



Medical Qi-Gong Meditation

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Medical Qi – Gong Meditation

By Dr. Richard Cheng M.D. Ph.D.

Introduction

- I. Qi – Gong Meditation is a set of ancient Eastern training techniques that help promote physical and psychological well-being by teaching one to feel one’s internal energy and harmonize it, achieving the “Qi”: the vital energy of the body.**
- II. Meditation classes today are being filled by mainstream Americans. It is offered in schools, hospitals, law firms, government buildings, corporate offices, prisons and military school – West Point. Meditation is being recommended by more and more physicians as a way to prevent, slow or at least control the pain of chronic diseases like heart conditions, AIDS, cancers, infertility, depression, hyperactivity and attention-deficit disorder.**

Scientific studies have shown that meditation can:

- 1. Boost the immune system (people who meditate have higher level of immune cells known to combat tumors. e.g. breast cancer, prostate cancer etc.)**
- 2. Lower blood pressure, slow the heart rate, promote healthier heart (increase beat to beat variations) and enhance success in heart surgery.**
- 3. Reduce chronic pain syndromes and stresses.**
- 4. Help asthma, diabetic mellitus, skin diseases such as eczema, psoriasis and other immune diseases.**
- 5. Reduce degeneration or aging of the brain (Meditators have bigger brain sizes seen in functional MRI).**
- 6. We have found, by spectrometer recording, that only Qi – Gong practitioners significantly activate the left prefrontal cortex brain cells. This activation has been showed to be associated with increasing levels of happiness, more energetic and optimistic.**

Techniques of Qi – Gong meditation

The basic aim of Qi – Gong meditation is to silence the thinking mind and to shift awareness from the rational to the intuitive mode of consciousness. There are many forms of Qi – Gong meditation. The silencing of the rational mind is achieved by concentrating one’s attention on a single item, like one’s breathing, the sound of music or the visual image of a flower. Other schools focus their attention on body movement, which have to be performed spontaneously without the interference of any thought.

- a. Breathing technique – can be done sitting, standing or lying down. The focus centered on one’s breathing. Diaphragmatic breathing is to pay attention to the abdomen, bulging out on inhalation and sucking in on exhalation.**
- b. Dynamic Qi – Gong meditation – Simple body movements which have to be performed spontaneously without the interference of any thought. The rhythm of the movement can lead to the same feeling of peace and tranquility while simultaneously increasing circulation and strengthening the body part.**
- c. Body scan – massage the acupuncture points; meridians or body parts, using your own hands or life energy, - “Qi” or “feelings”.**
- d. Walking meditation - involves focusing on the sensations in the feet or legs, or alternatively, feeling the whole body moving. Simply put, one is to “focus the mind on the foot”. During walking meditation, one is fully aware of each foot as it contacts the ground. This feeling is the same as carefully walking backward. This technique has been shown to reduce chronic pain syndromes, stress and boost the immune system, which can fight many kinds of cancers.**

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Medical Qi-Gong

The technique of spontaneously healing

There are many successful cases of illnesses that are cured or helped by Qi-Gong masters or through Qi-Gong practice. It is reported that dying cancer patients have their life span lengthened when they practice Qi-Gong daily. Severe cardiac patients slowing recovered from heart attacks; severe hypertension became normal and stopped taking medication; diabetic patients had complete remission, etc. after they began to practice Qi-Gong. In Western society, clinicians have encountered rare cases of patients who recovered spontaneously from lung cancer; breast cancer, severe heart disease, coma for many years, etc. Our brain contains about 1 billion cells of which only about 2 million actively function daily. More than 90% of the brain cells remain quiet or non-active. Perhaps our body has self-healing powers that are activated by certain brain cells. Qi-Gong seems to be able to activate some of the quiet brain cells and promote spontaneous healing power.

Medical Qi-Gong is simple, safe and easy to learn. It is very effective for promoting both physical and mental health. It is divided into 6 parts and takes 45 to 60 minutes to finish part 1 to 6. Each part can be done alone or in any combination. To achieve maximum cardiovascular protective effect, Medical Qi-Gong should be practiced for 45 minutes and at least 3 times weekly.

Qi, Kundalini, !Kia

An African tribe called the “!Kung” lived in the Kalahari desert at the northwest part of Botswan. The “!Kung” people practiced a mysterious ceremony of dancing for hours to achieve the ‘hotness’ (called ‘n/um’) in order to reach a state of trance called ‘!kia’. The ‘n/um’ was described as the hotness rose from the base of the spine and would reach to the top of the head to achieve ‘!kia’. At the peak of ‘!kia’, the practitioner could perform many supernatural power such as healing patients, walking on fire or experiencing telepathic phenomena.

Practicing medical Qi-Gong, one will experience a feeling of warmth or soothing hotness or fire arising from the base of the spine (lumbo-sacral area) and going up to the neck, top of head (GV – 20), and then coming down to the face (third eye – GV - 24.5 between the eyebrows) throat, chest and storing at Dan Tien (CV-4), two inches below the umbilical cord. The Qi continues to flow through this pathway which is called the micro-cosmic orbit. From Dan Tien, it can also distribute to all parts of the body. This feeling of warmth is called Qi or ‘life energy’ and in Indian and Tibetan teachings, it is called the awakening of the kundalini.

The awakening of Kundalini was described in ancient Indian texts such as Vedas, Agamas, Tantras and Hatja Yoga etc. There are seven centers called Chakras storing the kundalini. The

kundalini can rise from the first center to the seventh center. The first center is at the base of the spine around the rectal area called muladhara – Chakra, The second center is around the sexual organ called svadhishtana – chakra; the third center is around the umbilical cord called manipura – chakra; the fourth center is around the heart area called anahata-chakra; the fifth center is around the throat called vishuddhi – chakra; the sixth center is at the third eye, between the eyebrows called ajna – chakra and the seventh center is at the top of the head (GV-20) called sahasrara- chakra.

The Qi energy has been experienced by many people including shamans, Hindu, Yoga practitioners, Buddhists, Tibetan Lama, Chinese Taoists, Qi-Gong masters, Christian and Catholic priests, etc. This kundalini may be expressed in the form of hotness, spontaneous muscle spasm, pain at the body (at the feet, back, neck or severe headache), deep cold, itching, feeling of great pleasure, seeing flashing light of white, yellow, gold or blue, palpitations, hearing loud noises, hysterical laughing, feeling explosion of the head, stretching tear or levitation of the body, out of body perception etc. These feelings are described to be the process of rebirth. However, practicing medical Qi-Gong can achieve the Qi without going through the bad experience such as pain, insomnia, headache, unpleasant palpitation, depression, epilepsy, mental illness, etc.

Medical QI-GONG

GENERAL INTRODUCTION

Qi-Gong is a set of ancient Eastern training techniques that help to promote physical and psychological well-being by teaching one to feel one's internal energy and harmonize it, achieving the "Qi". The vital energy of the body. THE BODY AND ENERGY: The modern Western view:

Bio-electric energy permeates the human body and mediates all its vital functions. Electric fields are maintained by individual cells can communicate with each other through electrical currents. Cells grouped into specialized areas on hormonal systems or entire organs are intricately connected through nerves which form complex and precise networks; human thought, emotions and behavior, the senses of touch, smell, taste, hearing and vision, the heart rate and blood pressure, breathing, muscle action, the digestive process, the kidney and bladder functions, all are influenced and controlled through bioelectrical energy processes. The body as a whole generates its own electromagnetic field which may fluctuate according to activity level, alertness or the state of one's health.

The techniques of Qi-Gong train a person to become aware of this vast, dynamic energy source and focus it in health-promoting ways. Early in training, practitioners will first experience the benefits of the state relaxation the techniques induce, which may help reduce the daily strains and anxieties of modern life and favorably influence heart rate, blood pressure and fatigue. Further training develops the ability to meditate more profoundly, which can help intuitive thought, insight and emotional peace. Long term practice by certain individuals (i.e. "Masters; Monks") has been reported to induce powerful phenomena such as mystical and psychic experiences.

In our everyday life, direct intuitive insights into the nature of things are normally limited to extremely short moments. Through Qi-Gong training, these intuitive insights can be extended to longer periods and ultimately, become a constant awareness. The basic aim of the Qi-Gong techniques seems to silence the thinking mind and to shift the awareness from the rational to the intuitive mode of consciousness. There are many forms of Qi-Gong meditation. The silencing of the rational mind is achieved by concentrating one's attention on a single item, like one's breathing, the sound of music or the visual image of a flower. Many Qi-Gong methods focus the attention on body movements which have to be performed spontaneously without the interference of any thought. This is the way of the dynamic Qi-Gong, Hindu Yoga and the Taoist Tai Chi Chuan. The rhythm of the movements can lead to the same feeling of peace and tranquility which is characteristic of the more static forms of meditation, a feeling which, incidentally, may be evoked also by sports e.g. dancing, jogging or martial arts can be a highly rewarding form of meditation.

The dynamic Qi-Gong can favorably influence heart rate, blood pressure, and the strength of muscles, ligaments, tendons and joints. Its technique of exercise, having similar effects to fast

walking or jogging, can significantly reduce the cardiovascular risks of hypertension, stroke and heart disease. The meditation and the shifting of the thinking mind to the intuitive mode of consciousness tremendously reduce the stresses of our daily life both physically and psychologically.

Prolonged stress or frequent injuries will release cytokines (such as interferon, interleukins 1 and 6, tumor necrosis factor, etc.) which cause sustained cortisol in our body. The sustained cortisol and together with other stressed-hormonal releases may deplete their productions & produce myopathy, fatigue, weakness, decalcification of bone and accelerate neural degeneration of the hippocampus during aging. Sustained release of cortisol also suppresses the immune system and creates chronic pain syndromes as well as many auto-immune diseases such as multiple sclerosis, rheumatoid arthritis, lupus, scleroderma, Crohn's disease, psoriasis, hay fever etc.

Medical Qi-Gong is specially designed to promote health by reducing stresses, cardiovascular risks, cancers, auto-immune diseases and slow down aging. It is easy to learn and very effective to practice.

1. Part I – External Qi training & Walking Meditation
2. Part II – Natural spontaneous Qi-Gong
3. Part III – Body Scan: Massage the Meridians and Acupuncture points for health
4. Part IV – Intellectual Qi-Gong
5. Part V – Natural (Mindful) Meditation

The History of Qi-Gong

Qi-Gong originates from and can be classified into 6 types practiced by:

- 1. Confucianism**
- 2. Buddhism (Including Tibetan and Indian yoga)**
- 3. Taoism**
- 4. Kung Fu (Martial Art – Tai Chi Chuan)**
- 5. General public**
- 6. Chinese Medicine**

The history of Qi-Gong has been recorded in many medical books and can be dated back to 5 thousand years ago, when shaman or witch-doctors started dancing, in a state of trance dynamic spontaneous movements and meditation to heal patients.

1. History before Tsin (秦) Dynasty. (A.D.265-420)

The book “Lui’s Spring and Autumn” (呂氏春秋) recorded that Qi-Gong had been used to treat different kinds of illnesses about 4 thousand years ago.

“昔陶唐之始， 陰多滯伏而湛積， 水道壅塞， 不行其源， 民氣郁悶而滯着， 筋骨瑟縮不達， 故作為舞以宣導之。

The famous medical literature, “The Yellow Emperor’s book of Internal Medicine” describes in detail the theory and technique of Qi-Gong practice.

“虛邪賊風避之有時， 恬淡虛無， 真氣從之， 精神內守， 病安從來， 是以志閑而少慾， 心安而不懼， 形勞而不倦。 呼吸精氣， 獨立守神， 肌肉若一。”

In his book “The way of Taoism” Lao Tse (老子) wrote the technique of meditation including breathing methods, relaxation of the body and mind.

“虛其心， 實其腹， 綿綿□進出， 用之不勤， 載營魄抱一， 能無離乎？ 專氣致柔， 能嬰兒乎。”

2. Han (漢) Dynasty (A.D. 421)

Qi-Gong became more popular and was practiced widely in general public and royal families.

Books and pictures describing Qi-Gong practice and techniques had been found in the Emperor's tomb of Han dynasty.

“導引图, 却谷食氣, 熊經鳥伸及五禽戲..”

In his medical book “Golden Essentials of Medicine” (金匱要略), the famous medical doctor Cheung Chung Jin (張仲景) stressed the importance of healing illnesses by Qi-Gong. He also described the Qi-Gong technique of “Five Animal Exercise” (五禽戲) (I) Tiger (II) Deer (III) Bear (IV) Monkey (V) Bird.

3. Two Jin Dynasties (两晋南北朝). (550---617)

There were several books describing Qi-Gong for health and longevity. i.e. Tze Kung's (嵇康) book “Nourishing Life” (養生論), Cheung Shum's book “The Chief Method of Nourishing Life” (養生要集) and Kuo Hung's book “葛洪抱朴子”. All these described the Taoists methods of practicing Qi-Gong. These included chanting, exercise, body postures, meditation and self-massage techniques.

4. Tsui & Tang (隋唐) Dynasties. (617---907)

Qi-Gong was further developed and popularized. Many books on Qi-Gong were published. The famous physician Sun See Mui (孫思邈) recorded the techniques of practicing Qi-Gong for disease – healing in his book “Emergency golden therapeutic formulae” (備急千金要方) which described the breathing technique: for lung disease say ‘Hui’ for 30 times & say ‘Hui’ quietly 10 times; for liver disease, say ‘Ho’ loudly 30 times & say ‘Ho’ quietly 10 times; for spleen disease, say ‘Ha’ loudly 30 times & say ‘Ha’ quietly 10 times; for kidney disease, say ‘She’ loudly 50 times and say ‘She’ quietly 30 times.

5. Sung and Yuen (宋元) Dynasties (908 – 1363)

Under the influence of Confucianism, Taoism and Buddhism, the philosophers and educated people incorporated Qi-Gong meditation into a regular teaching in school. They often studied the books for half a day and practiced Qi-Gong for the next half day. Many books were written mixing the ideas and techniques of Confucianism, Taoism and Buddhism (including Tibetan Meditation).

6. Ming (明) (1364 – 1644) and Ching (清) (1644 ---1911) Dynasties

During the Ming dynasty, there was new development and ideas about Qi-Gong.

Medical workers stressed the importance of Qi-Gong for health and disease – healing. In Lee Ting's book “Medicine for beginners”, he denied the idea that Qi-Gong could turn people into God or Buddha.

In Ching Dynasty, more books were written systematically describing the technique of Qi-Gong practice.

7. Recent Development of Qi-Gong In China (1911 to 1999)

In 1954, Qi-Gong was first used to treat patients in hospitals. In 1956, the first Qi-

Gong nursing home was built in Huipei Province. Later, many similar Qi gong treatment centers were established in different provinces in China. The first national Qi-Gong meeting was carried out on October 6 to 31, 1959. In 1981, the Chinese Medical Qi-gong Research Association was officially formed in Beijing. Classes were organized to train Qi-Gong healers as clinical workers. Successful results were reported in treating different illnesses especially hypertension, coronary artery disease, anxiety and nervousness, brain concussion, thyroiditis, bony fracture, some digestive problems, respiratory problems, genitourinary problems and hormonal problems. Much research has been conducted to look for the validity and effectiveness of Qi-Gong on various illnesses, especially the incurable ones like aids, cancers, intractable pain etc.

Qi-Gong was also found to have effect on enhancement of memory, learning, antiaging and growing in humans, animals and plants (refer to the chapter – Scientific Research on Qi-Gong).

8. After year 2000, Qi-Gong meditation became very popular in the western world

Meditation classes today are being filled by mainstream Americans. It is offered in schools, hospitals, law firms, government buildings, corporate offices, prisons and military school – West Point. Meditation is being recommended by more and more physicians as a way to prevent, slow or at least control the pain of chronic diseases like heart conditions, AIDS, cancers, infertility, depression, hyperactivity and attention-deficit disorder, fibromyalgia, complex regional pain syndromes I and II etc.

The Techniques of Qi-Gong Meditation

1. Find a quiet place and suitable time with minimal distractions (e.g. telephone, children... etc.).
2. The environment should be comfortable and pleasant where it is not too polluted, hot, cold or windy.
3. Meditation should not be practiced under a hungry or extremely full stomach or when the subject is too tired.
4. Qigong can be practiced while sitting in a chair, sitting on the floor, lying down in a comfortable position or standing while keeping the spine straight.
5. Keep the mind and body relaxed. The mind should be focused on breathing or on the lower abdomen. (CV5). Do not over-concentrate to cause tension.

A. Breathing Techniques

Begin meditation with quiet, slow and regular breaths. The breath should be long, deep, continuous and comfortable. You can focus your mind on breathing or on the lower abdomen (CV 5) with diaphragmatic breathing.

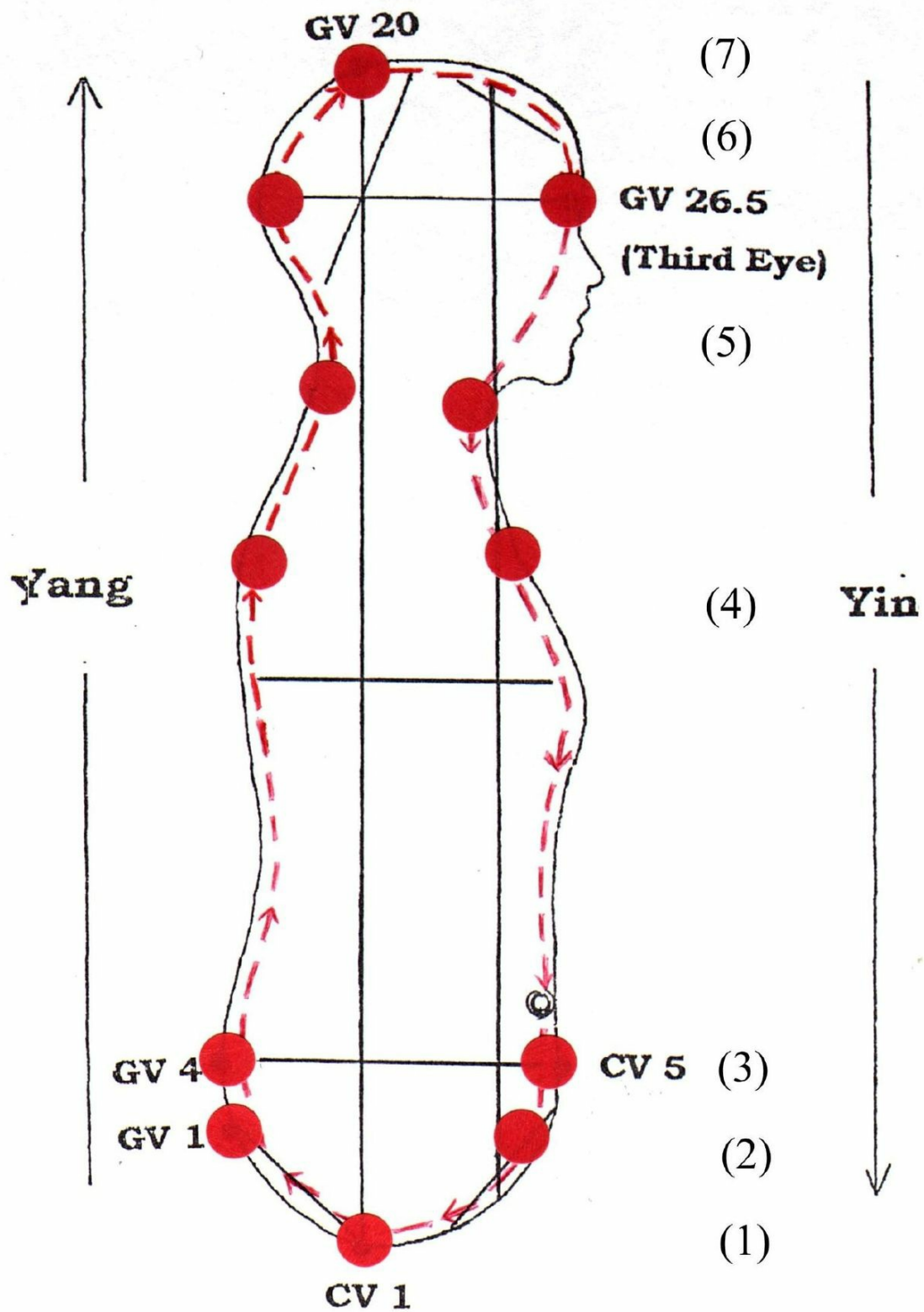
B. Diaphragmatic breathing

Diaphragmatic breathing requires the abdomen to extend and bulge out upon inhalation and suck in upon exhalation. This breathing technique uses the diaphragm to facilitate the expansion and contraction of the lungs.

