong and weight loss, dehydration, or the like are observed. Irritable bowel syndrome involves alternating constipation and diarrhea, but spastic constipation is the major complaint. Crohn's disease gradually develops in the teens to the 20s and includes abdominal pain, diarrhea, weight loss and pyrexia as the main symptoms, accompanied by hematochezia, melena, anal lesions, or the like.

(3) Consultation

During the inquiry, questions are asked about when it occurred, the course (acute, chronic and transient), stool frequency and regularity, the presence or absence of allergies, the relationship between diet and diarrhea, diet and lifestyle, routinely used drugs, as well as confirmation of the nature of the stool (e.g., steatorrhea and watery stool), the presence or absence of hematochezia, mucous and bloody stool, or the like. It is necessary to ask in detail about the presence or absence of accompanying symptoms other than diarrhea (e.g., abdominal pain, pyrexia, nausea and emesis), confirmation of dehydration, the presence or absence of underlying diseases, or the like. In abdominal palpations, tenderness, muscle tone, or the like are checked. Also, body temperature and weight are measured as needed. If significant abdominal pain, pyrexia, significant weight loss, hematochezia, anal lesions, or the like are observed, appropriate responses such as referral to a physician are required. Functional diarrhea, transient diarrhea and irritable bowel syndrome are the main targets of treatment.

(4) anma massage treatment method

[1] Functional diarrhea

Relaxation methods for psychological stress should be taught.

To release physical and mental tension and calm down moods such as irritation, comfortable treatment of the entire body is performed. If there is tension from the shoulders to the interscapular region, treatment is performed to release it. Mild treatment is performed for the abdomen and lumbar region.

[2] Transient diarrhea

For diarrhea that occurs from a chilled abdomen or when something cold is ingested, the abdomen should be warmed. In addition, instructions should be given to refrain from excessive eating of cold and raw items.

For the purpose of improving gastrointestinal function, treatment is performed for the lower back and abdomen. It should be noted that excessive stimulation should not be performed on the abdomen. In addition, if a chilled abdomen is observed, thermotherapy is also carried out.

[3] Irritable bowel syndrome

For treatment, refer to irritable bowel syndrome in the spastic constipation section.

10. Dysmenorrhea

(1) Concept

Various symptoms occur during menstruation, and pain during menstruation mainly including lower abdominal pain and lumbar pain is called menorrhagia (menstrual cramps). Depending on the degree of pain, treatment may be required, which is distinguished from normal menorrhagia as dysmenorrhea.

In this article, dysmenorrhea is described as follows.

(2) Classification of dysmenorrhea

[1] Functional (primary) dysmenorrhea

This constitutes the majority of dysmenorrhea. It is a type in which symptoms appear, although there are no physical causes such as diseases.

[2] Organic (secondary) dysmenorrhea

This is less common among dysmenorrhea. It involves physical diseases that may directly cause dysmenorrhea.

(3) Pathological condition

[1] Functional dysmenorrhea

The cause is considered to be mass secretion of a substance called prostaglandin. This substance acts like hormones, and is produced in the endometrium during menstruation and causes pain. In addition, psychological stress is greatly involved with the development of pain.

[2] Organic dysmenorrhea

It is caused by uterus-related diseases such as uterine fibroid, endometriosis and uterine adenomyosis, and menorrhagia is observed as one of the symptoms.

(4) Diagnosis

[Main symptoms]

[1] Lower abdominal pain

It is strongest on the 1st to 2nd day of menstruation, and there are many cases leading to absence from work and school because of the great burden.

[2] Other symptoms

Lumbar pain, headache, nausea, anemia, fatigue or the like are included. Also, the burden and pain during menstruation may lead to mental instability. Moreover, in the case of organic dysmenorrhea, diseases such as endometriosis, and uterine fibroid may progress behind these symptoms.

[Examination]

[1] Inquiry

An inquiry is made regarding subjective symptoms, menstrual condition, menstrual cycle, age of first menstruation, the presence or absence of sexual experience, and experience of pregnancy, delivery, miscarriage and abortion, previous diseases, currently used drugs, or the like.

Particularly, the organic type often accompanies irregular vaginal bleeding and vaginal discharge, and menorrhagia increases little by little every time menstruation occurs. In addition, functional type is often combined with accompanying symptoms such as nausea, headache and fatigue, often with causes of psychological stress in the background.

In addition, from the viewpoint of Western medicine, the following examinations are conducted for the purpose of differentiation of functional type and organic type.

[2] Urine and blood test

[3] Blood pressure estimation

[4] Internal examination

[5] Ultrasonography, MRI and CT

(5) Treatment

[Indication]

Functional dysmenorrhea is the target for treatment.

[Treatment policies]

To adjust the autonomic nervous and endocrine system functions in order to improve and prevent symptoms.

To improve blood circulation around the pelvis by adding comfortable stimulation mainly to the lower abdomen, lumbar region and gluteal region to encourage moderate parasympathetic nervous tension.

[Treatment sites]

Treatment of the entire body focusing on the lumbar region, lower abdomen and gluteal region is performed. The following sites are particularly important.

