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Review article

Contemporary acupressure therapy: Adroit cure for painless recovery of therapeutic ailments

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ABSTRACT

Since time immemorial, complementary and alternative medicines (CAM) have played a significant role in human health care. CAM is known to have a strong reputation and reliability within every culture to provide basic health care treatment for patients. CAM acts as a better therapeutic option in human being for treating various diseases and improving quality of life with apt consideration to the economic aspects. Acupressure, one of the known CAM, originated in ancient China is based on the principal of acupoints activation across the meridians which correct the imbalance between Qi. Activation of specific points on the meridians is known to facilitate reduction of pain at the local sites. It also reduces the pain from other body parts. This review outlines various types, devices and mechanisms involved in the acupressure treatment.

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1. Introduction

CAM has become one of the fastest growing remedial approaches. It has already achieved very distinctive reliability and eminence outside territory of traditional medicine system due to their various therapeutic attributes. Some forms of CAM have been practiced for centuries, whereas others like electrotherapy are more recent in origin.¹ Acupressure is one of the known CAM practices across the world. It is based on fundamental principle of activation of acupoints across the meridians. Activation of acupoints is facilitated by use of fingers or the simply available various hand-held acupressure devices. Due to easy and safe manual (hands-on) therapy, acupressure is exercised by number of people across the globe. As these are often used in people to build health and as remedy for various ailments, it's essential to have knowledge about the current acupressure techniques along with investigation of its scientific and biomedical scope.

2. Acupressure

Acupressure was originated in ancient China.² It showed superior therapeutic potential against numerous disease conditions. Acupressure is a type of acupuncture. Both acupressure and acupuncture are based on same fundamental principle of acupoints activation across the meridians. In acupressure, muscular tension is released by applying pressure with hand at specific acupoints or pressure of the thumbs on specific points or the application of pressure to acupoints is used to balance the flow of the physiological energy.^{3,4} Acupressure also resembles reflexology; however in reflexology therapeutic response was obtained by work on predetermined reflex zone.⁵ Acupressure demand application of physical pressure on trigger points/acupoints/specific pressure points which are positioned along the meridians. Meridians are the channels within human body which helps to maintain Qi and thus, steadiness of health condition. Each meridian is connected to various organs and tissues of human body. Activation of specific point on meridian by pressure facilitates pain reduction at the local site and also reduces the pain from other parts of the body.⁶ It is a pressure point, hand-mediated energy healing technique which is considered as useful strategy for the management of multiple symptoms, along with beneficial physical comforts, satisfaction and economy.^{2,7} As a whole,

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acupressure is a manually operated, needle-free, non-invasive, cost-effective and non-pharmacological healing intervention to promote patients' well-being.

2.1. Acupoints

Entire human body is a cluster of pressure points.⁸ Acupoint is the point closest to the surface of the skin and activation of acupoint is the prime step in acupressure.⁹ Stimulation of specified acupoints is known to elicit functional responses that can be used to treat diseases.¹⁰ Acupoints are any specific points for needle insertion in acupressure; mostly these are area of high electrical conductance on the body surface.⁴ Each acupoint possess a different sensation based on the body part which suffers from the pain or a specific problem. Simply, application of pressure at different points cause different effects.^{11,12} Acupuncture points per se have different physical effects according to location.¹³ Location of each acupoint on specified meridian is determined in terms of body inch (BI) or Cun. One BI/Cun equals one thumb width at the base of the finger nail.¹⁴ BI/Cun are known as acupressure units of measurement (AUM).

Local Points (LP) and Distal Points (DP) are the two important acupoints, employed by acupressurists to treat the patients in routine clinical practice. Acupuncture and acupressure show different physiological effects on these points. Application of acupressure on only LP exhibits the therapeutic response on autonomic nervous system. Tender points (TP) are the third type of acupoints present on nociceptors and polymodal receptors. Activation of such TP sensitized polymodal receptors result in better effects on pain relief.¹⁵ In acupressure, acupoints can be activated by elbows, fingers, feet, knuckles, palms, thumb or specific tools. In ancient China, acupoints were activated with the help of stones, known as Bian Stones.⁵ Currently, numerous acupressure or elastic bands with a protruding plastic button are available.¹⁶

2.2. Mechanism of action

Qi permeates everything and it is vital energy of life. It is the quality attribute that determines the state of one's health. Yin and Yang are customary medicinal traits conflicting as well as in

equilibrium with each other.¹⁷ In accordance to traditional Chinese medicine (TCM), acupressure uses pressure to stimulate specific acupoints for therapeutic purposes and stimulating these points can correct imbalance between Qi through channels and subsequently treat the diseases.¹⁸ Re-equilibrium of Qi achieve therapeutic benefits by improving the physiological functions of body systems or Zang-fu in the process.¹⁹ Zang-fu is a combined term for human internal organs; five zang organs are the heart, liver, spleen, lungs and kidneys, along with the six fu organs involve gallbladder, stomach, small intestine, large intestine, urinary bladder and san-jiao (the triple energizer).²⁰ It is simply a non-pharmacological intervention on the body to treat a wide range of conditions by applied pressure to specific acupoints.²¹ It is the massage of acupoints performed with the fingertips, knuckles, thumbs, elbows or suitable devices to achieve effective treatment that would last from several minutes to hours post a single treatment.^{2,22,23} Acupressure is a multi-modal therapy whose working mechanism can be elucidated by miscellaneous theories.²⁴