C. Microcosmic circulation

After a period of Qigong training, some individuals are able to strengthen their parasympathetic system. They will feel a warm-like fire churning in their lower abdomen (CV 5 丹田). This warmth can be directed to flow from the lower spine along the governing vessel (midline of the spine GV) towards the head and back down along the conception vessel (midline of the front of the body CV) towards the lower abdomen again (CV 5). This flow of warmth represents the microcosmic pathway. The cycle can be repeated until the individual decides to stop meditating. Refer to the diagram below:

Microcosmic Orbit: Internal Qi flow through Governing (GV) and Conceptive (CV) vessels and 7 Chakras (1 to 7)



Side effects of Qi-Gong Meditation

1. **Tightness in the chest: breathing too fast and intensely**
2. **Stomachache: breathing too fast and forcefully**
3. **Dizziness: paying too much attention to breathing**
4. **Dry mouth: breathing through the mouth**
5. **Nausea: meditating with an empty or full stomach**

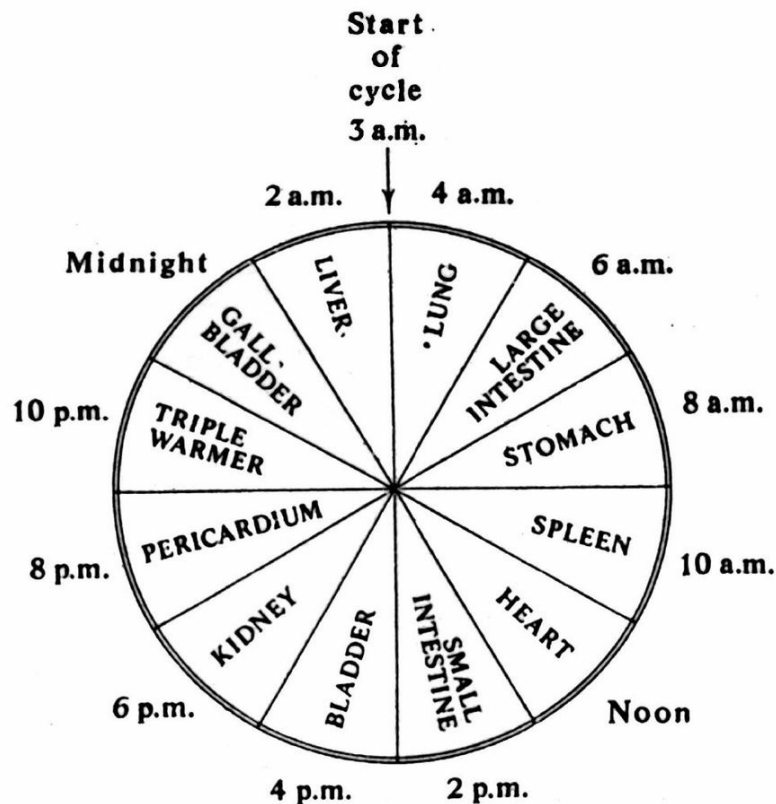
Brain Waves

1. α – 8 to 13 cycles per second during resting stage
2. β – 14 to 20 cycles per second during exercise or tension stage
3. θ – 4 to 7 cycles per second while half asleep and half awake (this is the stage that should be achieved during meditation)
4. δ – 1 to 6 cycles per second during sleep

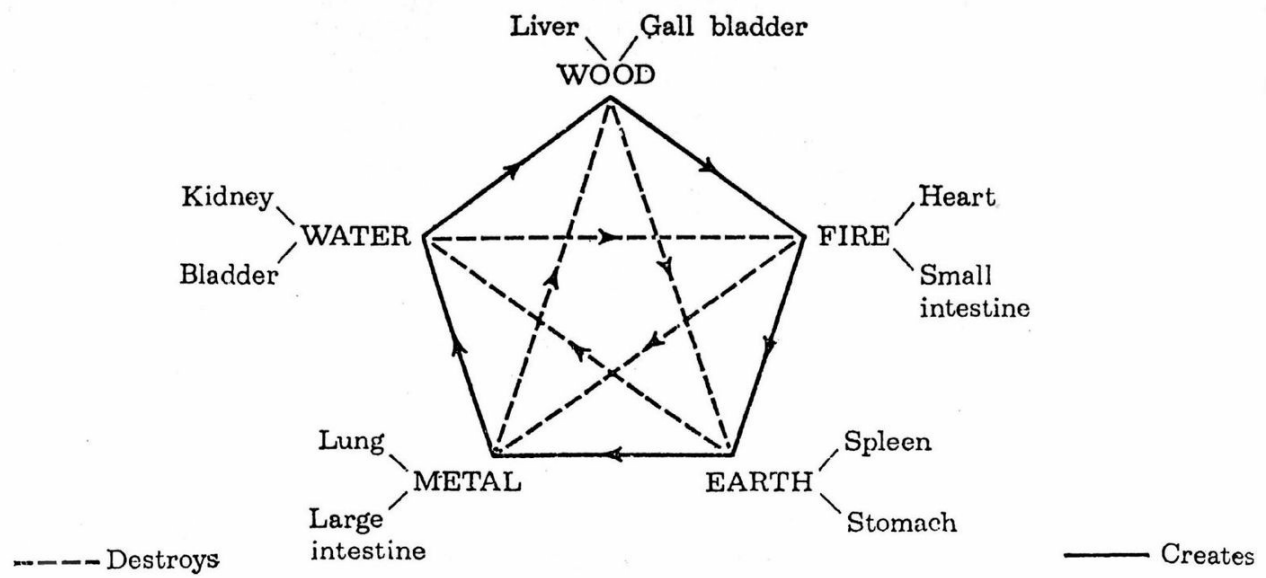
Medical Qi-Gong

Part III: Body Scan: Meridians and Acupuncture Points for Health

The Circadian Rhythm of Meridians



The Relationships of the Five Elements



The Relationships of Meridians and 5 Elements (in the hands, three yang meridians begin at the finger tips on the dorsal side; and three yin meridians end at ventral finger tips.)

==== Creative cycle tonifies

----- Destructive cycle sedates

YIN MERIDIANS

YANG MERIDIANS

Lung

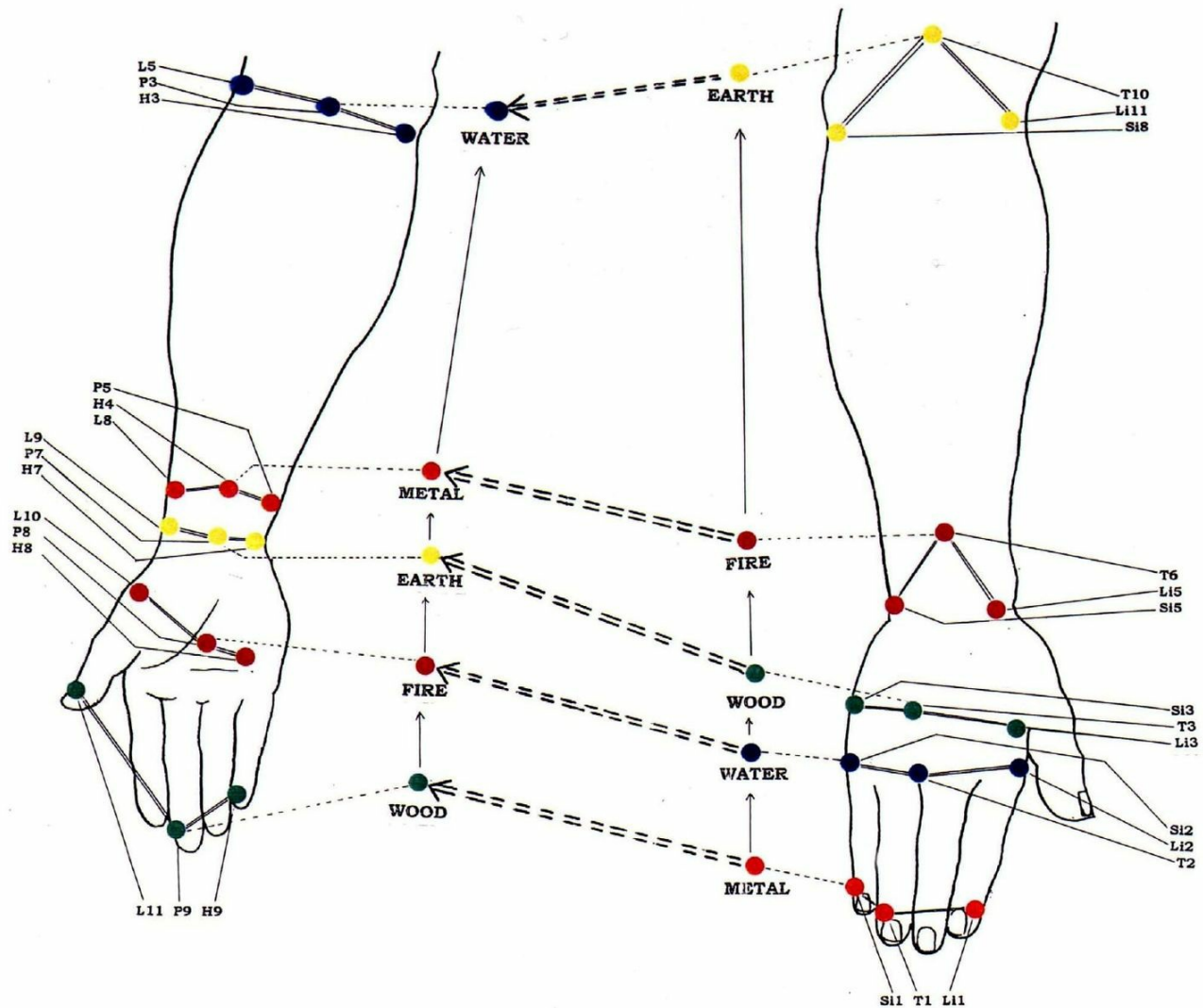
Pericardium

Heart

Small intestine

Large intestine

Triple warmer



The relationships of Meridians and 5 Elements (in the feet, three are 3 yin meridians begin from the medial side of the feet and legs, and 3 yang meridians end at the lateral side of the feet and legs.)

==== Creative cycle tonifies

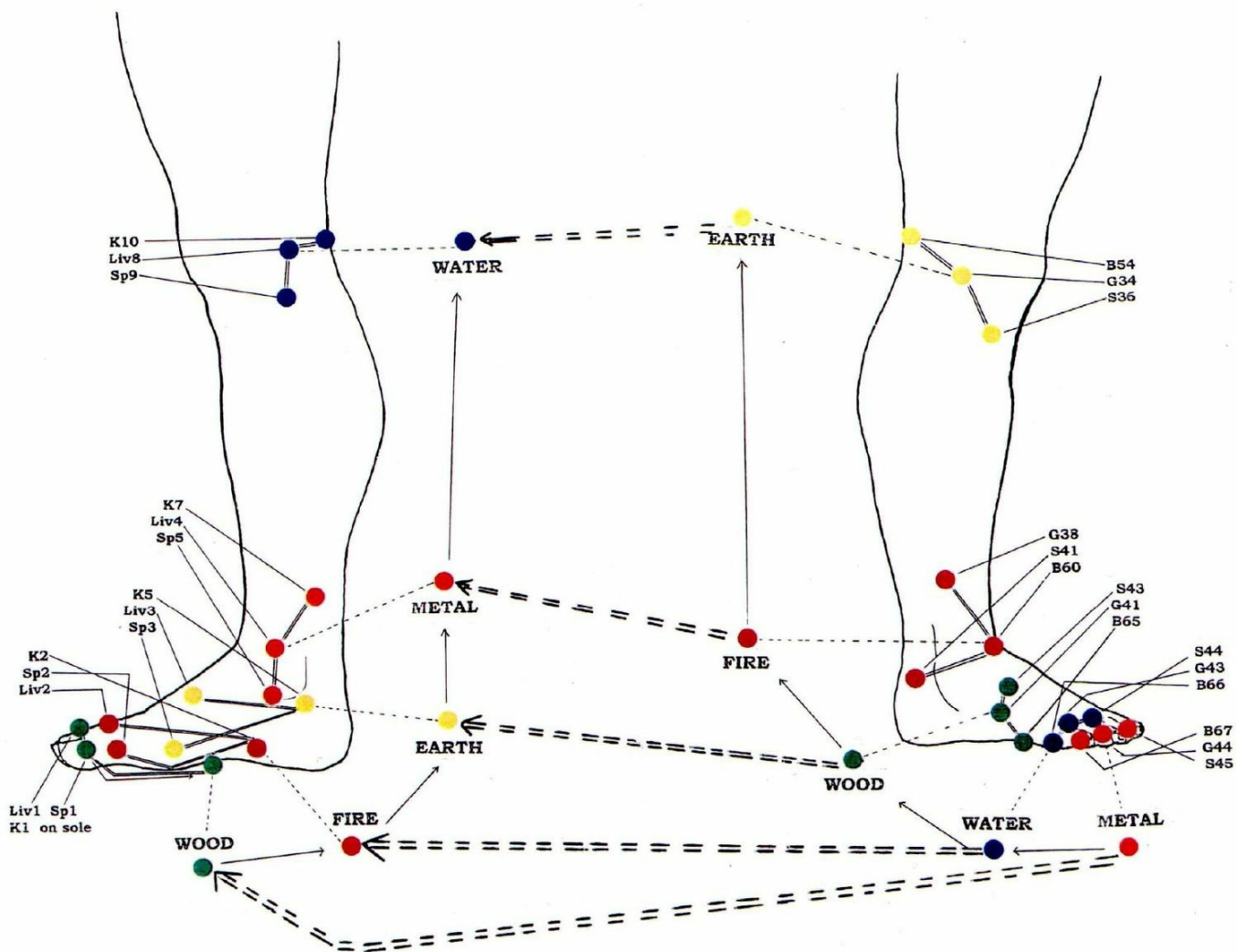
----- Destructive cycle sedates

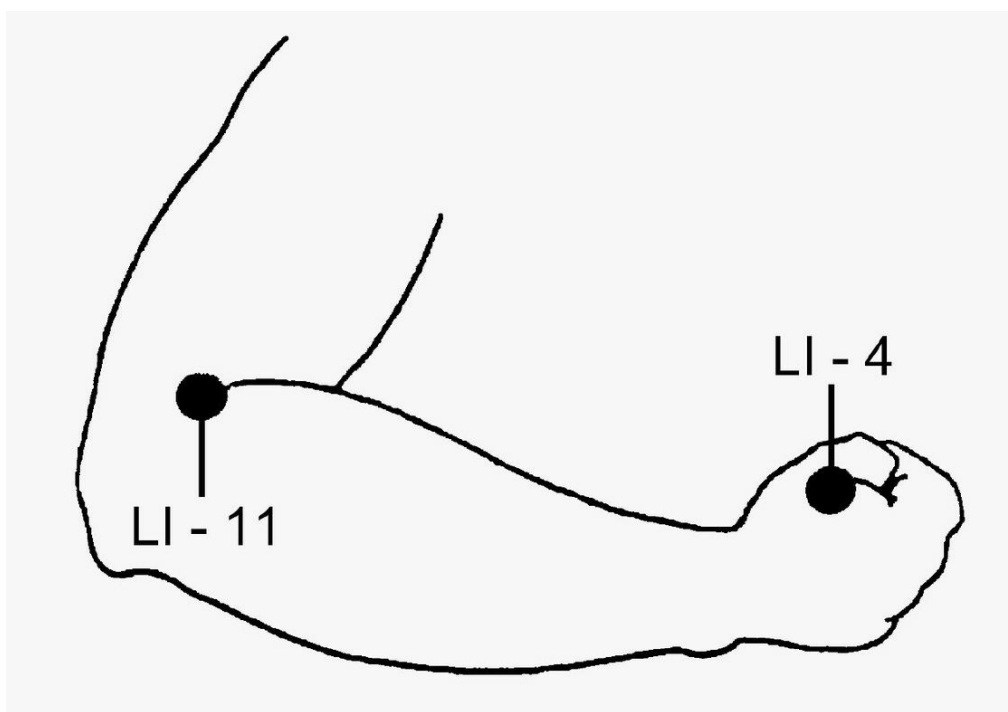
YIN MERIDIANS

Spleen, Liver, Kidney

YANG MERIDIANS

Stomach, Gall, Bladder





LI - 4

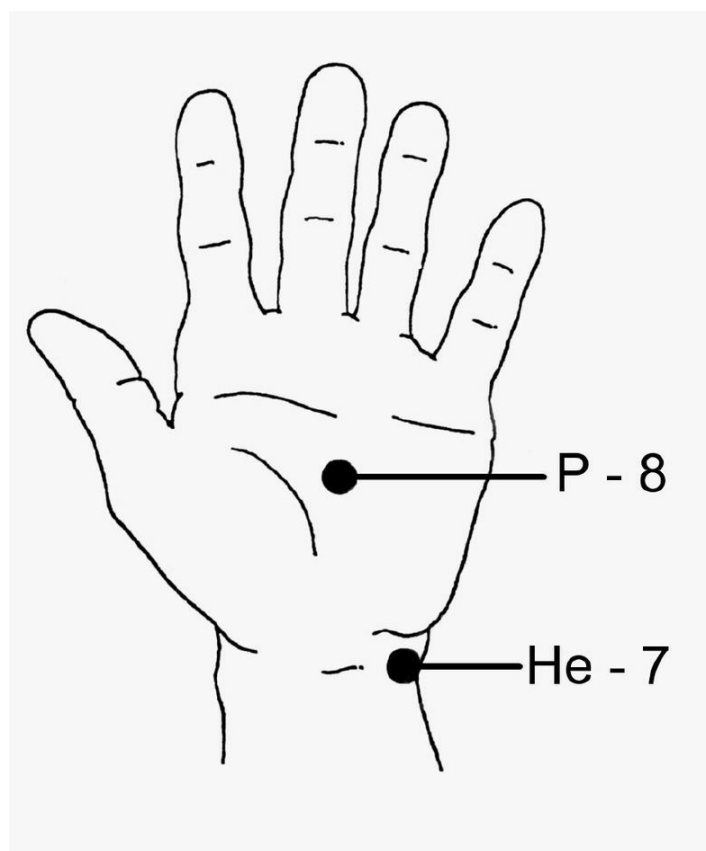
Functions: Common cold, toothache, headache, immune system