[1] Lower abdomen: Periphery of the umbilicus and superior part of the pubic symphysis

[2] Lumbar region: Over the erector muscle of the spine and sacral region

[3] Gluteal region: Outer edge of the sacrum and inferior part of the iliac crest

[4] Lower limbs: Inferior part of the lower medial thigh and inferior part of the medial thigh

Moreover, a reduction in psychological stress is attempted through counseling or the like.

[Improvement of lifestyle habits]

In combination with the aforementioned treatment, improvement of the following lifestyle habits should be taught.

[1] Regulating daily life.

[2] Eating balanced meals.

[3] Getting sufficient sleep and rest.

11. Hot flushing and cold constitution

Concept

“Hot flushing” is a condition with subjective symptoms such as flushing of the face and sudden heating in the head, and “cold constitution” is a complaint of feeling cold particularly in parts of the body including the back, lower back, hands, and feet. As causes, they appear due to the presence of some disease in some cases while no specific casual diseases are observed in other cases. There are also many patients who have both symptoms.

Pathological condition

The human body is provided with a function that maintains the body fluid volume and its composition, hydrogen-ion concentration (pH), body temperature, or the like constant (homeostasis) when faced with various external changes, and this is the factor essential to normal vital activity. Among these, in adjustment of body temperature, blood circulation plays a leading role. The prevalence of blood in the periphery throughout the body allows the temperature of the entire body to be maintained. It is a function of the autonomic nervous system and hormones that adjusts this blood circulation. Therefore, as causes of hot flushing and cold constitution, in addition to abnormalities in blood components (e.g., local hyperemia and anemia) and abnormal blood vessels (e.g., arteriosclerosis), disorders in blood circulation due to abnormalities in the autonomic nervous system and endocrine system can be considered.

Among complaints of hot flushing and cold constitution, those without particular diseases causing them are often found in females, and in addition to individual constitutions and longtime disorders in diet, it is believed that it is derived from abnormalities in the functioning of the endocrine system (e.g., disorders in female hormone secretions from the ovary) and disorders in the autonomic nervous system in the perimenopausal period. Such patients often complain of various symptoms such as headache, heaviness of the head, blurred eyesight, dizziness, stiff shoulders, lumbar pain, fatigue, asitia, and mental uneasiness, in addition to and in combination with complaints of hot flushing and cold constitution. In addition, some patients complain of cold constitution in the hands and legs and often complain of insomnia during the winter season.

Diagnosis

After checking the general living items of the patient such as appetite, bowel movements,

sleeping conditions and exercise habits, accompanying symptoms as previously described should be also checked. Conditions of locals complaining of hot flushing and cold constitution are checked by anthroposcopy and palpations (if heat and cold constitution are observed, it is desirable to perform treatment with the dorsal surface of the practitioner's hand).

If accompanied by the following symptoms, severe diseases causing hot flushing and cold constitution are considered, the physician should consult with the patient.

Symptoms to be noted that accompany hot flushing: Those accompanying continuous palpitations and shortness of breath, pink sputum, extremely small amounts of urine, presence of welts (venous dilatation) in the breast and upper limbs, continuous abdominal pain and diarrhea, and asthma attacks.

Symptoms to be noted that accompany cold constitution: Those with chronic palpitations and shortness of breath, pale eyelids (palpebral conjunctiva), and ulcers and wounds in the distal portion of the four limbs that are hard to heal.

Treatment

For the purpose of adjusting the endocrine system and autonomic nervous system, treatment by anma massage, massage and acupressure are performed.

For hot flushing, for the purpose of inducing blood flow, in addition to general practices such as effleuraging and kneading of the shoulders and back, it is effective to apply stronger pressure from the lower cervical vertebra to the periphery of the upper thoracic vertebrae and the upper shoulder. Moreover, effleuraging to the sternocleidomastoid (lateral region of the neck), pressure application to the boundary (superior nuchal line) of the head and the neck, carpus pressure to the temporal region or the like are performed as treatment for the upper limbs. *Nageli's head stretching* (stretching of the cervical spine) in a sitting posture is also performed.

For cold constitution, treatment is carefully performed mainly at the sites with complaints of cold constitution, such as the lumbar region, lower limbs, and upper limbs. If asitia is involved, treatment of the abdomen, back, Spleen Meridian (inside of the lower limbs) and Stomach Meridian (frontal outside of the lower limbs) is performed.

Instructions for daily life include moderate exercise and balanced meals, and for cases with complaints of cold constitution in the feet, "foot baths" in which the feet are bathed in hot water at about 40 degrees, hot and cold contrasting baths, or the like are instructed.

12. General fatigue and exhaustion

(1) Concept

This is a condition in which muscle movement and thinking activities become reluctant due to symptoms such as lassitude physically and mentally, diminished vigor, concentration and ability to think, stiff shoulders, and headaches. It is believed that it is originally a defence reaction that appears in order for the body to maintain its health. It is said that there are many factors that cause exhaustion in modern society. If severe exhaustion continues for a long time, it is known as chronic fatigue syndrome, and daily life may be difficult due to slight fever, pharyngalgia, muscular weakness, sleep disorders, unstable emotions, or the like.