Locations: Prominence of the 1st Dorsal Interosseus muscle

LI - 11

Functions: Hemiplegia, elbow pain, hypertension, asthma, hay fever, skin allergy, psoriasis, immune system

Locations: Between the end of the cubital crease and the lateral epicondyle



P - 8

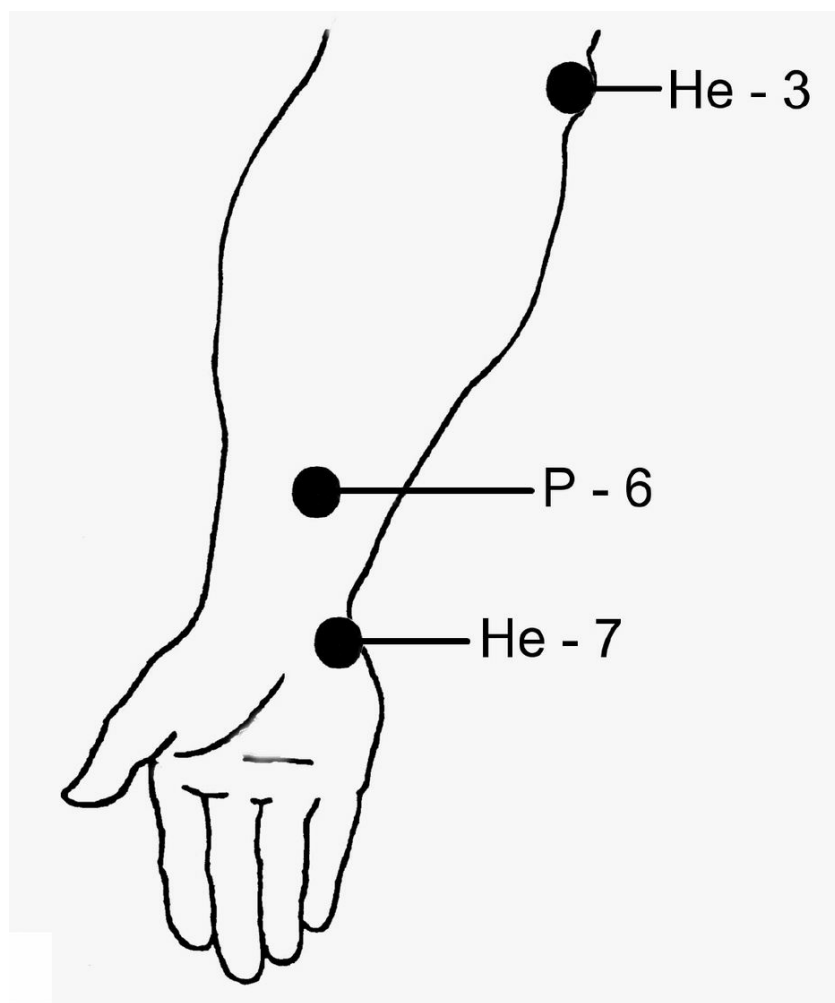
Functions: Palpitation, Tension Headache

Locations: In the middle of the palm

He - 7

Functions: Insomnia, Nervous Breakdown

Locations: At the ulnar crest of the wrist



He - 7

Functions: Insomnia, hysteria, amnesia, headache

Locations: Depression at the ulnar end of the wrist crease

P - 6

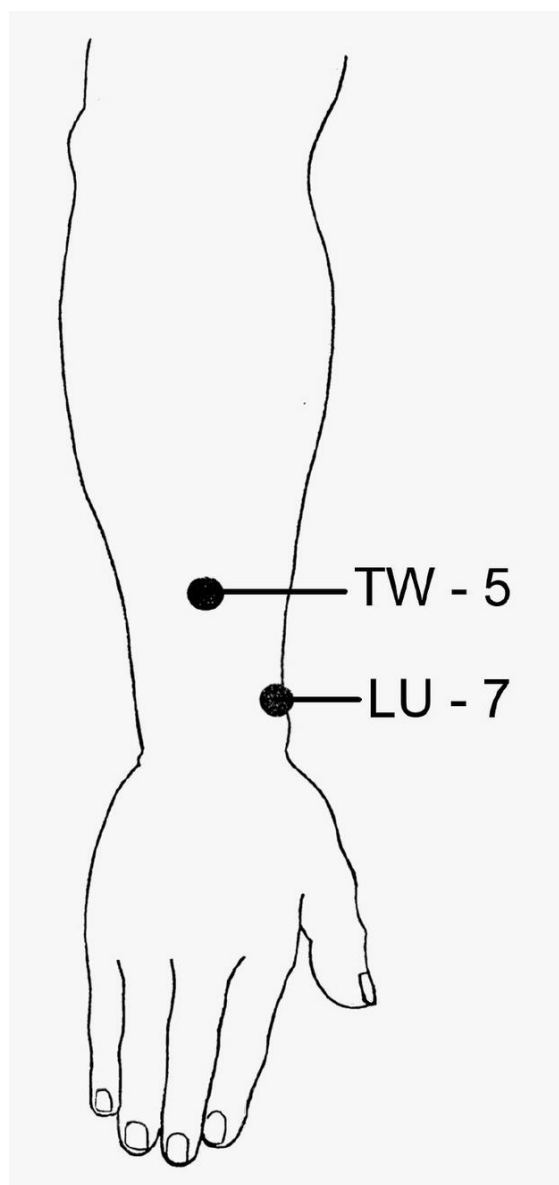
Functions: Intercostal pain, nausea & vomiting, sore throat, palpitation

Locations: 2 inches above the transverse crease of the wrist

He - 3

Functions: golfer's elbow, insomnia, palpitation

Locations: Ulnar crease of the elbow

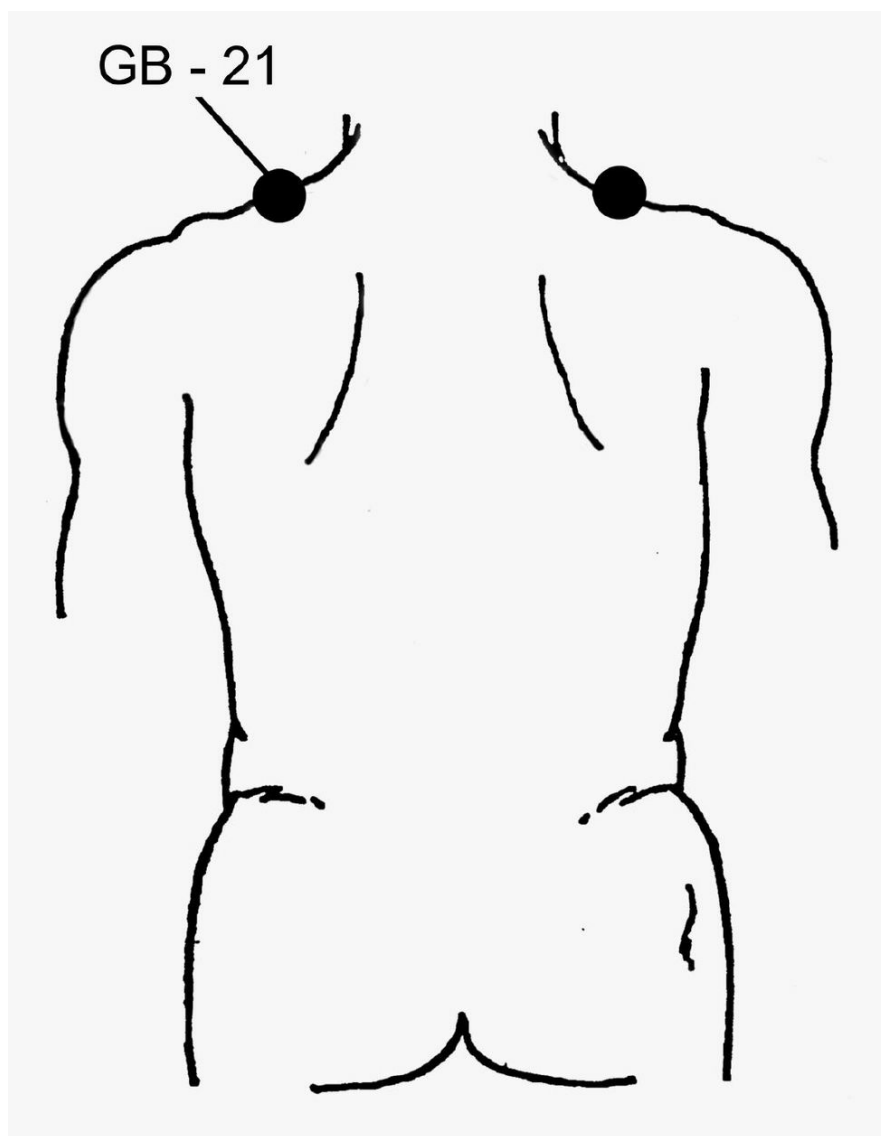


LU - 7

Functions: Headache, cough, quitting smoking
Locations: Above the styloid process of the radius

TW-5

Functions: Common cold, migraine
Locations: 2 inches above the transverse crease of dorsal wrist



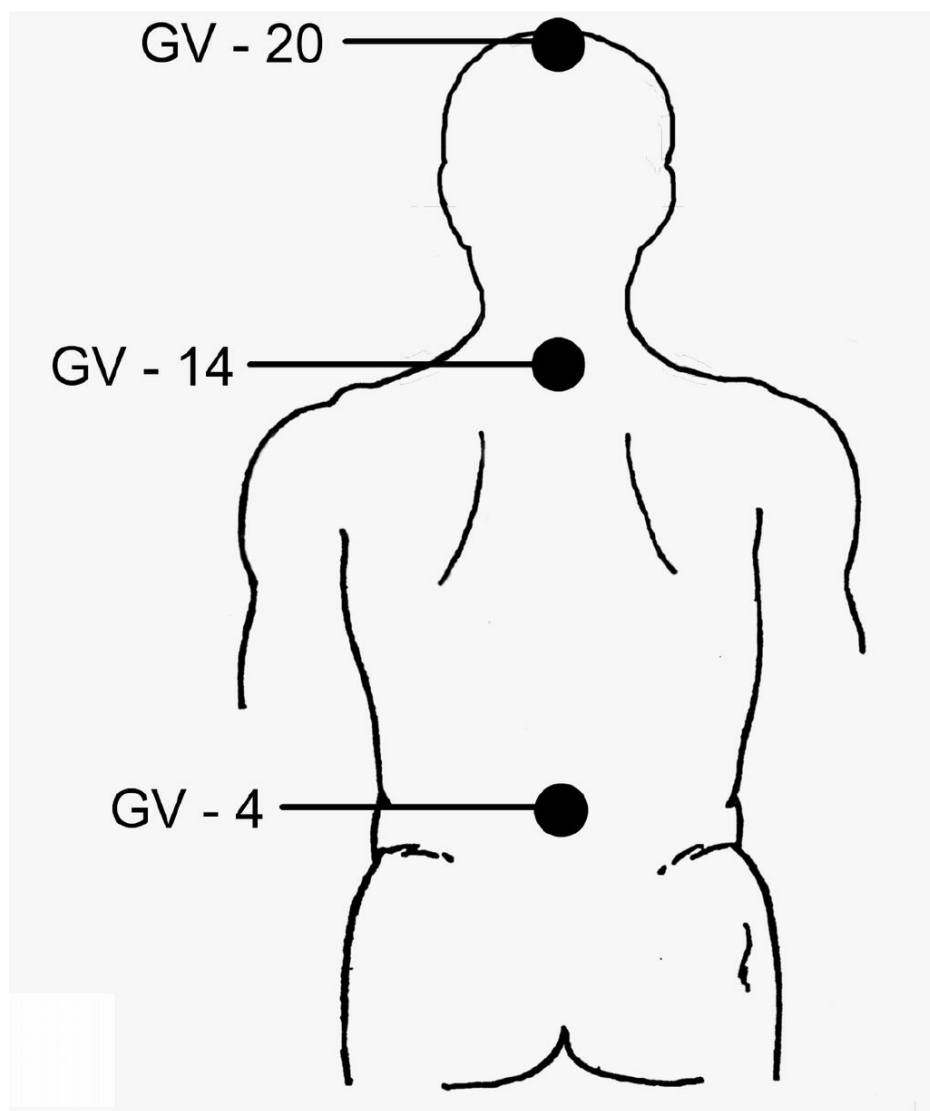
GB - 21

Functions: Lungs, shoulder pain, headaches, neck pain

(L) heart & spleen

(R) liver and gall bladder

Locations: At the highest point of the shoulder trapezius



GV - 20

Functions: Headache, dizziness, vertigo, mental disease, uterus prolapse, rectal prolapse, hemorrhoids

Locations: Top point of the skull

GV - 14

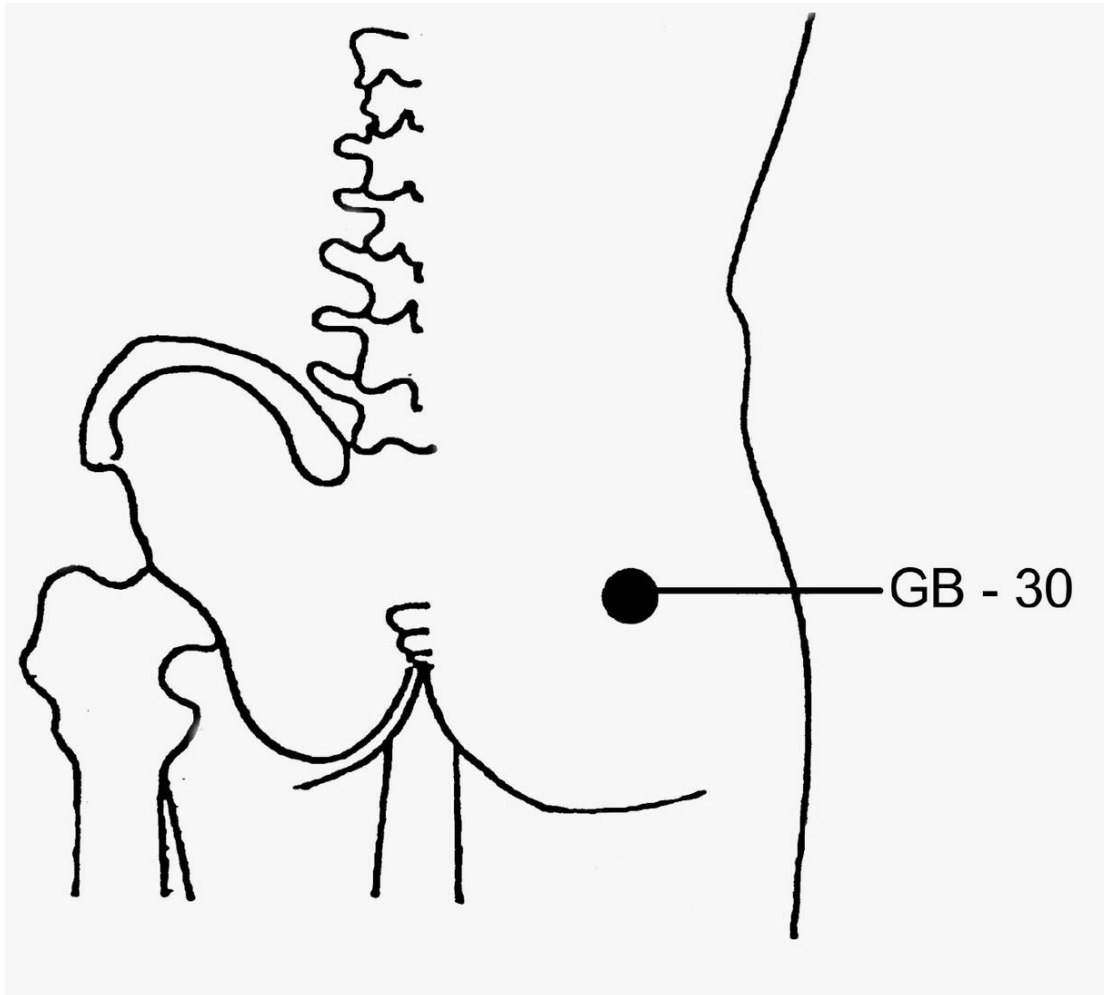
Functions: Fever, Common cold, cough, asthma, skin allergy, neck pain, stimulate the immune system and sympathetic system

Locations: Between 7th cervical vertebra and 1st thoracic vertebra

GV - 4

Functions: Impotence, low back pain, nocturnal emission, irregular menstruation and parasympathetic system

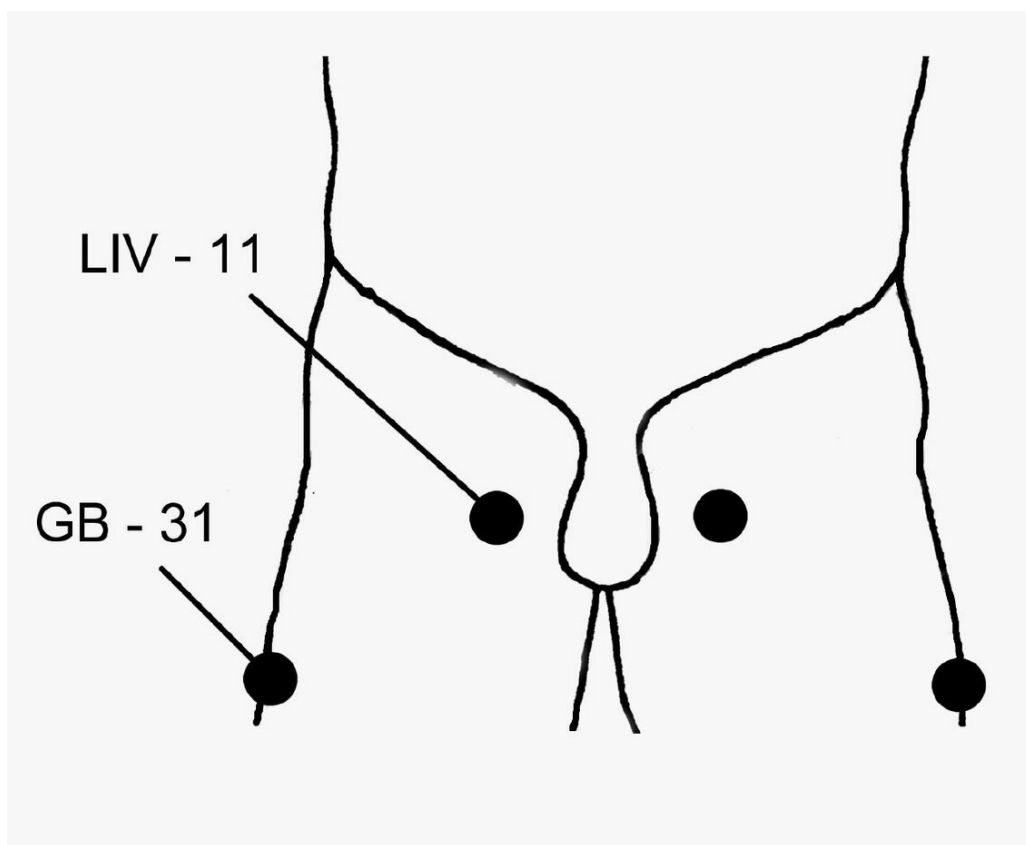
Locations: Between 2nd and 3rd lumbar spine