The main causes of exhaustion and fatigue are classified as follows.

[1] Physiological causes: They are caused by longtime labor or mental task. It is transient and improved by rest.

[2] Psychological and neurological causes: They are observed in neurosis and autonomic dystonia, with various complaints such as stiff shoulders and headaches.

[3] Caused by organic diseases: They are observed in the recovery phase of acute infection, chronic liver disease, chronic kidney disease, metabolic disease (e.g., diabetes), malignant tumor, anemia, chronic infection, or the like.

(2) Pathological conditions

As for the mechanisms by which fatigue and exhaustion occur, the following are considered.

[1] Lack of an energy source: This is likely to occur if sufficient energy is not ingested with meals.

[2] Poor blood circulation: Cells cannot take in nourishment and oxygen. If it progresses further, the cells themselves will no longer function normally, adversely affecting the nerves.

[3] Accumulation of exhaustion substances: It is also believed that the accumulation of lactic acid in the muscles due to activity is a cause.

[4] Electrolyte abnormalities and dehydration: From sweating, water content and electrolytes in the body are lost and homeostasis of physical strength is lost.

[5] Deconditioning of the adjustment ability of the brain: By continuously thinking and memorizing, the adjustment ability of the brain is diminished and information is not smoothly processed.

Viewpoint of Oriental medicine

Lack of vital energy: Physical strength that is a source of energy is diminished. Consumption of energy causes diminished physical strength, anorexia, or the like. Lack of nourishment due to loss of appetite results in a vicious circle leading to further lack of energy.

Spleen vacuity: The function to receive, digest and absorb foods and carry absorbed nourishment throughout the body is diminished. Nutrients that are transformed into energy cannot be

produced or cannot be carried even if produced.

(3) Treatment

[1] Treatment policies

To improve circulation to activate cells and tissues throughout the entire body. In addition, to remit various symptoms presented by patients. However, the following cases require treatment by specialists such as a physician.

- If abnormalities are observed in a urine test: kidney disease, liver disease, diabetes, or the like
- If ascites and jaundice are observed: liver disease (cirrhosis)
- If edema and high blood pressure are observed: chronic kidney disease, heart failure
- If dry mouth, excessive urination, weight loss and glycosuria are observed: diabetes
- If pyrexia, anorexia, weight loss, or the like are observed: chronic infection
- If palpitations, shortness of breath, facial pallor, nail changes, or the like are observed: anemia and malignant tumors

[2] Anma massage, massage, and acupressure practice

When anma massage, massage, and acupressure are performed, the body feels light, the mood is calmed down and the mind becomes radiant. As a result, increased appetite and the ability to sleep allows exhaustion to be easily eliminated. Undergoing treatment regularly improves physical condition and enhances self-healing capacity.

- Comfortable treatment for the entire body is performed.
- In brief treatment, local treatment for the neck, shoulders, lower back, palms, soles of the feet or the like are effective.
- For patients with various complaints, treatment for these are also performed.
- For spleen vacuity, treatment for *Taibai*, *Sanyinjiao*, *Yinlingqun* or the like located in the medial lower thigh is performed. In addition, it is effective to simultaneously perform treatment for the Stomach Meridian, Kidney Meridian, or the like.

[3] Instructions for daily life

- Obtaining physical strength with moderate exercise.
- Not continuing the same work for a long time.
- Getting sufficient sleep.
- Regulating daily life.
- Eating balanced meals.
- Taking a rest and switching moods.

13. Tinnitus and deafness

Introduction

Tinnitus is also known as “ear ringing” and varies from greatly affecting daily life and work to a degree that is not so bothersome. First, herein the relationship between tinnitus and deafness is mentioned, and then the respective symptoms are described. A survey exists on the relationship to deafness in patients complaining of tinnitus. According to this survey, it was found that 80% of patients complaining of tinnitus experienced deafness. Therefore, these two symptoms are closely related, and it may be said that tinnitus does not develop without deafness or a hearing disability. Secondly, as for the degree of tinnitus and deafness, there is a tendency that the poorer hearing becomes, the more frequent complaints of tinnitus become. As described above, it is important to bear in mind that tinnitus and deafness are closely related symptoms.

(1) Tinnitus

[1] Concept

“Tinnitus” means being aware of hearing sounds in the head independently of any ambient sound. Whatever it is, if it is a sound that is not actually heard by others or it is felt as a sound in the head, it can be said to be subjective tinnitus.

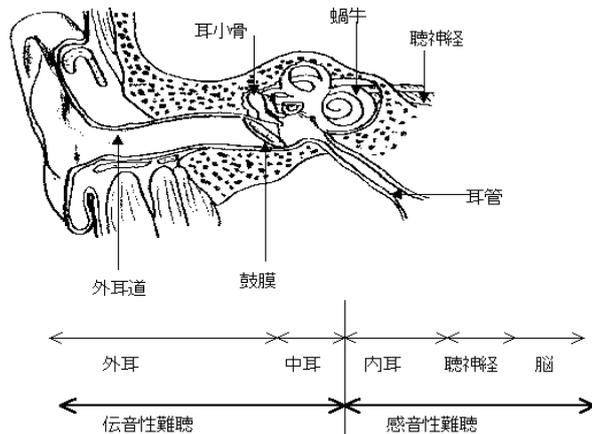
One problem of tinnitus is that it is a ringing in the head (ear), and therefore it is impossible to escape from this sound. Tinnitus is classified into subjective and objective types or the like, but herein subjective tinnitus that is the most common in daily life is described.

A: Subjective (self-rated) tinnitus

Tinnitus that can be heard by the patient only, with a sound that is commonly expressed as being similar to the buzzing of “cicadas.” In addition, in many cases multiple sounds are heard at the same time. Regarding causes and damaged sites, it is believed that the relatively peripheral parts before entering the brain such as the inner ear and acoustic nerve are mostly attributed (figure on the right). It may be considered to be the part peripheral to the middle ear with the auditory ossicle.

[2] Treatment and implementation

By performing massage at the temporal region, neck, upper shoulder, or the like, improved blood circulation and relaxing effects can be obtained. Also, approaches from the aspect of a psychological counselor are effective. Moreover, recently a therapy known as TRT (Tinnitus Retraining Therapy) has been common. It attempts not to eliminate tinnitus but to try to ignore tinnitus.



Japanese	English
耳小骨	Auditory ossicle
外耳道	External acoustic meatus
鼓膜	Tympanic membrane
外耳	External ear
中耳	Middle ear
内耳	Inner ear
聽神經	Acoustic nerve
腦	Brain
伝音性難聴	Conduction deafness
感音性難聴	Perceptive deafness
耳管	Eustachian tube
蝸牛	Cochlea

(2) Deafness

[1] Concept and classification

The condition in which hearing becomes lower than usual for some reason and the hearing sound becomes poor is called deafness. Deafness is classified as follows according to the causative site.

Conduction deafness	The case in which hearing becomes poor due to a damaged external ear and middle ear (conductive mechanism). Diseases that cause this include
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	congenital morphological defects of the external ear and middle ear, earwax plug, otosclerosis, traumatic chain-disjunction of the auditory ossicles or the like, in addition to exudative otitis media and chronic otitis media.
Perceptive deafness	The case in which hearing is diminished due to damage from the inner ear to the cerebral cortex (perceptive mechanism). Labyrinthitis, senile deafness, Meniere's disease, sudden deafness and noise-induced deafness.
Combined deafness	The case in which with conduction deafness and perceptive deafness occur in combination. The hearing condition has characteristics of both types of deafness.

[2] Causes

As in the table above, conduction deafness is often caused by otitis media and otosclerosis. By comparison, perceptive deafness has many cases in which deafness occurs from diseases with unclear causes, and it is believed that it is triggered by viral infections such as common colds, exhaustion, psychological stress, or the like. In addition, it is not rare for these cases of deafness to accompany tinnitus.

[3] Diagnosis

To differentiate between conduction deafness and perceptive deafness, special examinations are required but it is possible to make a broad determination as follows.

- It is possible to distinguish between conduction deafness or perceptive deafness to some degree according to whether it is possible to understand what is spoken loudly. For conduction deafness, if the sound is strong, an accuracy rate of almost 100% can be obtained.

[4] Treatment and practice

In the case of deafness due to otitis media, hearing can be recovered if plastic surgery for a perforated tympanic membrane and broken auditory ossicle is performed, but in the case of perceptive deafness, patients tend to become irritated and reluctant to communicate because they cannot hear even if others speak loudly. In order for people with deafness to lead daily lives as smoothly as possible at ease, the understanding and support of their families and people around them is more important than anything else.

Therefore, by performing a massage that eliminates stress as well as tinnitus for the temporal region, neck, upper shoulder or the like, improved blood circulation and relaxing effects can be expected. In addition, therapy that eliminates these stresses also leads to calming down energy of the “liver” in Oriental medicine. Moreover, treatment of the lower limbs may be also performed. This can be expected to have an effect as a treatment for the elderly, considering the direction to supplement energy of the “kidney.”

Chapter 6 Access to Information for Persons Who are Visually Handicapped and Learning Medical Massage — Making Use of IT and Social Approaches —

1. Importance of Reading and Writing Skills

Learning from a textbook and by taking notes is essential for acquiring advanced skills and knowledge about massage. Also, it is important to correctly record the patient's condition and treatment when giving massages. Information exchange among all the relevant people and the transmission of written information to the public are necessary for the establishment and development of massage practices as a business by persons who are visually handicapped.

In this context, persons who are visually handicapped should be able to communicate by writing and gain access to information for preferable massage practices. For these purposes, it is essential to make use of IT and to establish a social infrastructure, which should be our basic premise.