GB - 30

Functions: Sciatica, low back pain

Locations: Sciatic notch (buttock) area



GB - 31

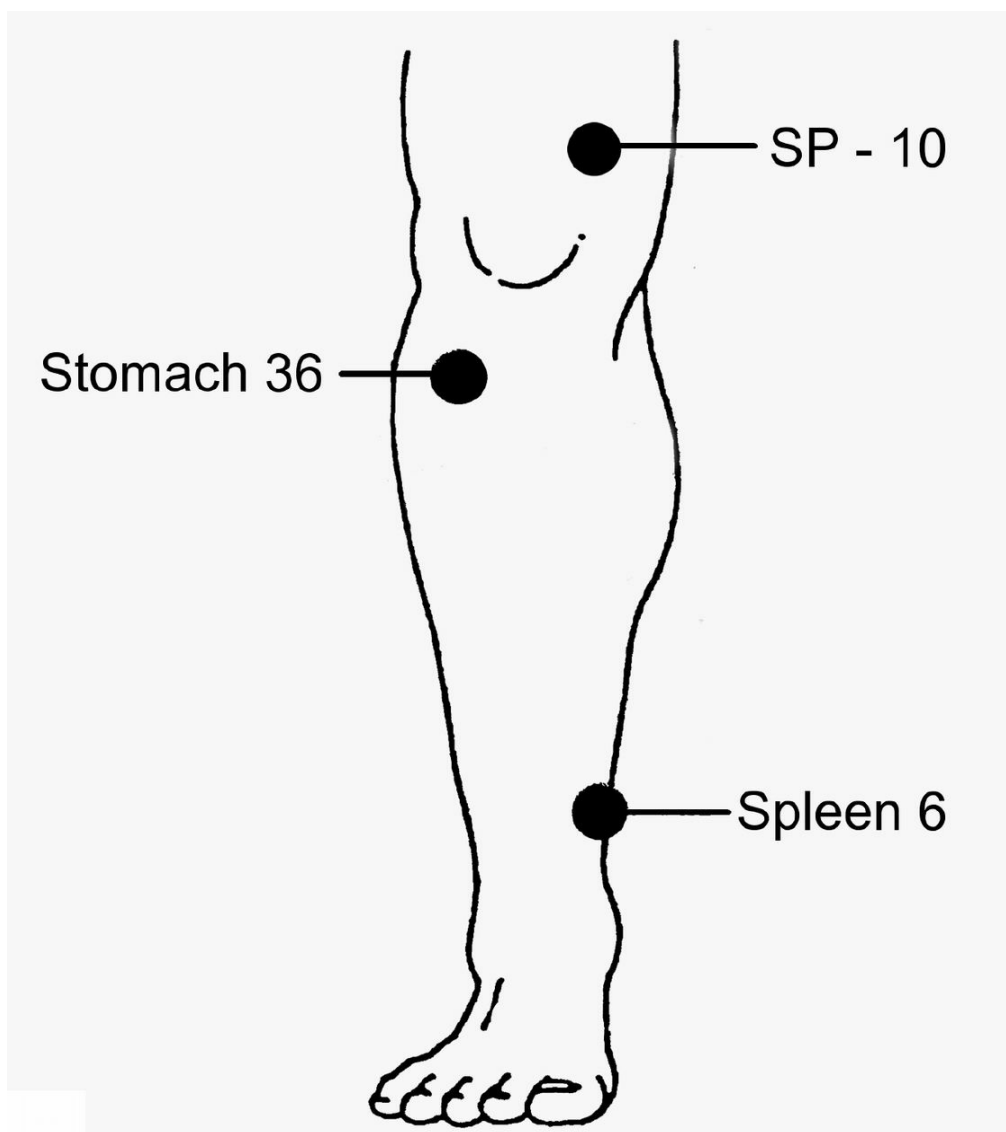
Functions: Lower leg pain, low back pain

Locations: Lateral thigh at the tips of the middle fingers

LIV - 11

Functions: Uterus prolapse, prostatitis, menstrual pain

Locations: Medial upper thigh



SP - 10

Functions: Irregular menstruation, functional uterine bleeding

Locations: 2 inches above the anterior border of the patella

Stomach 36

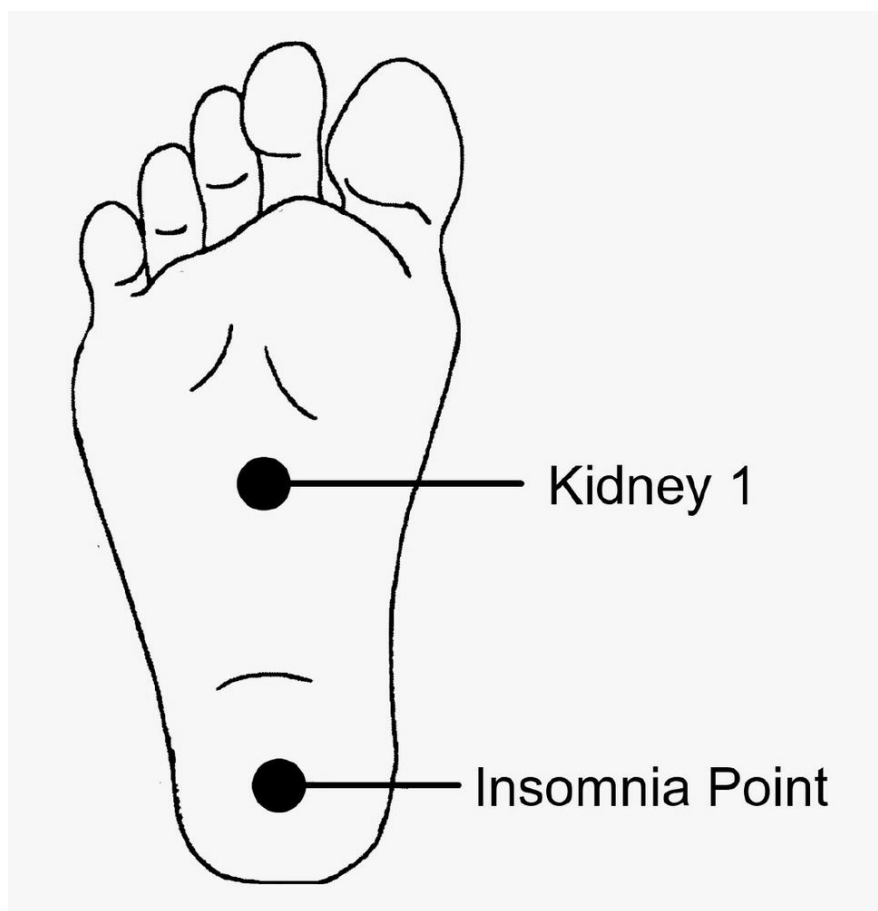
Functions: Long life, stomach ache, enteritis, paralytic ileus, diarrhea