Learning from a Braille textbook



Learning using CCTV

2. The current state of reading and writing by persons who are visually handicapped

In this section, we will show the reading and writing measures used by Japanese persons who are visually handicapped for access to the various types of information under the appropriate

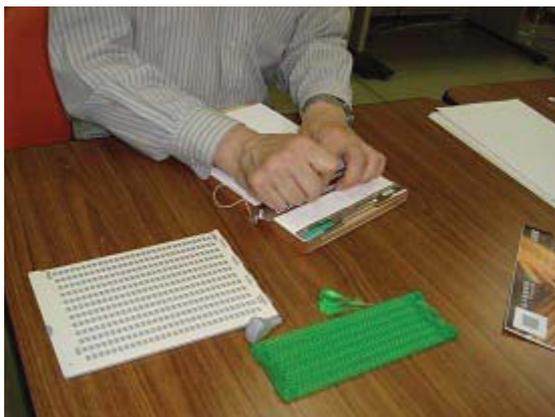
conditions to demonstrate that visually handicapped persons can access to reading and writing with proper training.

(1) Braille system

The Braille system is the surest way to read and write for persons who are totally blind or persons who are severely visually handicapped. In Japan, approximately 300,000 persons are visually handicapped, and 10% use the Braille system.

The Braille system was devised in 1825 by Louis Braille, a Frenchman who was blind. The system spread throughout the world. The Japanese Braille system was established in 1890. Braille is a system using 6 small dots in various combinations to indicate letters, which is highly appropriate for reading by touching.

a	i	u	e	o	ka	ki	ku	ke	ko	sa	si	su	se	so
⠁	⠃	⠉	⠑	⠕	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠
ta	ti	tu	te	to	na	ni	nu	ne	no	ha	hi	hu	he	ho
⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠
ma	mi	mu	me	mo	ya	yu	yo	ra	ri	ru	re	ro	wa	n
⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠



Note taking using a Braille board



Writing using a Braillewriter

The Braille board is a basic tool for writing in Braille that makes one dot after another on paper. There are various

commercialized types of small simple Braille writing instruments. Using a Braillewriter, one can write in Braille

efficiently with loud sound.

In recent years, PCs (personal computers) have become widely used for reading and writing Braille with software called a Braille editor. PCs process Braille as electronic data. Braille can be written with a standard keyboard and read through a Braille display terminal (Pin Display) connected to a PC that enables easy editing and the correction of errors. Also, Braille in the form of electronic data can be printed out using a Braille printer. PCs rapidly improved the efficiency of producing Braille documents and books.

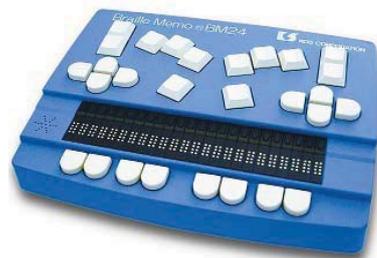
More recently, a portable electronic Braillewriter, a combination of a Braille keyboard and pin display, is becoming increasingly widespread. This device has the same function as the Braille editor for efficient and easy reading and writing of Braille even outside the home.



Access to a PC through a pin display



Documentation using a Braille printer



Portable electronic Braillewriter

(2) Voice recording

Voice recording is another useful means for recording and utilizing information. In Japan, household tape recorders have been widespread since the late 1950s, which enabled at-home recording and playing. Initially, open reel tapes were used, while in the late 1960s, cassette tapes

was introduced, which were more convenient. As a result, voice recording had become rapidly widespread among persons who are visually handicapped.

Since 1990, voice recording has shifted from analog to digital and the recording media shifted from tape to disk. In addition, the IC recorder, which is small and can record and play for a prolonged time, has become more popular. This palm-sized device can record and play for several tens of hours.

Persons with acquired blindness, who have difficulty communicating in Braille, use recordings with these devices in place of Braille.



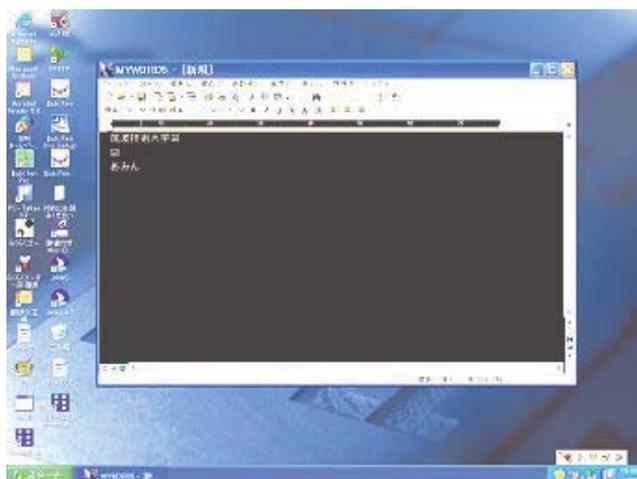
IC recorders

(3) Written letters

Written letters represent visually recognized letters. Owing to the PC, persons who are visually handicapped can now read and write written letters by themselves. Nevertheless, this cannot be realized with just the PC because persons who are visually handicapped cannot read what is on the display. Software called a screen reader enables persons who are visually handicapped to utilize a PC. The software reads the words shown on the display with a synthesized voice.

In Japan, a screen reader for MS-DOS, the standard operating system (OS) at the time, was developed in the 1980s. This enabled persons who are visually handicapped to write, calculate, and process data using a PC.

More recently, in the late 1990s, MS-DOS was replaced by Windows, a new standard OS. The Windows operating system uses a graphical user interface (GUI) that displays windows and pictographic characters on a monitor, which was, therefore, difficult to read out and prevented immediate development of the screen reader for this OS. Meanwhile, utilization of the PC by persons who were visually handicapped stagnated. Through the efforts of developers, a screen reader for Windows was at last developed, and persons who were visually handicapped were able to conveniently use the PC again.



Window of Myword (an editor for written words)

Currently, seven types of screen readers are used in Japan. There are also screen readers corresponding to Windows Vista, which was released in January 2007.

Persons who are visually handicapped utilize the PC variously for writing, reading aloud printed information after conversion into voice and Braille, calculations, data processing, and listening to music through the screen readers. Most of all, Internet access is actively utilized. Many persons who are visually handicapped read Web pages and/or e-mail (in written letters).

Several types of software for persons who are visually handicapped other than screen readers have been developed to accelerate these activities.

(4) Braille figures

Figures and graphs in a book can be read by expressing them using Braille figures that show them with the same convex dots as Braille. Braille translators prepare Braille figures by using a PC and a Braille printer. Otherwise, tactile figures may be prepared using a stereo copy machine.



Stereo copying

(5) Reading and writing for persons with amblyopia

Persons with amblyopia use CCTVs (closed circuit television) and magnifying glasses for

reading and writing. A variety of different types of small and lightweight CCTVs with a CCD camera and liquid crystal display are available.

Moreover, PCs are also highly useful for persons with amblyopia. Software that can enlarge images and words and/or adjust the color is very useful for persons with amblyopia.

Other than IT, wide-ruled notebooks are available as stationery for persons with amblyopia.



Portable CCTV

(6) Other IT equipment useful for persons who are visually handicapped to access information

(i) Cellular phones

Many persons who are visually handicapped use cellular phones equipped with voice guidance. These devices enable the use of convenient functions, including not only the telephone but also e-mail and Internet access.

(ii) Apparatus for DAISY

Digital talking books for persons who are visually handicapped are now being standardized into DAISY on a global basis.

DAISY enables one to directly jump to a specific location for listening, control the playback speed, and record several tens of hours on one CD (compact disk), showing that this system is far more convenient than tape recording. Therefore, the reading environment for persons who are visually handicapped will be further improved, possibly facilitating access to recorded information.

DAISY standards were established mainly in Japan. Many Japanese companies were involved in the

development of players for DAISY books and software to produce them.



Apparatuses for DAISY

Conventional DAISY books have been recorded on CDs, while Internet services have recently

started for listening to DAISY books. Media associated with DAISY books will possibly be more diverse in the future.

3. Social approaches for better accessibility to information for persons who are visually handicapped

In this section, we will show the social approaches of welfare measures and policies and volunteer activities in our country that facilitate reading and writing and access to information by persons who are visually handicapped. Smooth access to information is realized only when the efforts of persons who are visually handicapped and social support are combined.

(1) Publication of books

There are 29 Braille publishers in Japan that produce and distribute general printed books translated into Braille as well as original Braille books. The law permits translation and distribution of books regardless of copyright.

Also, there are a small number of companies that specialize in publishing talking and large print books.

Braille, talking, and large print textbooks for schools are produced by specialized publishers and volunteer groups. Owing to government subsidies, persons who are visually handicapped can get the books almost free of charge.

(2) Libraries

(i) Braille libraries

There are a total of about 480,000 Braille titles, 483,000 talking books on cassette tapes, and 260,000 DAISY books in about 90 Braille libraries in this country. Primarily, Braille libraries prepare Braille and talking books and lend books via mail (shipping is free of charge under the Japan Post Law). Since volunteers produce most of the books, building an inventory of books is an important activity of Braille libraries. In recent years, Braille libraries have increasingly used the Internet.

(ii) Public libraries

In metropolitan areas and the periphery, public libraries provide face-to-face reading services—a reader reads aloud a book in the library—for persons who are visually handicapped.

(3) Information media

(i) Braille newspaper

The *Braille Mainichi* is a weekly Braille newspaper that was first issued in 1922 by the

Mainichi Newspapers, one of the largest newspaper publishing companies. In every issue, original articles on visual handicaps are compiled in about 60 pages. A Braille newspaper in book form reaches readers weekly by mail, and a print edition and DAISY formatted media are issued.

The *Braille JB News* is a project by the Japan Federation of the Blind since 1991. In this project, articles are selected from the morning edition of general newspapers, original articles are written regarding persons who are visually handicapped, and both are translated into Braille data for distribution to 58 bases all over the country via the Internet daily. These bases print the information in Braille and send printed copies to subscribers by mail. Also, the Prompt Braille News Project was launched where one can download Braille articles directly from Web pages. In addition, JB News provides an automated read-aloud service on the telephone.