Locations: Below the knee cap and lateral to the crista anterior tibia

Spleen 6

Functions: Menstrual pain, nocturnal emission, impotence, immune system

Locations: 3 inches above the medial malleolus



K - 1

Functions: Syncope, fainting, drowning, plantar fasciitis

Locations: one 3rd anterior, two 3rds posterior of the foot

Insomnia Point

Functions: Insomnia, plantar fasciitis, headache

Locations: Heel

Diagram 1: The Lung Meridian

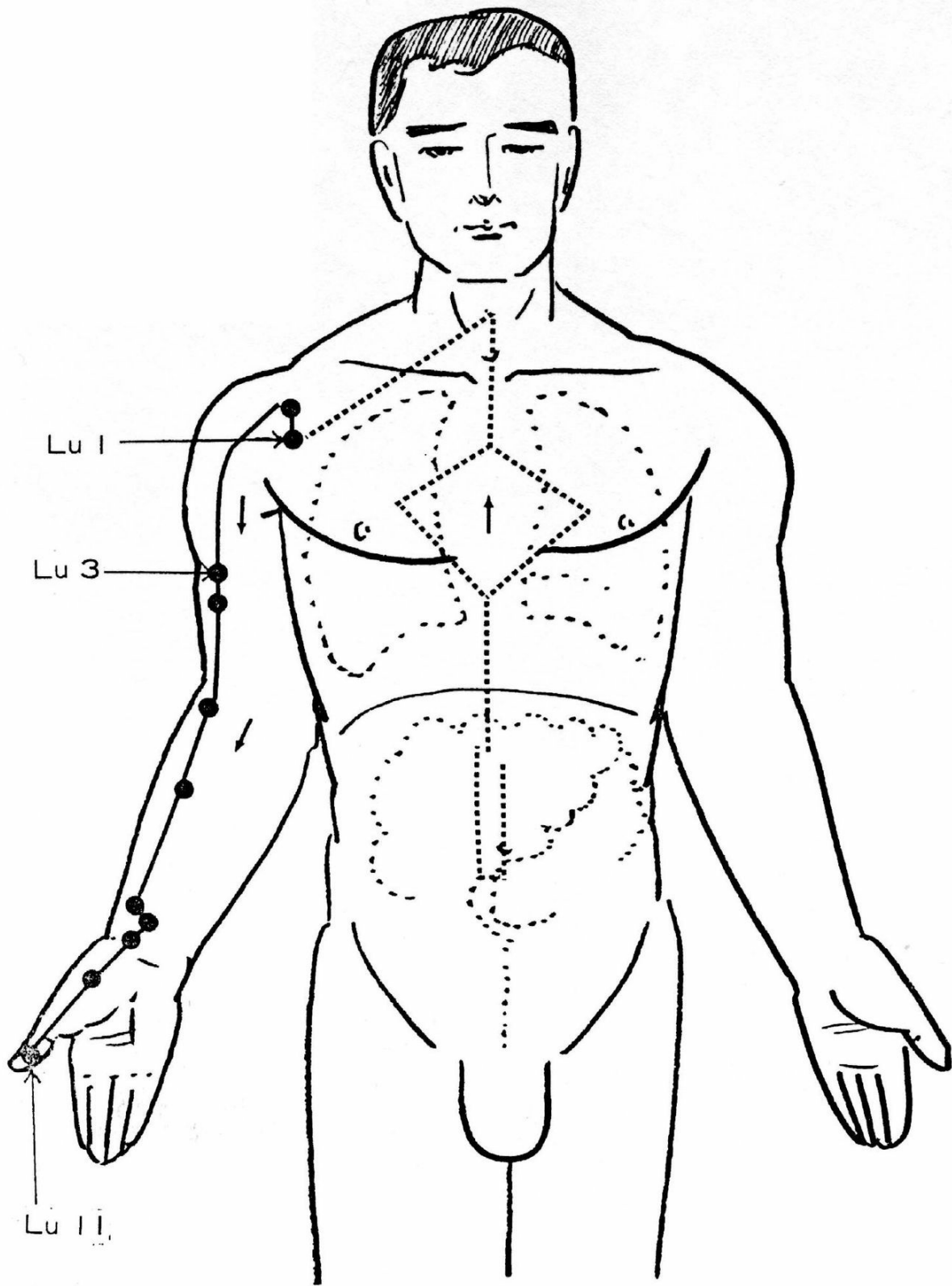


Diagram 2: The Large Intestine Meridian

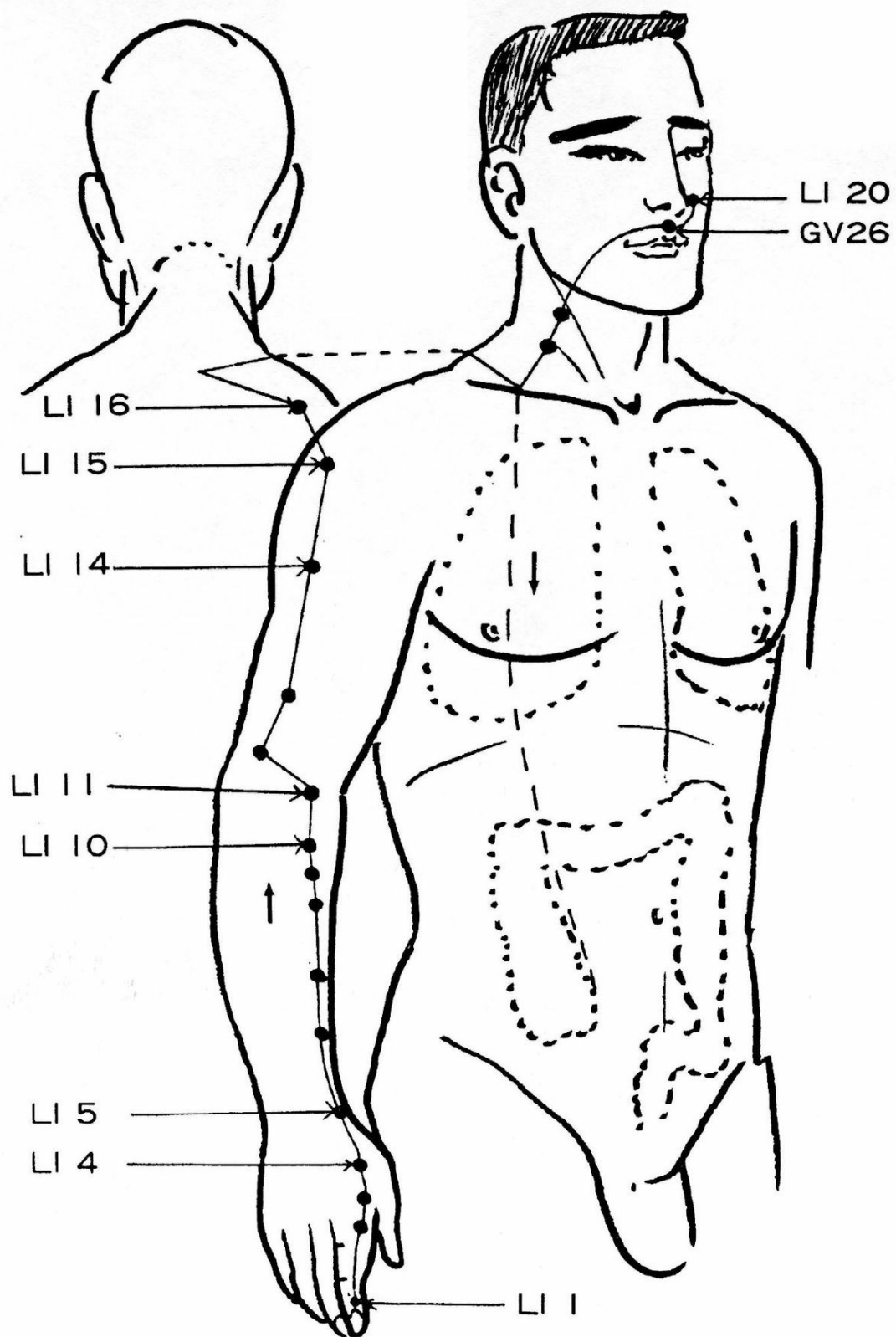


Diagram 3: The Stomach Meridian

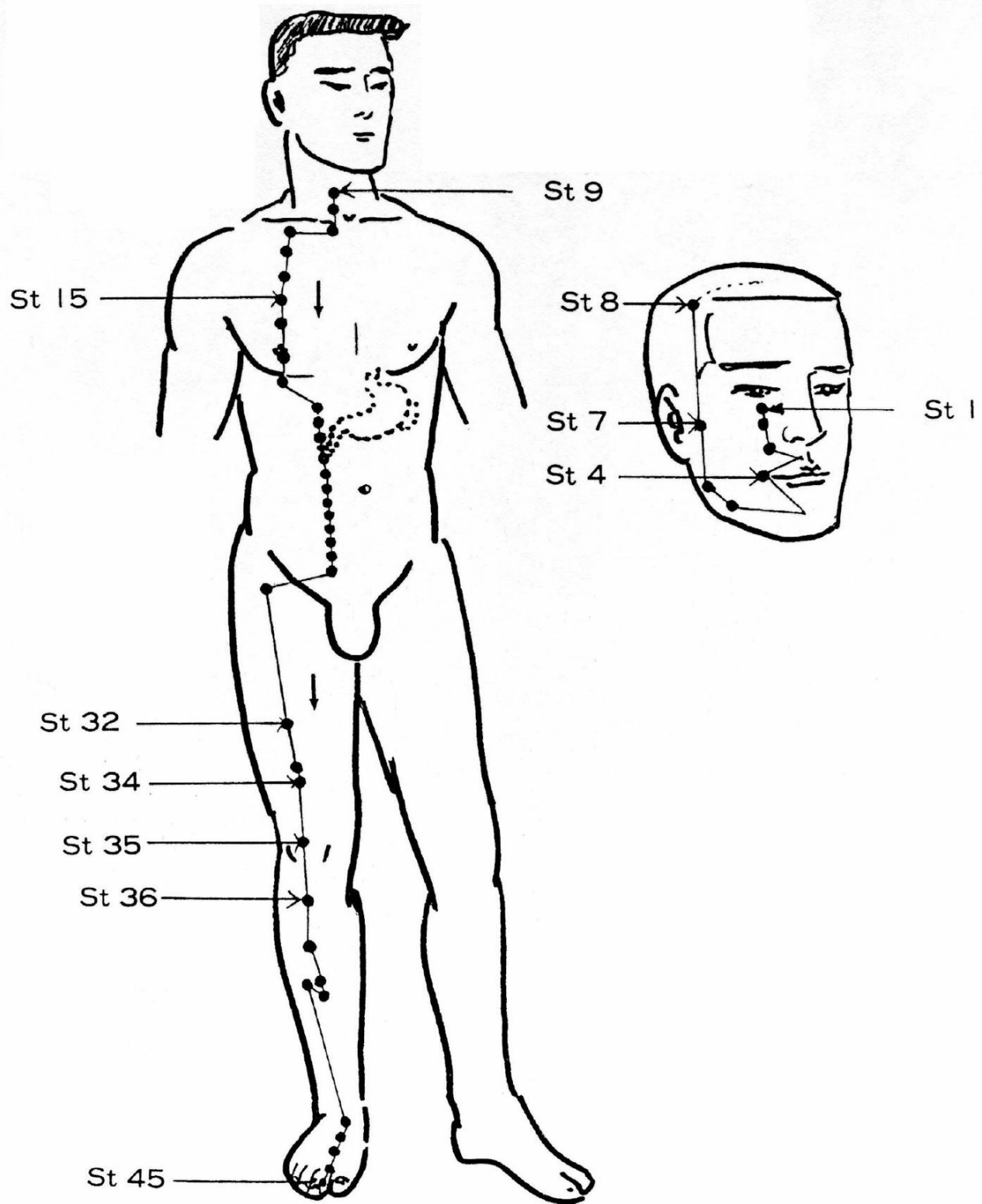


Diagram 4: The Spleen Meridian

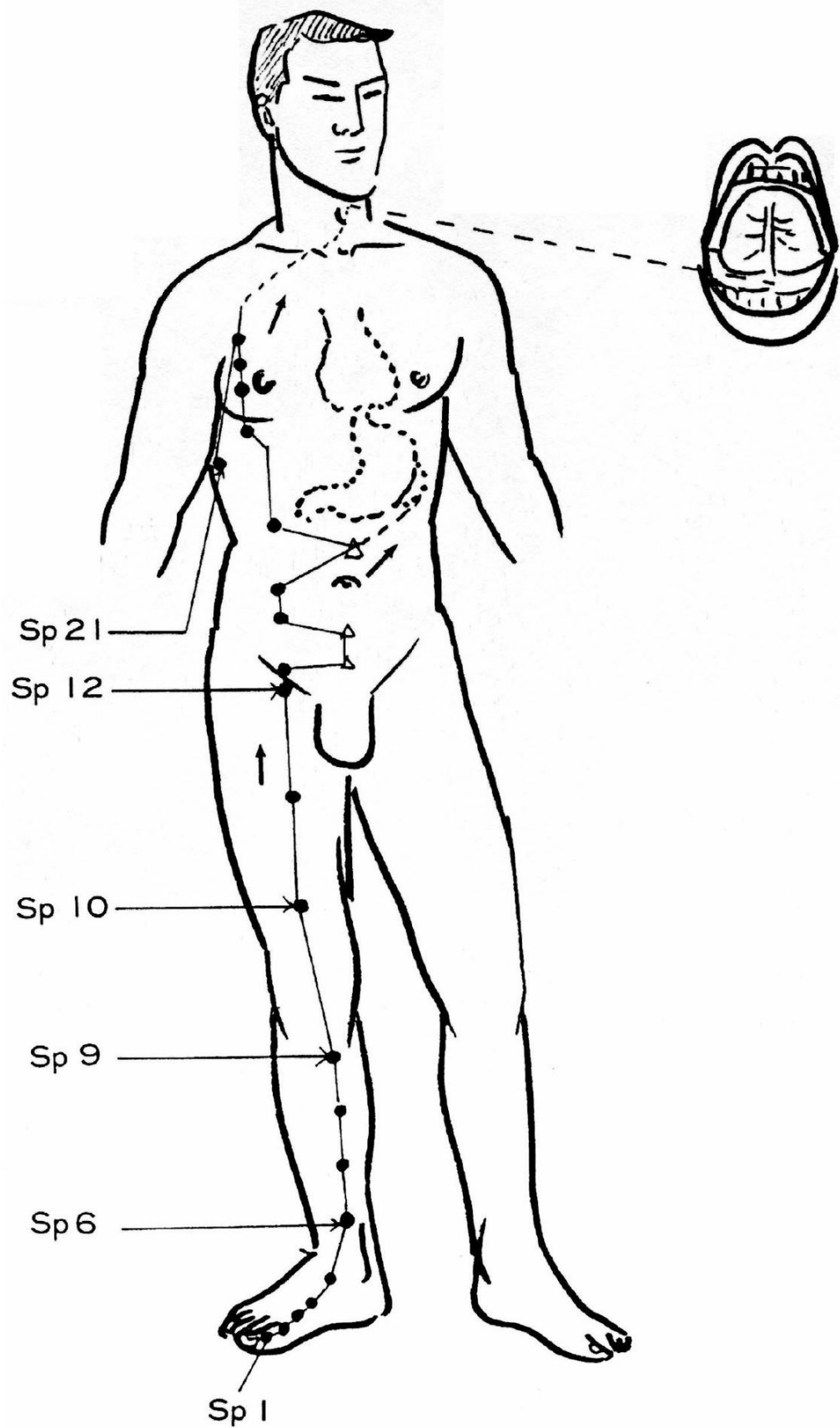


Diagram 5: Heart Meridian

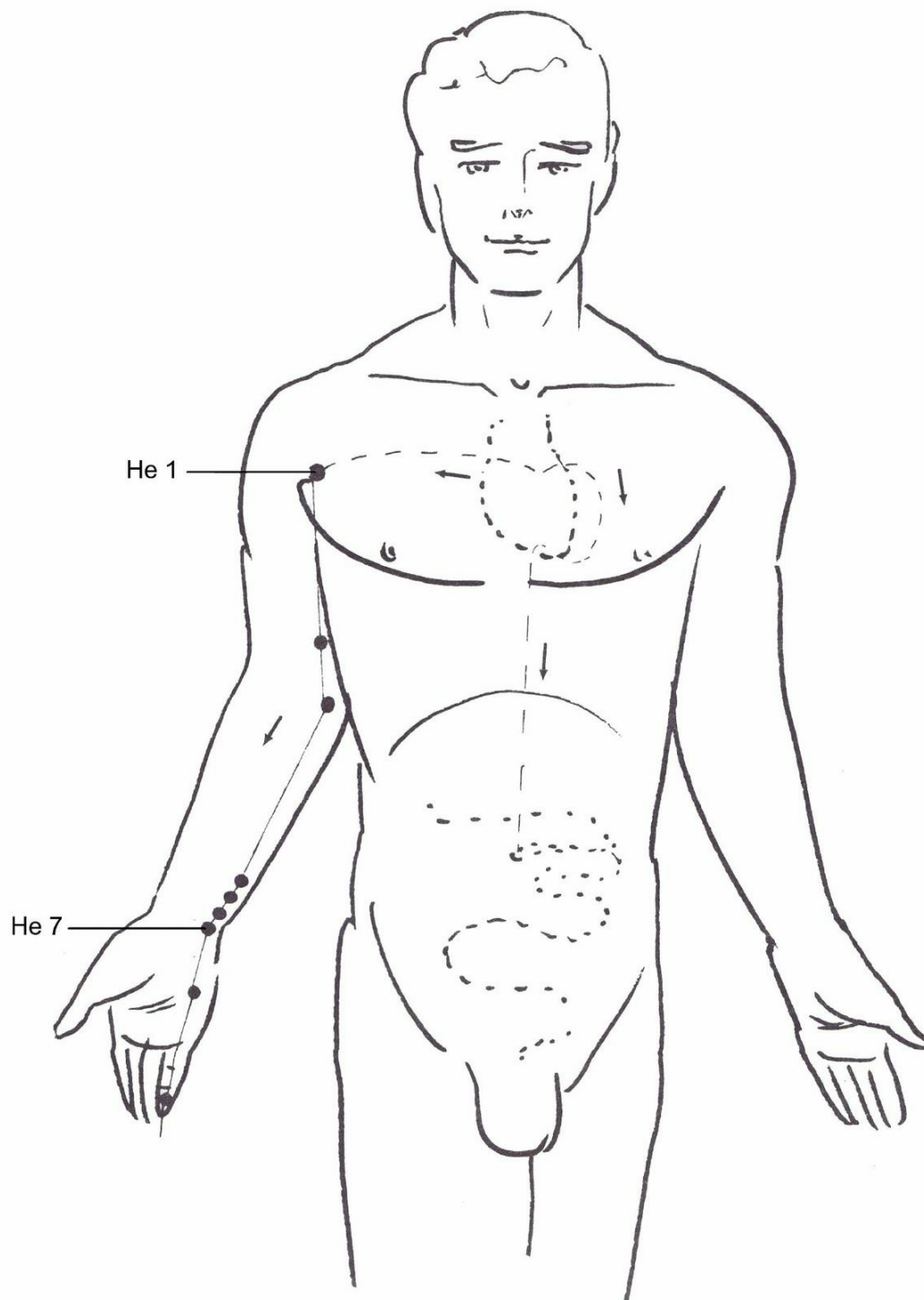


Diagram 6: The Small Intestine Meridian

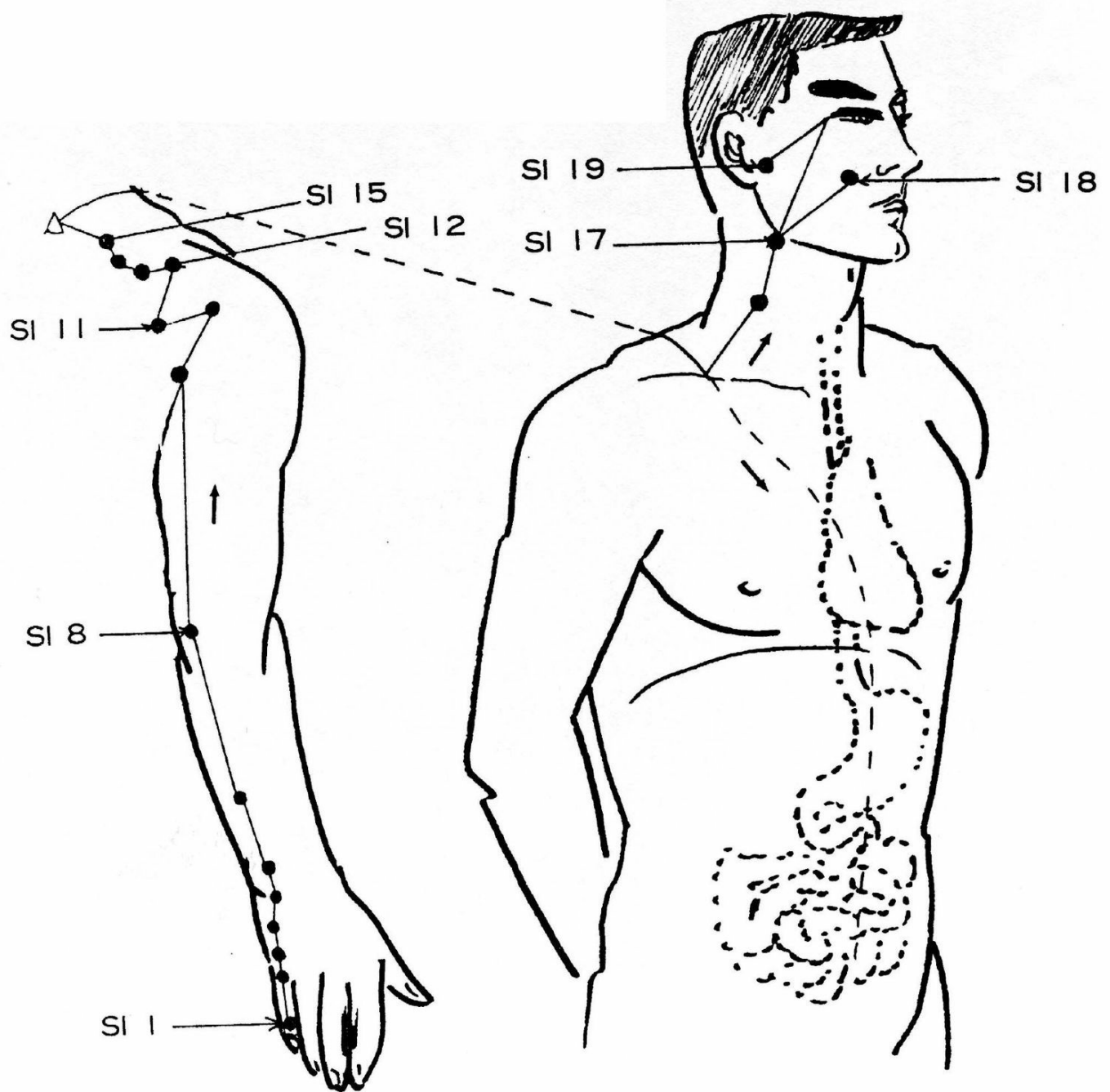


Diagram 7: The Urinary Bladder Meridian

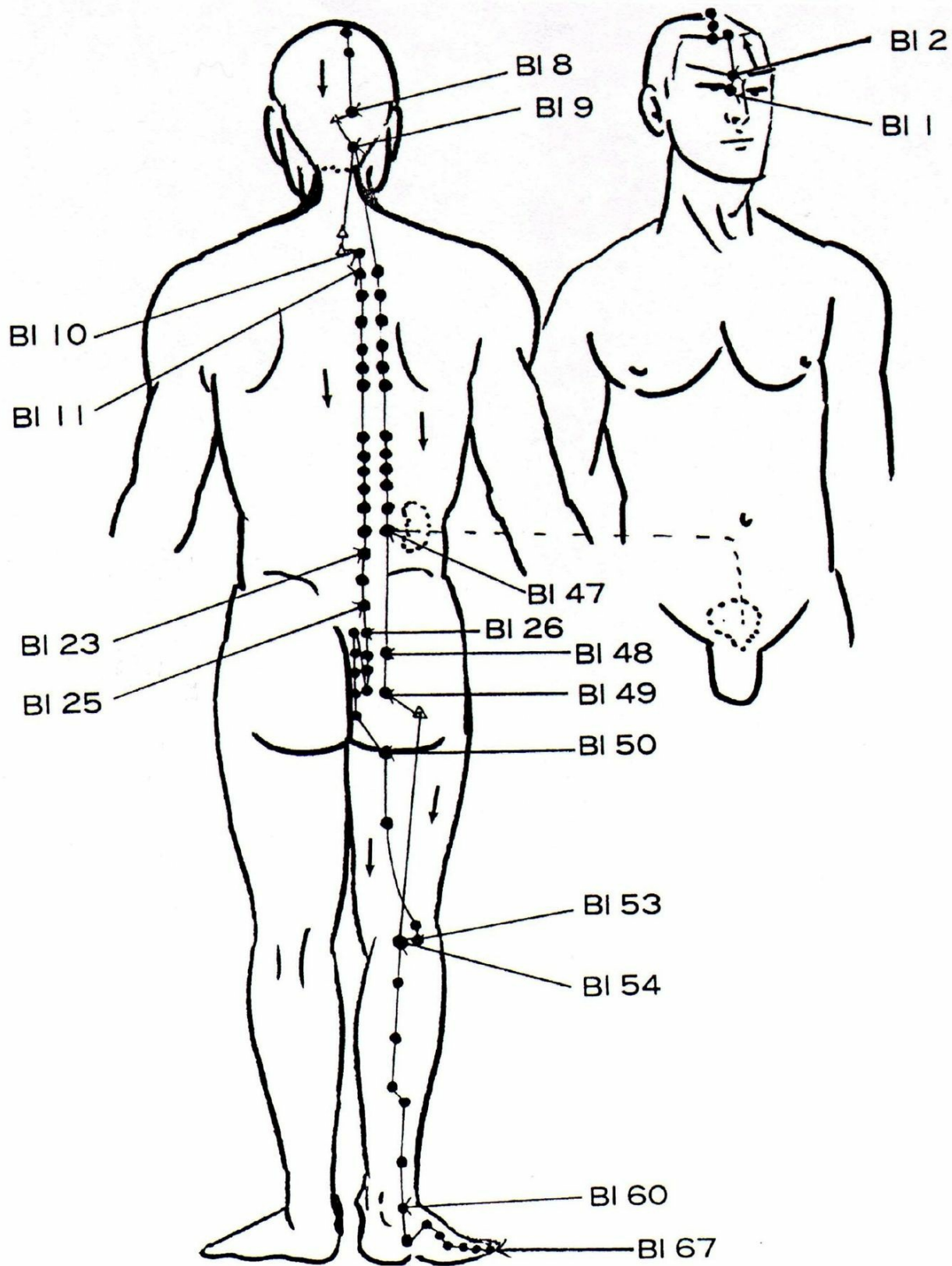


Diagram 8: The Kidney Meridian

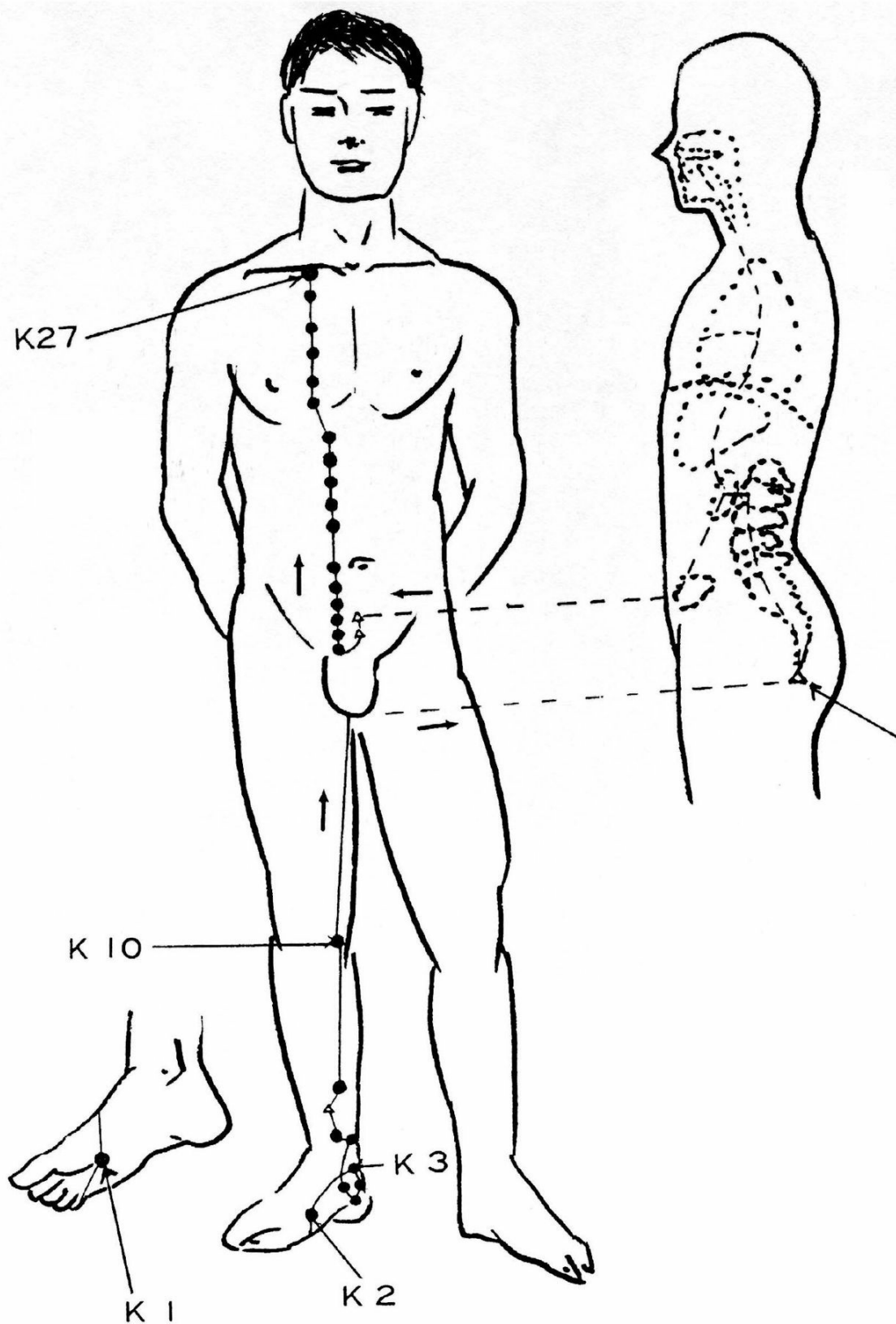


Diagram 9: The Pericardium Meridian

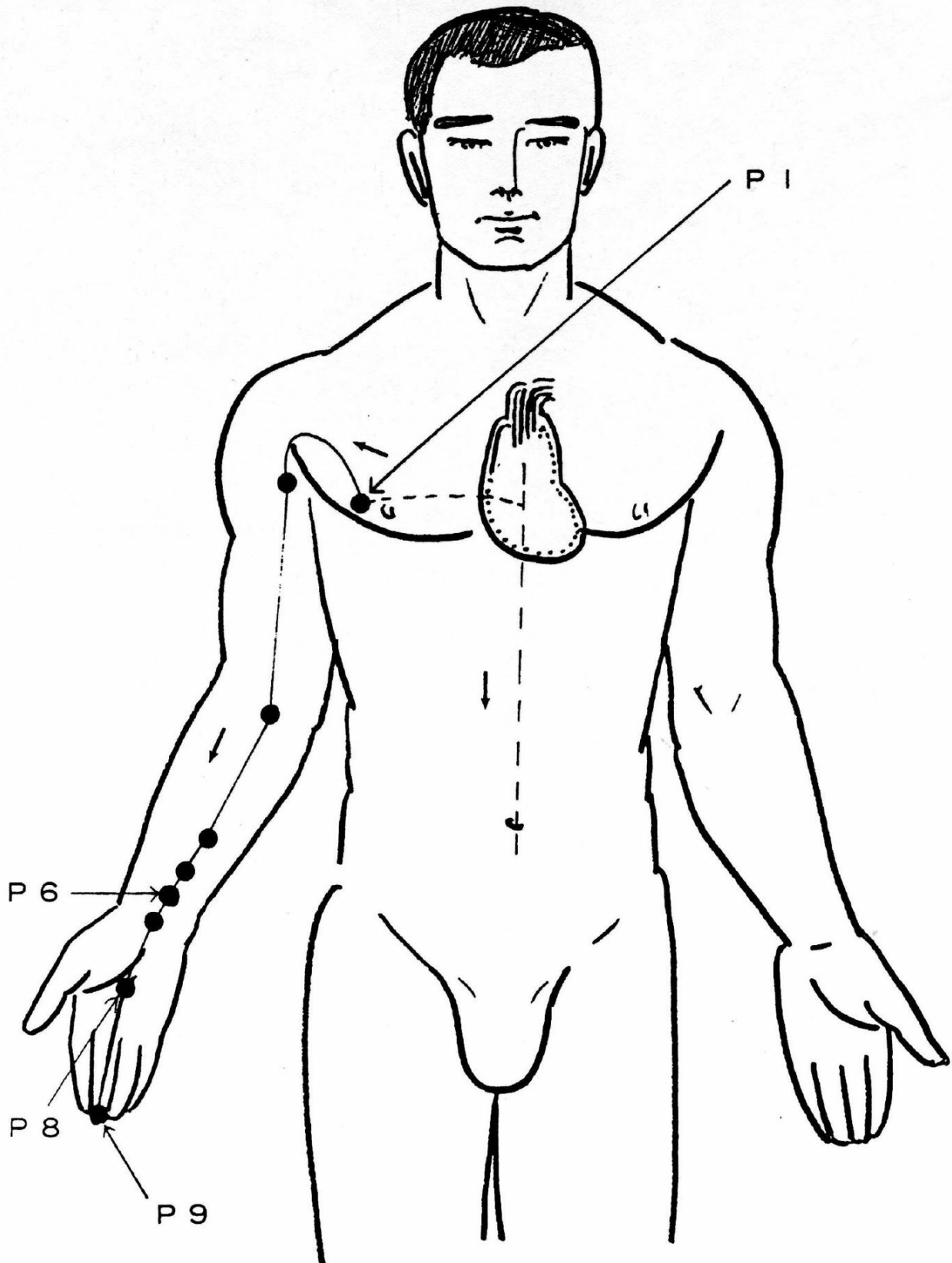


Diagram 10: Triple Warmer Meridian

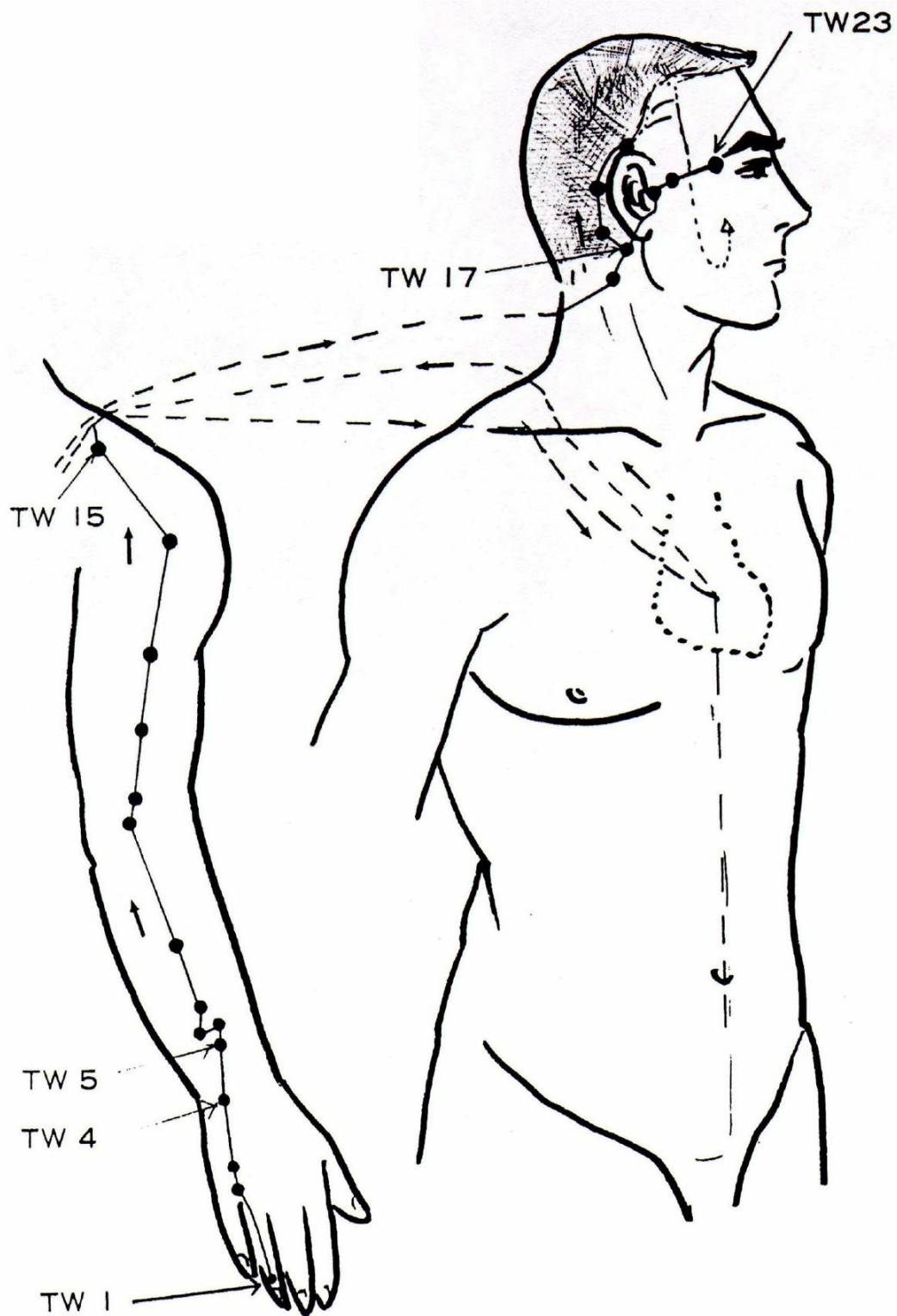


Diagram 11: The Gall Bladder Meridian

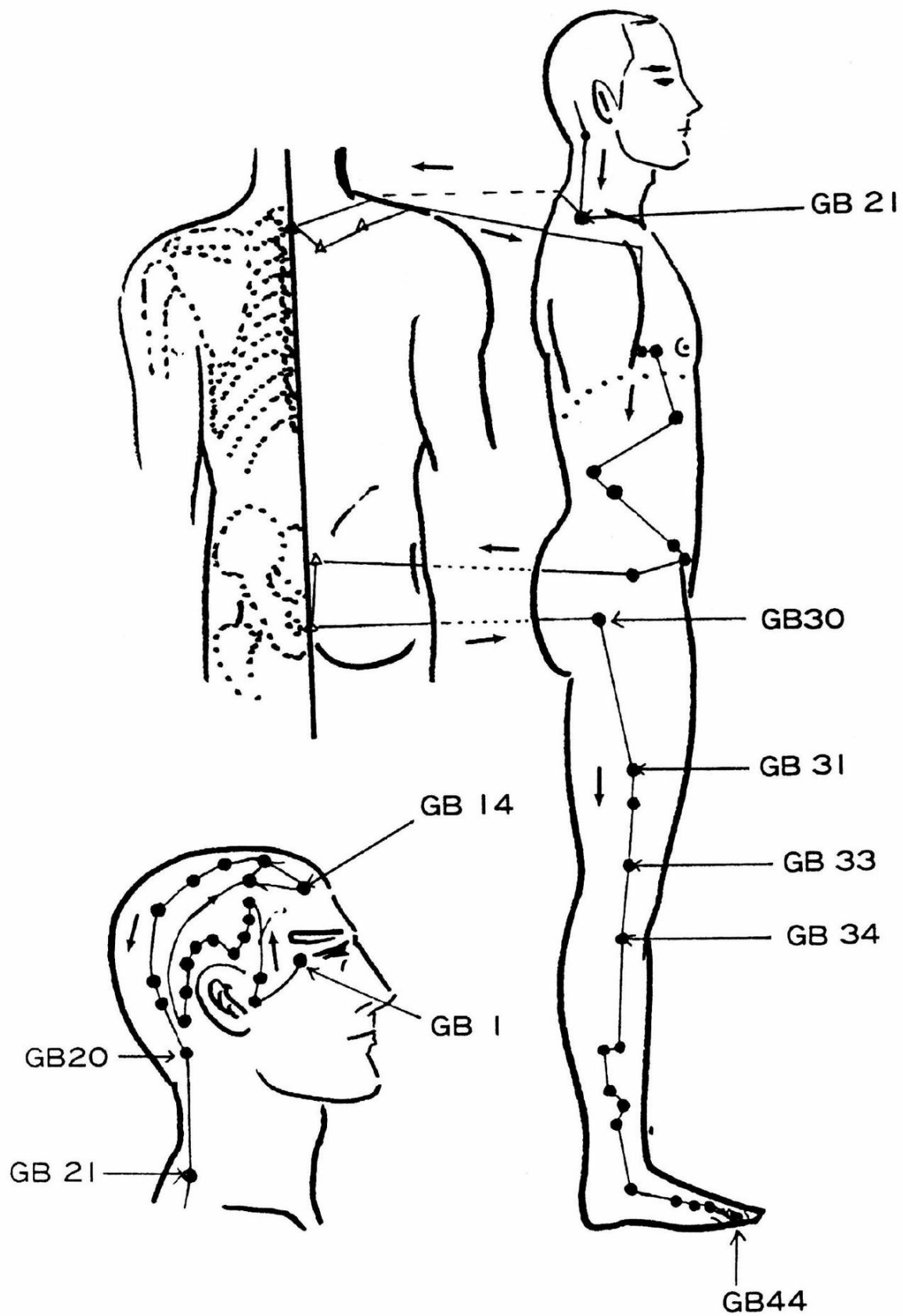


Diagram 12: The Liver Meridian

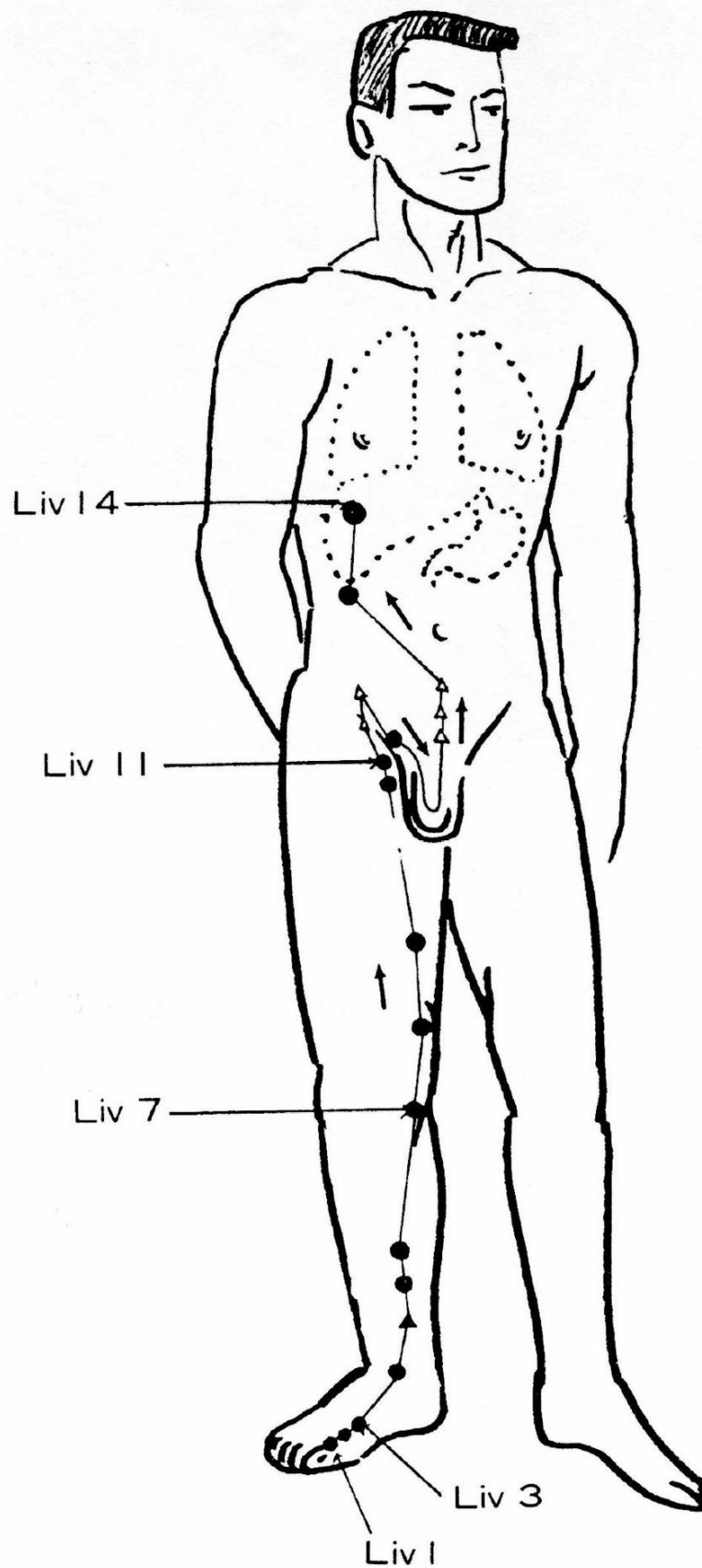


Diagram 13: The Governing Vessel (Meridian)

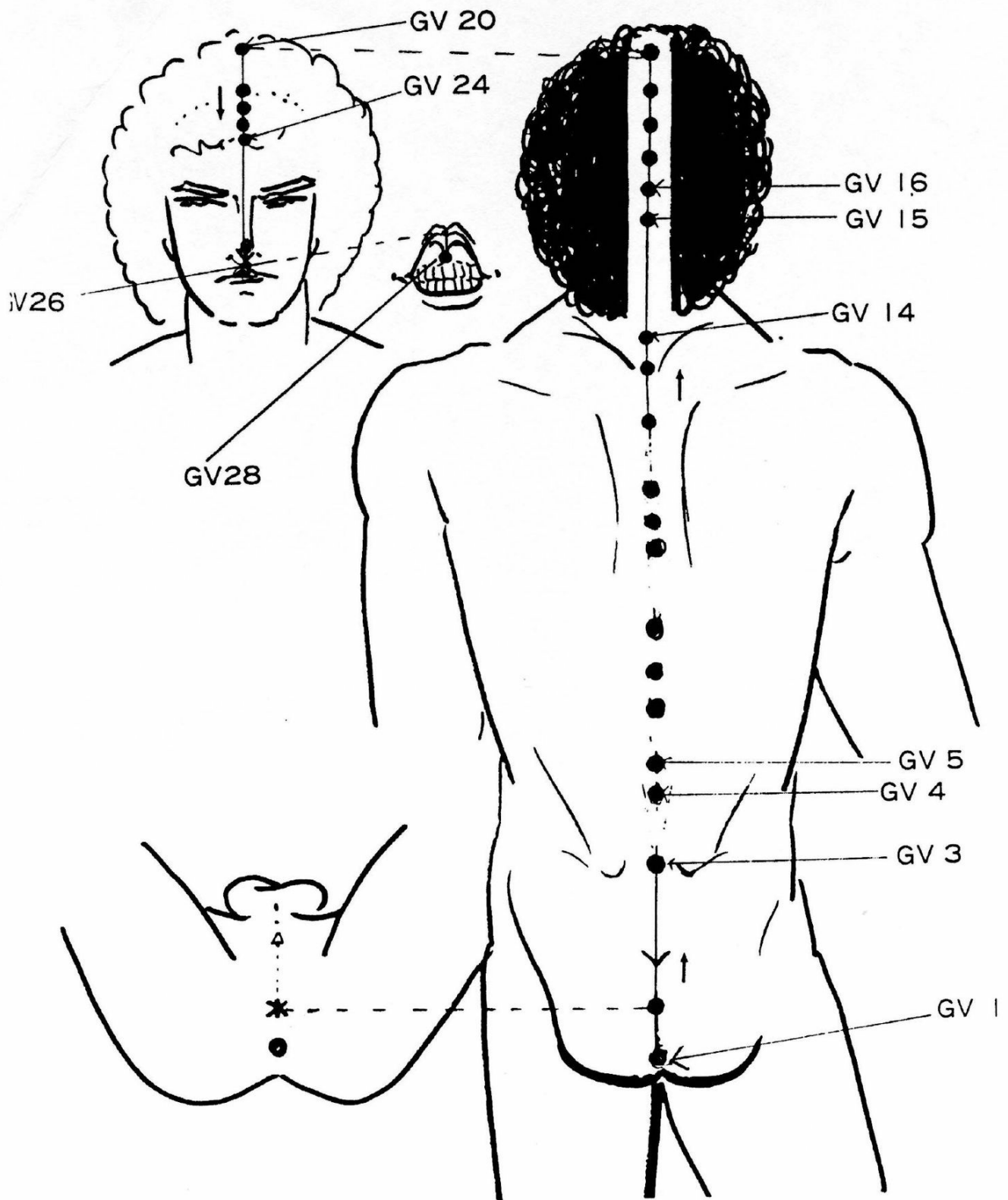


Diagram 14: The Conceptive Vessel (Meridian)