(ii) Magazines

There are 100 or more Braille magazines and around 500 talking magazines coming out. Braille libraries and publishers, as well as volunteer groups and organizations for disabled persons, issue these magazines. Some consist mainly of original articles, while others consist mainly of reprinted articles from general magazines. In addition, there are some talking magazines where all content in a general magazine is recorded.

(iii) Broadcasting

The Japan Broadcasting Service for Disabled Persons (JBS) broadcasts throughout the country for persons who are visually handicapped through a cable broadcast. This broadcast started in 1988 and provides specific information on visual handicaps. In order to listen to this broadcast, one needs to contract with a cable broadcasting company and pay a monthly subscription fee. Also, JBS now provides experimental broadcasting via the Internet to provide live programs that read aloud the morning and afternoon papers of major national newspapers every day.

The public broadcast station NHK started a radio program for persons who are visually handicapped in 1964. This is a 30-minute program that is broadcast twice a week (one is a repeat) to provide information regarding visual handicaps.

(4) Newsletters from public agencies and private companies

Many of the newsletters issued periodically by local governments are provided in Braille and recorded media. Some Braille and recorded media are produced by Braille publishers commissioned by the local governments, while others are produced by local volunteer groups.

During the national elections, the official gazette for elections in Braille, with information on the candidates and party policies, is distributed for persons who are visually handicapped.

In recent years, many companies provide information on their own products in the form of

recorded media and/or distribute materials about their business in Braille.

(5) Volunteer activities

There are about 7,000 Braille translation volunteers and about 8,000 read-aloud volunteers in nationwide organizations. Far more volunteers are active in Braille translation and reading aloud in various regions.

Recently, volunteer activities that provide instruction and support for the use of PCs by persons who are visually handicapped have expanded, contributing to widespread PC availability.

(6) Utilizing the Internet

On JARVI, a mailing list on which about 1,500 people concerned about persons who are visually handicapped and their welfare, rehabilitation, and education participate in actively exchanging information and opinions on visual handicaps. There are also many mailing lists and Web pages regarding visual handicaps that provide valuable information.

Glossary of Medical Massage Terms

(A)

Applications and Limitation

It is important to understand that the practice of acupressure is not completely versatile and that there are applications and limitations for when the practice can be applied.

(B)

Blood

Material that provides nutrition and fuel for the body and is necessary for maintaining life. It is almost the same as the concept of blood in Western medicine; however, the concept of blood in Oriental medicine includes the functions of the blood. It nourishes all bodily systems and organs.

Bodily Fluid

Bodily fluid is necessary for maintaining life and it moistens the body and keeps the joints in good condition. It looks like water, but it has functions that contribute to bodily movement.

(C)

Carotid triangle

A triangular part bounded by the venter superior musculi omohyoidei, the anterior edge of the sternomastoid muscle, and the posterior belly of the digastric muscle. It is normally situated at the bifurcation of the carotid artery.

Clavipectoral Triangle

A region bounded by the exterior claviculae on its upper side, the greater pectoral muscle on the inner side, and the deltoid muscle on the outer side.

Clotted Blood

Clotted blood occurs when blood circulation is blocked and is common among women experiencing difficult menstruation. It also occurs during injuries, such as through bruises, or after surgery for a sprain. Patients often experience chronic stabbing pain.

(D)

Digastric Triangle

The space between the muscles of the cervical region. It is a triangular region situated between the inferior maxilla and the posterior and anterior bellies of the digastric muscle and contains the submandibular gland.

Draping and Covering

Sometimes called covering. It refers to a method of taking into consideration the patient's privacy and possible shyness during the treatment and/or manipulative therapy by covering certain body parts with a towel or sheet so that the patient's body is not unnecessarily exposed. This is a very important consideration for patients in the field of medical acupuncture.

(E)

Electronic Medical Chart

A paperless type of medical chart data used to manage patient information by inputting information in a computer. This method is in practical use in some medical institutions.

Examination and Evaluation

It is necessary to perform all required examinations and make evaluations during the process of a clinical examination. It is especially common in the field of orthopedics for neurological examinations to be required. Additionally, it is important to determine which evaluation methods to use according to the results; therefore, it is necessary to have sufficient knowledge and a full understanding.

(F)

Five Elements

The concept of the five elements divides all things in the natural world between the five elements Wood, Fire, Earth, Metal, and Water to understand the interrelationship between the activities of natural phenomena and the human body. In the human body, the basic categories are liver, heart, spleen, lungs, and kidneys.

Fossa Poplitea

The rhomboideus space situated in the posterior knee joint, surrounded by the biceps femoris and musculus semimembranosus on the upper part and the two heads of the gastrocnemius muscle on the lower part.

Fossa Supraclavicularis Major

A part of the Carotid triangle. It is the depression in the central part of the clavicae and is situated in the outer side of the sternocleidomastoid muscle.

Fossa Supraclavicularis Minor

The rhomboideus space situated between the sternal head and clavicular head of the musculus sternocleidomastoideus.

(I)**Indirect Lighting**

Indirect lighting is a method of utilizing indirect light by directing lighting to walls so that the light source does not directly illuminate the subject. This method is commonly used in areas requiring soft lighting, such as medical institutions and restaurants.