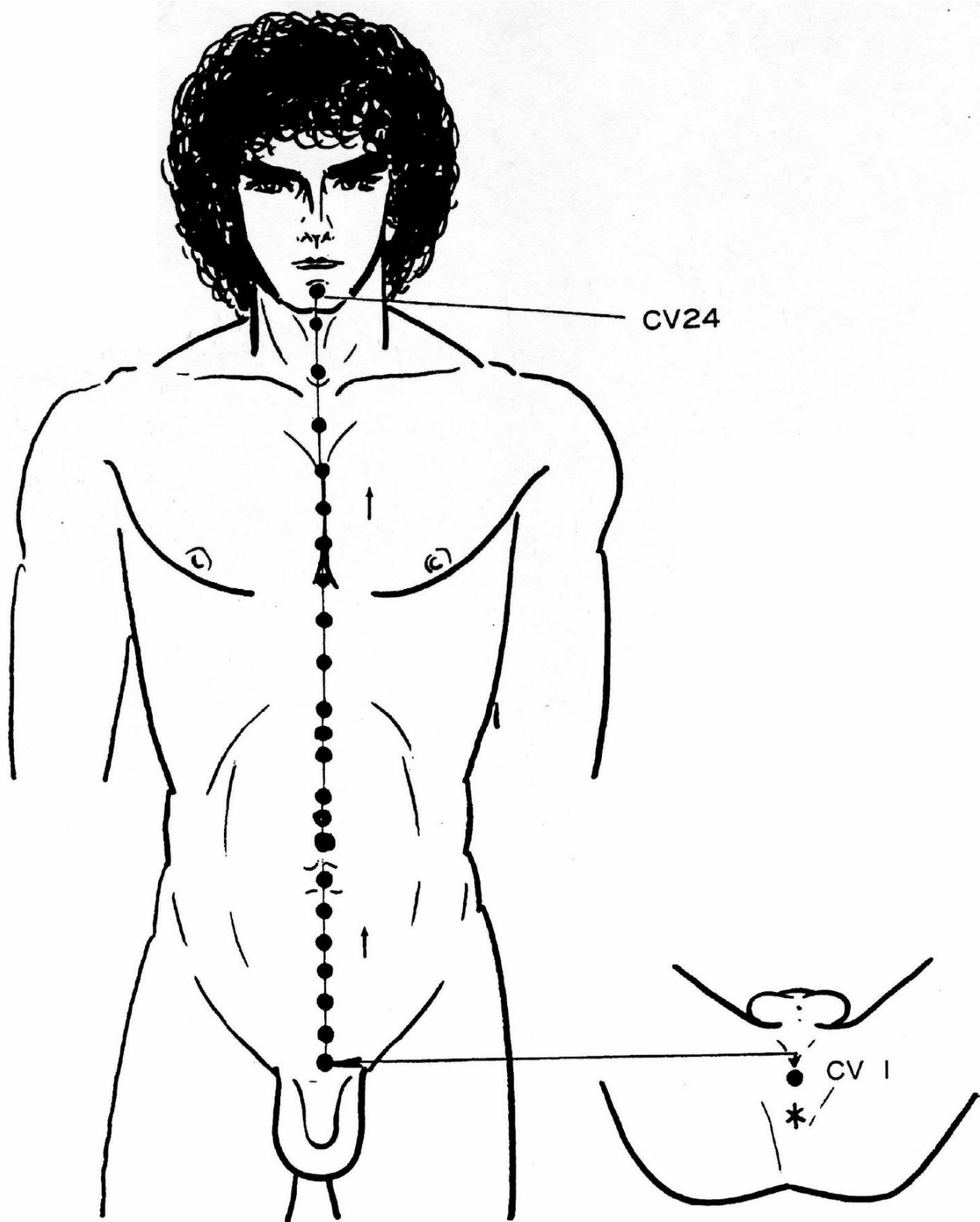
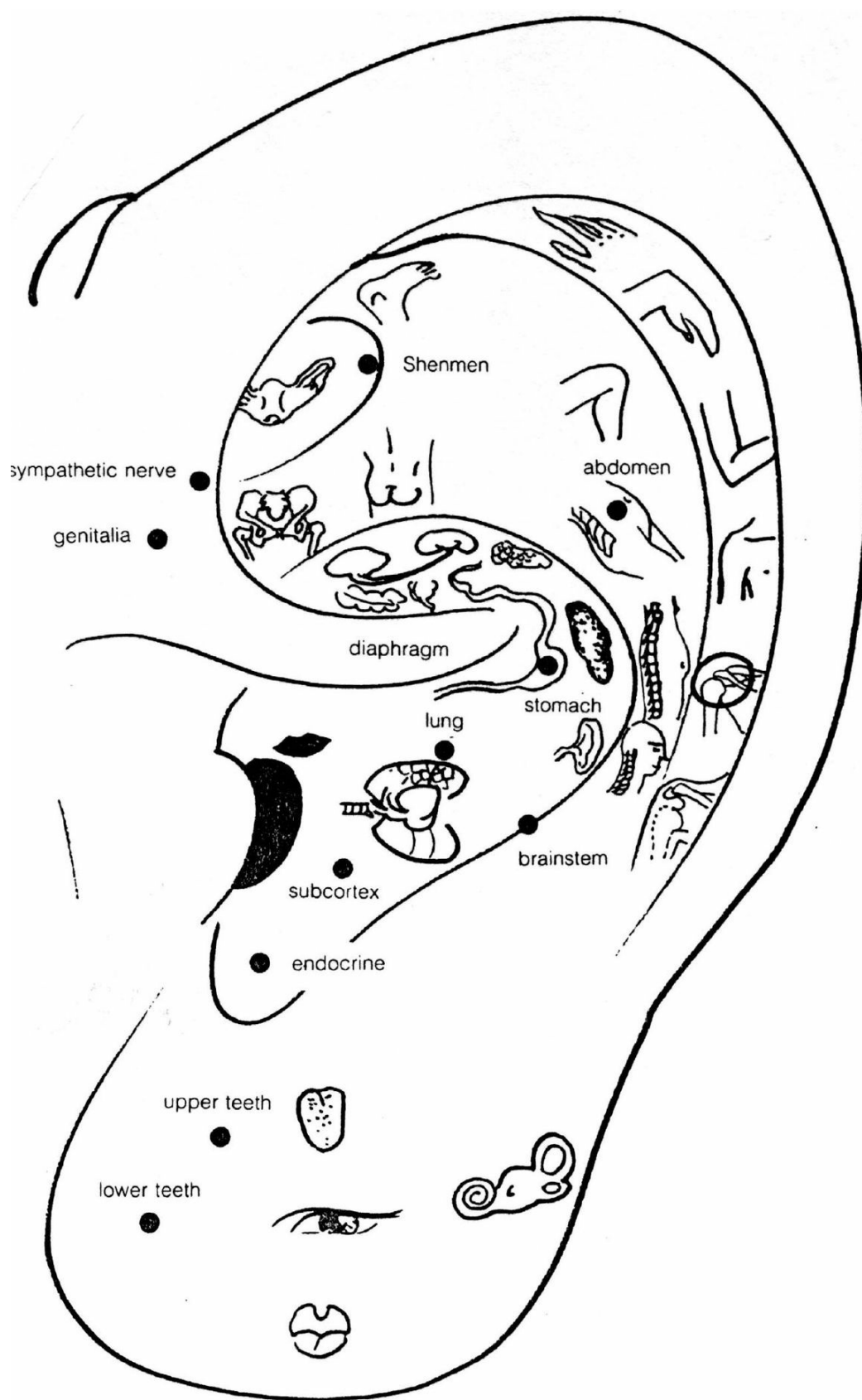


Diagram 15: The Ear Points



13. HISTORY OF ELECTROTHERAPY

The use of electrical stimulation for medical purposes was described in the books of Hippocrates in about 420 BC. The Roman physician Scribnius Largus used the torpedo fish or electric ray to treat pain, especially headache and gout. This method of bioelectric therapy was also used to treat hemorrhoids by a Greek physician, Dioscorides. The torpedo fish continued to be used up to the 16th century to treat migraine, melancholy and epilepsy. In 1672, Otto von Guericke constructed an early prototype of an electrostatic generator. In 1744, Christian Gottlieb Kratzenstien in Germany was able to use a modified electrostatic generator to treat paralysis, epilepsy, kidney stones, sciatica, and angina pectoris. In the mid-19th century, G.B. Duchenne, often called the father of electrotherapy, identified the motor points and the action of all muscles in the body and proposed the use of Faradic (induced) current and moistened pads as surface-electrodes for electrical stimulation. By 1900, most American doctors had at least one electrical machine in their offices to treat painful symptoms of rheumatism, gout, neuralgia, bruises, fracture and even insomnia. In 1960, it was found that connecting the acupuncture needles to an electrical stimulator produced stronger analgesic effects and in the 1970s **electroacupuncture (EA) followed by Transcutaneous Electrical Nerve Stimulation (TENS)** enjoyed widespread use (1). In the decade that followed, Dr. C.N. Shealy, an American neurosurgeon, was the first to implant electrodes into the spinal cord and brain for the purpose of producing analgesia by direct electrical stimulation (2). This led in 1973 to the engineering of the first modern TENS machines for the treatment of pain in North America (3).

14. THE MECHANISMS OF TENS AND ACUPUNCTURE

ABSTRACT

Acupuncture, electroacupuncture (EA) and TENS are widely used by many medical workers especially in clinics of physiotherapy, pain and sport medicine. Many researches have tried to look for the plausible and interesting mechanisms particularly in its efficacy in the treatment of many pain problems. Different levels of analgesia and clinical benefit can be achieved by changing treatment parameters such as current frequencies, intensities and electrode placements etc. Possible anatomical sites and mechanisms of TENS and EA as related to endorphins and monamines are proposed.

THE USE OF TENS AND ACUPUNCTURE

In China, acupuncture has been used for several thousand years, not only to alleviate pain but also to treat depression, tinnitus, insomnia, hay fever, asthma, psoriasis, dermatitis, common cold, irritable bowel syndrome, cigarette withdrawal symptoms, drug or alcohol addiction, and musculoskeletal and neurovascular problems, acute lower back and neck spasms and other myofascial pains, herniated intervertebral disks of the spine and degenerative back-pain. Other treatable conditions are migraine headaches, tension headaches, carpal tunnel syndrome, sinusitis, intercostal neuralgia, post-herpetic neuralgia, trigeminal neuralgia, diabetic neuropathy, leg growing pain, etc. Most pain problems that respond generally well to acupuncture and TENS are of musculoskeletal origin, including osteo and inflammatory arthritis, tendonitis/bursitis of the shoulders, elbows, wrists, hands, hips, knees, ankle and foot, work and sports related strains and sprains.

In a typical week, the total number of patients treated in the Sport Medicine and Pain Management Clinic was 362. ([Table 1](#))

[Table 1.](#) Pain clinic population by anatomical distribution of presenting complaint.

Age	Low back	Neck	Shoulder	Upper extrem.	Lower extrem.	Head	Other	Sample size
60+	31	16	9	3	21	1	4	85
45-59	55	28	21	22	35	7	7	175
25-39	30	13	4	10	13	4	6	80
<25	6	3	1	2	2	2	6	22
Totals	122	60	35	37	71	14	23	362

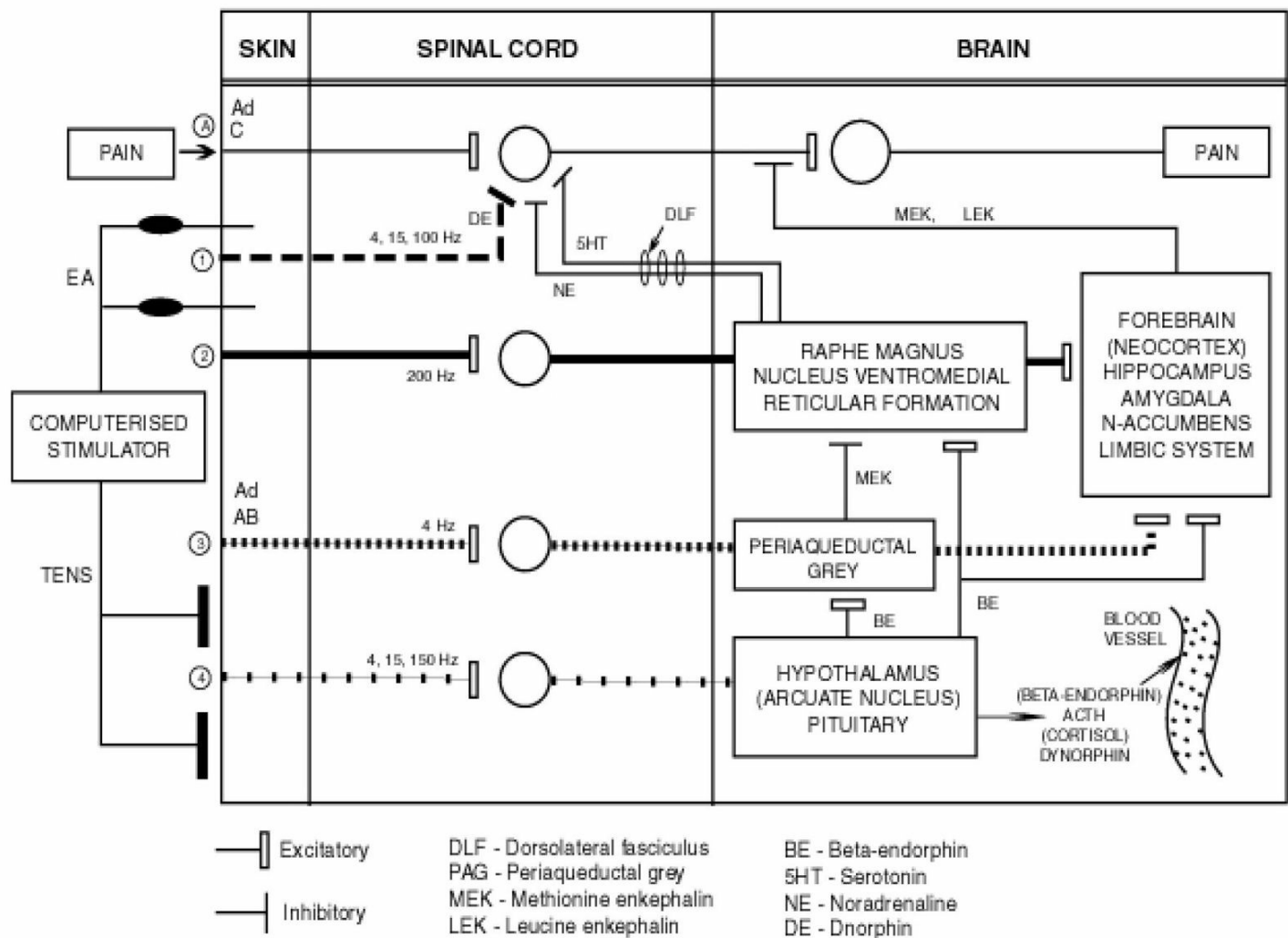
The analgesic effect of TENS or electroacupuncture ranges from 30% to 90% in most patients (4). Certain common problems such as soft tissue injuries (tendonitis, sprain and strain), osteoarthritis, tension headache, etc. often respond very well to electrical stimulation and will recover quickly and completely. However synergistic results can be achieved by combining with a variety of other therapeutic approaches such as medications (NSAIDS, analgesics, anticonvulsants, antidepressants, SSRJs, antimigraine), trigger point injections, strength and aerobic exercises, spinal traction, manipulation, traditional Chinese herbalism etc. TENS and electroacupuncture could be very useful to help many diseases but should not be the sole method of treatment for illnesses like hypertension, anorexia, colitis, enterocolitis, hepatitis, nephritis, prostatitis, prostatic hypertrophy, Alzheimer's disease, Meniere's disease, severe asthma, depression, rheumatoid arthritis, lupus, migraine headache, chronic back pain, frozen shoulders, diabetic neuropathy, tinnitus, fibroid, menopause syndrome etc.

Many research showed that acupuncture released endogenous opioid substances in the spinal cord and brain of animal models and humans (8, 9). In 1979, while completing doctoral work at the University of Toronto in the laboratories of Dr. B. Pomeranz, the author (Dr. R. Cheng) first proposed that different frequencies of electrical stimulation could trigger the preferential activation of different endogenous pain-relieving pathways (10). It was suggested that stimulation at 4 Hz released beta-endorphin, enkephalins and ACTH, while 200 Hz stimulation caused increases of serotonin (5HT) in the brainstem pain modulating pathways. Later, Dr. J.S. Han did show that at 15-100 Hz dynorphin was released in the spinal cord, while enkephalins were released at 4 Hz (11). The mechanisms underlying the pain relief produced by TENS and EA appear to be complicated. Locally, at the site of application, electrical stimulation can increase vascular circulation, reduce edema and promote healing of various tissues. For example, bone repair can be augmented by applying an electrical current across the fracture; muscular trigger points, a common source of pain seen in the clinical setting, can be observed to release after electrical stimulation. Centrally, it may release enkephalins, beta-endorphin, dynorphins, serotonin, noradrenaline for pain-relief and increase cortisol for anti-inflammation,

THE TENS/EA ENDORPHIN HYPOTHESIS

An integrated pain-modulating system of TENS and EA as related to endorphins, the endogenous hormones and neurotransmitters. Collectively, the TENS/EA endorphin hypothesis may be divided into 3 levels of analgesia:

Fig. 1. Proposed mechanism of TENB and ac upuncttre (from Ph.D. thesis 1981 - Richard Cheng)



* The author use PCM - 8000, a programmable multi-frequency stimulator.

1) Local

Properly applied TENS or EA to an area of the body for a sufficient length of time produces an area of numbness at the site. Such discretely localized analgesia is probably mediated by a segmental release of endorphins in the spinal cord which corresponds to the area of the body stimulated. Several lines of evidence have suggested that substance P is the neurotransmitter at the terminals of small primary afferent (A-delta and C) fibres responsible for peripheral pain transmission (13). Immuno-histochemical analysis has further revealed that Methionine Enkephalin (MEK), one of the endogenous opioids, and substance P neurons have an intimate spatial relationship in the spinal cord (and also in the brainstem) 14. Moreover, it has been demonstrated that endorphins are able to suppress the release of substance P in the spinal cord (15,16). Finally, TENS and EA can be shown to stimulate A-beta and A-delta peripheral fibres and that this releases endorphins in the spinal cord 10, MEK being released at 4 Hz and dynorphin at 15-100 Hz (Fig. 1-pathway 1) (11,12). Thus, a plausible mechanism exists to explain TENS and EA analgesia at the local/segmental level.

2) Regional

Regional analgesia refers to pain-relief in a certain part of the body, e.g. upper arm, left upper body,

etc. It may be due to the release of enkephalins in the midbrain nucleus (periaqueductal grey – PAG). The PAG has input to the brainstem nuclei (Raphe Magnus and Reticularis Magnocellulis) which can send down a descending inhibition through the dorsolateral fasciculus (DLF) to the spinal cord, where noxious input signals are then decreased (17). It has been demonstrated that the Nucleus Raphe Magnus releases serotonin (5HT) while the Nucleus Reticularis Magnocellulis releases noradrenaline (NE) through the DLF (18,19). It has been advocated the existence of regional mapping in these midbrain structures, suggesting that stimulation of a certain midbrain area will cause analgesia in a corresponding area of the body (17). At 4 Hz. electrical stimulation can be shown to activate the PAG – brainstem nuclei pathway which can send down an inhibitory descending flow in the DLF and cause a regional analgesia (12). There are also ascending projections for the midbrain nuclei which reach the hippocampus, amygdala, nucleus accumbens (limbic or emotional system) and neocortex (Fig. 1 – pathway 3). These also involve enkephalin release (MEK and Leucine Enkephalin or LEK) and are associated with memory, reward or sexual behavior and higher pain associations. We can see that electrical stimulation of the PAG may not only modulate pain relief but also some of its emotional, memory, reward and sexual behavior impact. Evidence suggests that high frequency stimulation at 200 Hz may also stimulate the Nucleus Raphe Magnus and the nucleus reticularis magnocellularis directly and thereby activate the descending inhibitory pathway in the DLF, mediated by the release of 5HT and NA in the spinal cord (10,20) (Fig.1 – pathway 2).

3) General

Non-segmental analgesic effects can also be observed (21), e.g. the relief of facial, dental or headache pain by stimulation of distant areas on the hands, arms or legs. This with TENS and EA may be partially explained by beta-endorphin neurons in the Arcuate Nucleus of the hypothalamus and other endorphin neurons in the pituitary which can be stimulated by low frequencies (4Hz, 10Hz, 100Hz) TENS and EA (10). (Fig. 1 – pathway 4). Ascending neuronal pathways from the hypothalamus to the Nucleus Accumbens, PAG, Nucleus Magnus Raphe, Vento-Medial Reticular Formation, Amygdala and Periventricular Nucleus Of the thalamus could then activate widespread pain modulation (22). Beta-endorphin and ACTH are made and released together into the CSF and blood stream by TENS or EA (8). This may cause a generalized Analgesia. The ACTH increases the synthesis of body cortisol which may add anti-inflammatory effects (23). Hypothalamic and pituitary endorphins (beta-endorphin and dynorphin) are neural hormones which seem to provide particularly long duration analgesia of a generalized character.