Inferior Limb Girdle (Pelvis)

A circular configuration in which the right and left coxal bones are connected to the pubic symphysis at the front and the os sacrum at the back.

Informed Consent

Informed consent is a “total understanding between the healer and a patient” when a patient undergoes treatment, whereby the patient is given a full explanation regarding the results of an examination or diagnosis, the treatment options and the course of each treatment available to the patient, and the possible outcomes of the treatment, and the patient is assisted in choosing the most appropriate treatment method.

(M)**Malpractice**

Refers all adverse events caused by acupressure and finger pressure. These events include bone fractures, intercostal neuralgia, bruises, sprains, contused wounds, exacerbation in symptoms, and skin inflammation, and an average of approximately eight cases are reported annually in Japan and compensated with insurance.

Medical Acupressure

Practice of acupressure performed by a massager who has knowledge and skill in the field of medical acupressure for the purpose of relaxation, maintenance of health, and

improvements of illnesses to improve a patient's condition.

Modern Medicine

Since the industrial revolution, it has gained prominence as a field of medicine based on modern scientific perspectives developed through modern Western sciences, especially physics, and refutes Hippocratic medicine. Oriental medicine, represented by fields such as acupressure and acupuncture, Ayurvedic medicine, Unani medicine, and Avicennian medicine are, much like Hippocratic medicine, based on ancient ideologies and philosophies and are refuted in Western medicine.

Moisture

Useless water in the body that appears when bodily fluids become excessive or clogged. It causes stagnation of *Qi* and blood. It is usually accompanied by coldness and swelling in the lower body.

(O)

Obligation of Confidentiality

As mentioned in Patient Privacy, it is against your obligation of confidentiality if you disclose any personal information of a patient without their permission. It is essential that each individual who is engaged in the field of medicine to understand and carefully apply this important concept.

(P)

Patient Privacy

Patient privacy is not simply a matter of the exposure of their skin during treatment and it also includes personal information necessary for treatment, such as date of birth, birth place, disease name(s), family relations, personal requests for treatment, and beliefs/religion. This information must not be disclosed as the person performing treatment has an obligation of confidentiality.

Physical attributes and body types

Physical attributes is a concept that synthesizes the morphological elements of body development and is normally described in terms of structural elements of the body that can be shown in values, such as height, weight, bone structure, seated height, and chest circumference. For example, descriptions such as “He has a well-built physique” or “She has a fragile physique” can be made. In contrast, body type is a concept that

categorizes the physical features of individuals according to the harmony between the elements of each body part that compose the physical attributes as well as the elements involved in bodily movements, appearance, and posture, between several patterns. Body type is strongly related to the individual's constitution and risks of illness. For example, a person with a short and thick neck, wide shoulders, thick chest, big head, and a chunky build is called a cycloid type. This type of individual has the risk of developing high blood pressure. A cycloid-type person with a reddish face has higher risks of developing cerebral embolism; therefore, this type of person is called a cerebral embolism type. A person with descensus ventriculi typically has an elongated shape body, tall seated height, and underdeveloped muscles; therefore, such persons are called splanchnoptosia body type. Other examples include the asthenic body type (body type with pale skin, a flat chest, underdeveloped muscles, and thin body) and the muscle strength type (body type of an active person with well-developed muscles). Physical attributes and body types differ between individuals, genders, races, and ages as well as between regions, employment history, history of sporting activity, living environment, and life history.

Practice

The word practice, while not entirely medicinal in meaning, indicates the practice of acupressure as a treatment rather than simple relief.

(Q)

Qi

An invisible form of energy that is necessary in maintaining life. It has a function of circulating blood and bodily fluids throughout the entire body.

***Qi* stagnation**

A condition in which the circulation of *Qi* becomes bad, resulting in stagnation. The condition often occurs in the upper body, and it is accompanied by tension and muscle pain. It is commonly seen in persons with stress and overuse syndromes.

(S)

Somatic-Visceral Reflex

A phenomenon in which a visceral reflex is caused by stimuli to the organs and systems such as the skin, joint structures, and muscles. This is one of the explanations of the mechanisms behind the effects on acupuncture and manipulative therapy.

(Y)

Yin and Yang

Yin and Yang is the idea of recognizing everything in the natural world through a mutual relationship between opposite characteristics. Yin is characteristically represented by water, while Yang is characteristically represented by fire. The two forces maintain balance by helping growing and controlling one another.

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12-7 Kasuga 4-chome, Tsukuba, Ibaraki Prefecture, Japan

305-8521

Phone/Fax: 029-858-9612

E-mail: saito@e-amin.org

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About AMIN

AMIN is the acronym for Asia Medical Massage Instructors Network. Instead of being abbreviated as AMMIN, one “M” has been omitted. The purpose of AMIN is to allow instructors in Asia who are engaged in massage education for visually impaired people to share their knowledge, techniques, and information necessary for them to accomplish their purpose and improve the quality of their skills to promote the independence of visually impaired people in the region.