ENDORPHIN RELEASE & OPIATE RECEPTORS

<u>Frequency</u>	<u>Opiate</u>	<u>Opiate Receptors</u>
4Hz	MEK LEK	Mu / Delta
15 – 100 Hz	Dynorphin	Kappa
4Hz	Beta-endorphin	MU

4 Hz	ACTH (↑ CORTISOL SYNTHESIS)
200 Hz	SEROTONIN and NORADRENALINE

Other scientific investigations and clinical observations review the functions of TENS or electroacupuncture treatments.

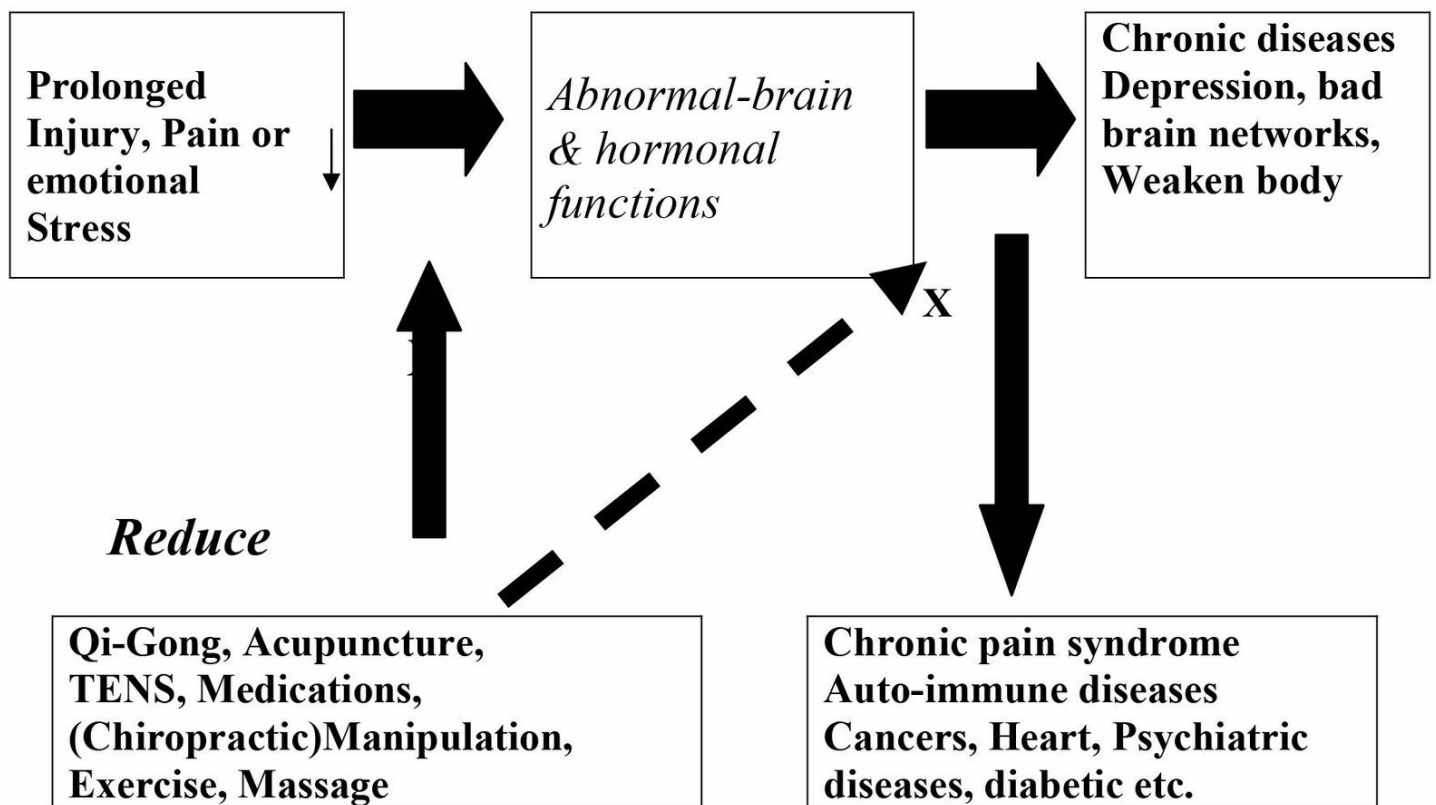
FREQUENCIES (Hz)	FUNCTIONS	POSSIBLE BODY CHEMICALS
1-10	Pain-relief Pleasure – learning	Met – Enkephalin Leu – Enkephalin
3	Euphoria, sexual	Dopamine
4	Pain – relief, anti-inflammatory	Beta – endorphin ACTH – cortisone
15	Pain – relief, addiction	B – dynorphin
100	Pain – relief, addiction	A – dynorphin
200	Pain – relief, insomnia, depression	Serotonin
300	Depression, pain - relief	Norephinephine
1000 – 2000	Weight control Energy	Amphetamine
5 – 10	Tobacco – withdrawal	Nicotine
75 – 300	Sedative (minor tranquilizer)	Diazepam
75	Cannabis	LSD, THC
130	Auto – immune system	Immune system
3,3000	Headache	Autonomic nervous system
1000 – 5000	Interferential – decrease skin resistance - For deep organs	Internal organs
micro – current 300 – 600	Headache	Sympathetic nervous system

micro A		
Acupuncture	Micro – current of damage: Pain – relief, healing, auto – immune system	Histamine, Bradykinin, prostaglandin, substance P long dendritic cells immune system

Discussion

Recently, Melzack (24) discussed the idea that prolonged stress (including viral or bacterial infections) and frequent injuries will release cytokines (such as interferon, interleukins 1 and 6, tumor necrosis factor etc.) which cause sustained cortisol release in our body. The sustained cortisol release may deplete its production and produce myopathy, fatigue, weakness, decalcification of bone and accelerate neural degeneration of the hippocampus during aging. Sustained release of cortisol also suppresses the immune system and creates chronic pain syndromes as well as many auto-immune diseases such as multiple sclerosis, rheumatoid arthritis, lupus, scleroderma, Crohn’s diseases, psoriasis, hay fever etc. Early treatment and prevention of tissue damage or stress may reduce the sustained cortisol release and stop the development of chronic pain syndrome and other illnesses. Regular exercise, Qi-Gong, manipulation, TENS or acupuncture, may be the best methods to reduce stress and prevent sustained cortisol release: Early childhood abuse or severe physical or emotional trauma will have a profound injury to the hormonal and auto-immune systems. This will affect the networks and the memory of the brain cells. It often entails some chronic diseases like depression, chronic pain syndromes, complex regional pain syndromes, fibromyalgia, auto-immune diseases, heart disease et

Chronic Pain Treatments



15. Appendix II: Illnesses treated by acupuncture

Acupuncture has been used to treat various illnesses. It is often used in conjunction with other techniques or treatments. For interest, most of the traditional uses of acupuncture are listed below:

1. **Abdominal pain:** St – 36, 10,12,P – 6. Ear points – stomach, small intestine, sympathetic.
2. **Abortion:** LI – 14, Sp – 6, CV – 2, 3, 4, BI – 60.
3. **Acne:** Sp – 2, H – 9, Ku – 11, Liv – 11.
4. **Addiction:** LI – 4, H – 7, St – 36, P – 6. Ear points – shenman, lung.
5. **Alcoholism:** H – 7, St – 36.
6. **Alopecia:** BI – 54, GV – 20, 24. Ear points – intestinal secretion, lung, occiput, kidney.
7. **Amenorrhea:** H – 7, LI – 4, Sp – 6, GV – 2,3,4, CV – 4. Ear points – shenman, uterus, ovary, internal secretion.
8. **Amnesia:** H – 7, P – 6, K – 1, St – 36, amnesia point.
9. **Angina pectoris:** P – 6, H – 7, St – 36, BI – 15.
10. **Anorexia:** St – 36, H – 7, CV – 9, 12. Ear point – stomach, small intestine.
11. **Anuria:** CV – 1, 6, K – 1, BI – 23, St – 36, GV – 2,3,4.
12. **Anxiety:** H – , P – 7, LI – 4. Ear point: - shenman, heart, stomach.
13. **Apnoea:** K – 27, LI – 4, GB – 40.
14. **Apoplexy:** CV – 24, GV – 20, 26, St – 36, GB – 14,20. Ear point: shenman, adrenal gland.
15. **Appendicitis:** LI – 11, St – 44. Ear point - appendix, large intestine, shenman.
16. **Arteriosclerosis:** St – 36, GB – 39, P – 9.
17. **Arthritis:** use points across the joints for local problems. General treatment: LI – 11, St – 36, LU – 5, P – 6, Sp – 6.
18. **Ascites:** St – 36, 45, CV – 6,9,12, Sp – 6. Ear point – stomach, shenman, liver.
19. **Asthma:** LU – 5,7,9, LI – 4, CV – 16, 17. Ear point – shenman, lung, adrenal.
20. **Auto immune disorders:** aids, psoriasis, rheumatoid, arthritis, asthma, lupus etc: P – 6, He – 7, GV – 14, LI – 4, LI – 11, St – 36.
21. **Bell's palsy:** LI – 4, St – 4, 6.
22. **Blenorrhagia:** GB – 1, 2, CV – 1, Liv – 1.
23. **Blepharospasm:** St – 1, He – 7. Ear point - eye.
24. **Blurred vision:** SI – 6, UB – 2, GB – 1, GB – 14.
25. **Bronchitis:** St – 36, LI – 4, Lu – 5. Ear point – lung, asthma, shenman.
26. **Cardiac arrhythmia:** P – 6, H – 7. Ear point – shanman, heart, sympathetic.
27. **Carpal tunnel syndrome:** H – 7, LI – 11. Electrically stimulated for 30 minutes.
28. **Cataract:** LI – 4, St – 36, GB – 20.
29. **Cerebral hemorrhage:** St – 6, LI – 4, GV – 26, GB – 20. Ear point – shenman.
30. **Cerebral ischemia:** St – 36, 45, GV – 20, GB – 44.
31. **Cholecystitis:** GB – 34, CV – 12, P – 6.
32. **Colitis:** St – 36, CV – 6, 9, 12. Ear point – large intestine, small intestine.
33. **Common cold:** LI – 4, GV – 14, 16, GB – 20.
34. **Conjunctivitis:** GB – 20, GV – 22, BI – 1.

35. **Constipation:** St – 25, 36, CV – 1, Liv – 1.
36. **Contraception:** Sp – 6, LI – 4.
37. **Cough:** Lu – 5, 7, LI – 4.
38. **Cystitis:** B – 23, CV – 4, Sp – 10.
39. **Deafness:** LI – 4, GB – 15, T – 17.
40. **Diabetes mellitus:** P – 6, BI – 60, St – 33, Lu – 5.
41. **Diarrhea:** St – 36, Sp – 6, 14. Ear point – large intestine, small intestine shenman.
42. **Dermatitis:** LI – 11, P – 6, GB – 31.
43. **Dementia:** St – 45, LI – 45, T – 10.
44. **Depression:** H – 7, GV – 14, P – 6.
45. **Dysentery:** St – 36, P – 6, CV – 4, Li – 11.
46. **Dysmenorrhea:** Sp – 6, CV – 1, 4, 7, LI – 4.
47. **Dyspnea:** LI – 4, Lu – 5, 7, 10. Ear point – lung, adrenal.
48. **Dysuria:** Sp – 6, GB – 34, CV – 4.
49. **Edema:** St – 36, Sp – 6, CV – 4.
50. **Emotional:** H – 7, GV – 20, P – 6, K – 1.
51. **Endocarditis:** Sp – 4, P – 6, K – 2, GB – 41.
52. **Enterocolitis:** CV – 6, 10, GV – 3, Sp – 1.
53. **Enuresis:** Sp – 6, CV – 4, K – 10. Ear point – urinary bladder.
54. **Epididymitis:** CV – 6, Sp – 6, Liv – 2.
55. **Epilepsy:** P – 6, St – 36, GV – 14, BI – 20.
56. **Epistaxis:** LI – 4, Lu – 11, GV – 14, 23.
57. **Esophagus spasm:** Sp – 6, B – 38, GB – 20, LI – 11, CV – 22.
58. **Facial pain:** LI – 4, St – 1, 4, 7. (contralateral side)
59. **Fainting:** GV – 26, K – 1.
60. **Fatigue:** St – 36, BI – 20.
61. **Fever:** H – 9, GB – 22.
62. **Flatulence:** St – 36, GB – 25.
63. **Frigidity:** CV – 3, K – 12, B – 23, Sp – 6.
64. **Gastritis:** St – 36, P – 6, BI – 21, CV – 12, Liv – 13.
65. **Goitre:** LI – 4, GB – 21, T – 10, P – 6.
66. **Heart attack:** H – 7, GV – 26, P – 6.
67. **Heat stroke:** LI – 4, GV – 14, 20, BI – 40.
68. **Hiccough:** BI – 20, CV – 12, St – 36.
69. **Hives:** LI – 4, 11, Sp – 6.
70. **Hepatitis:** Liv – 3, St – 36, BI – 10, LI – 11. Ear point – liver, shenman.
71. **Hypertension:** St – 36, GB – 20, LI – 11, Liv – 3, H – 7. Ear point – shenman, antihypertension.
72. **Hysteria:** H – 7, P – 6, LI – 4, Sp – 6.
73. **Hematemesis:** B – 17, Sp – 1, T – 5.
74. **Hemoptysis:** B – 17, Sp – 4, CV – 12.
75. **Hemorrhage:** Cerebral

Ocular: P – 6

Intestinal: GV – 1, B – 18, 35, CV – 4

Stomach: CV – 1, GV – 1, CV – 12, B – 27

Postpartum: H - 7

- 76. **Hemorrhoids: CV – 1, GV – 1, Sp – 10, B – 57, GV – 20.**
- 77. **Hypersalvation: LI – 18, B – 41, K – 18, GB – 23.**
- 78. **Hypotension: B – 15, Sp – 6.**
- 79. **Ileitis: St – 36, B – 21.**
- 80. **Ileus: St – 36, B – 21, P – 6, CV – 22.**
- 81. **Impotence: Sp – 6, CV – 3, 11, B – 23.**
- 82. **Insomnia: H – 7, Sp – 6, LV – 10, insomnia point.**
- 83. **Intercostal neuralgia: P – 6, points on local dermatome.**
- 84. **Intestinal obstruction: St – 36, CV – 6, 14, Sp – 6, B – 21.**
- 85. **Jaundice: LI – 11, St – 36, GB – 21, Liv – 8, CV – 12.**
- 86. **Laryngitis: LI – 4, LU – 6, GB – 12, K – 7.**
- 87. **Lethargy: LI – 11, St – 36, GB – 34.**
- 88. **Malaria: P – 9, LI – 11, GV – 14, T – 5, SI – 3.**
- 89. **Meniere's disease: GB – 20, LI – 4, P – 6, St – 36, SI – 19.**
- 90. **Menopause: Sp – 6, LI – 4, CV – 4.**
- 91. **Menorrhagia: Sp – 6, LI – 4, CV – 4.**
- 92. **Migraine: LI – 4, GV – 24, GB – 14, 20, H – 7.**
- 93. **Myocarditis: P – 6, 9, T – 6.**
- 94. **Nausea & Vomiting: St – 36, P – 6, CV – 12.**
- 95. **Nephritis: LV – 14, T – 9, B – 23, K – 13, Liv – 14, St – 28, CV – 13.**
- 96. **Neuralgia: Local acupuncture points.**
- 97. **Neurasthenia: GB – 34, LI – 11, St – 36, H – 7.**
- 98. **Neuropathy: St – 40, CV – 15.**
- 99. **Nocturnal emission: B – 13, H – 7, Liv – 3, K – 1, CV – 36.**
- 100. **Obesity: St – 36, SI – 19. Ear point – stomach, lung.**
- 101. **Osteoporosis: Sp – 6, BI – 57.**
- 102. **Otitis media: GB – 41, St – 36, LI – 4, GB – 20.**
- 103. **Parotitis: GB – 20, LI – 4, LU – 7.**
- 104. **Pelvic inflammatory diseases: CV – 4, Sp – 6, St – 36, Liv – 5, Sp – 10.**
- 105. **Pericarditis: P – 6, B – 16, CV – 14.**
- 106. **Peripheral vascular disease: K – 2, Sp – 6, B – 55, GB – 34.**
- 107. **Peritonitis: Liv – 14, Sp – 1, LI – 13, K – 17, Liv – 14, St – 36, Sp – 9.**
- 108. **Pharyngitis: LI – 4, St – 44, LU – 7.**
- 109. **Pleuritis: K – 9, GB – 44, Liv – 14, Sp 21, B – 19, K – 23, GB – 36, CV – 18.**
- 110. **Prolapse – rectum: GV – 1, CV – 8.**
- 111. **Prostatitis: CV – 3, K – 7, Sp – 10, GV – 20.**
- 112. **Prostatic Hypertrophy: K – 3, CV – 4, Sp – 10, B – 67.**
- 113. **Raynaud's disease: Sp – 6, K – 6, LI – 11.**
- 114. **Renal colic: B – 23, Sp – 6, K – 3, B – 47.**
- 115. **Restlessness: H – 7, 9, P – 6.**
- 116. **Rhinitis: LI – 4, 11, 20, GV – 14, 24, GB – 20.**
- 117. **Schizophrenia: LI – 4, GV – 26, H – 7.**
- 118. **Sciatica: GB – 30, B – 50. Ear point – shenman, sciatica.**

- 19. **Shock:** P – 6, GV – 24, K – 1.
- 20. **Sinusitis:** LI – 4, GV – 23, T – 33.
- 21. **Speech impairment:** GV – 15, CV – 23.
- 22. **Sterility:** Sp – 6, CV – 3, K – 2, 12.
- 23. **Stomach ulcer:** St – 36, P – 6, CV – 14.
- 24. **Stomatitis:** Center of the ulcer or the surrounding area.
- 25. **Stroke:** LI – 4, GV – 29, Sp – 6, K – 1.
- 26. **Sweating (Hyperhidrosis):** CV – 12, St – 36, LI – 4, LU – 11.
- 27. **Syncope:** GV – 20, 26, Sp – 6, H – 7, P – 6.
- 28. **Tonsillitis:** LU – 11, LU – 7, H – 7, LI – 4.
- 29. **Tinnitus:** GB – 20, K – 1, T – 17. Ear point – inner ear, kidney, shenmen.
- 30. **Tracheitis:** LI – 4, P – 3, GV – 12.
- 31. **Urethritis:** CV – 6, B – 23, Liv – 13.
- 32. **Urinary incontinence:** LU – 7, GV – 4.
- 33. **Urinary retention:** CV – 4, 6, Sp – 10, Kid – 11, St – 37, B – 54.
- 34. **Urinary tract infections:** Sp – 6, St – 36, B – 32, Liv – 8.
- 35. **Varicose vein:** GV – 4, 14, GB – 21.
- 36. **Vertigo:** LI – 4, GB – 20, St – 40.
- 37. **Vitiligo:** Sp – 6, GV – 14, LI – 11, LI – 4, LU – 7.
- 38. **Vomiting:** P – 6, St – 36, CV – 12.

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