According to Gate Control Theory by Melzack and Wall, acupressure at specific point passes pleasurable impulses to the brain at a rate four times faster than painful stimuli. Continuous impulses shut the neural 'GATES' and slower messages of pain are blocked from reaching the brain and helps to improve or strengthen the pain perception threshold of body.²⁵ Based on the location of stimulation, pressure-generation activates the small myelin nerves in the muscles and pass stimulations to the higher nerve centres including spinal cord, midbrain, hypothalamus and pituitary axis.²⁶ Magnetoencephalography (MEG) studies demonstrated conditioning of primary somatosensory response during the acupressure. In addition to sub-cortical effects on endogenous pain regulation acupressure also exhibits potential for affecting primary somatosensory processing and possibly altering maladaptive neuroplasticity.²⁷ Auricular acupressure (AA), a micro-acupuncture is a non-invasive technique similar to reflexology in which endocrine functions are improved effectively. It is known to exert its effects via stimulating the central nervous system through the cranial/spinal nerves on the auricle of the ear.^{28,29}

Biochemical mechanism (Fig. 1) of acupressure involves the stimulation of acupoints that leads to complex neuro-hormonal responses.³⁰ It involves the counteraction among hypothalamic-

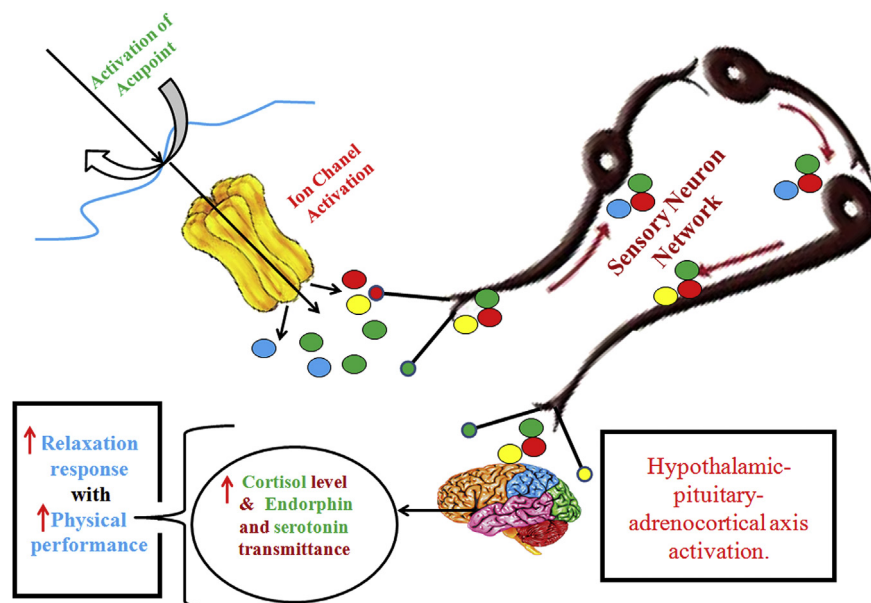


Fig. 1. Biochemical mechanism of acupressure.

pituitary-adrenocortical axis that leads to overproduction of cortisol and cause a relaxation response.³¹ Also, it modulates the physiological response by increasing endorphin and serotonin transmittance to the brain and specific organs through nerves and meridians.^{32–34} After exercise, restorative meridian acupressure helps to change the concentration of stress hormones and lactic acid.³⁵ Specifically in case of the respiratory function, acupressure plays a moderating role. Activation of acupoint activates myelinated neural fibres that stimulate the hypothalamus and pituitary gland, leading to the release of β -endorphins from the hypothalamus into the spinal fluid and pituitary into the blood stream, respectively. Thus, the analgesic and sedative effect of β -endorphins facilitates the normal respiratory function of patient.³⁶

As per the Meridian theory, on stimulation of acupoints, the area along the meridian will be affected whereas stimulating proximate acupoints would affect the functioning of local tissues.³⁷ Acupressure mediates nitric oxide (NO) signal, known to improve local microcirculation via cyclic guanosine monophosphate (cGMP).³⁸ It helps in enhancing the physical performance by suppressing fatigue-inducing molecules in the blood.³⁹ The specific relationship between acupressure and microcirculation can be enumerated by various spectroscopic methods. Near-infrared spectroscopy (NIRS) assists in determining the regional oxygen saturation whereas Laser Doppler measurement (LDM) is used to examine the

microcirculatory efficacy and underlying mechanisms of acupressure therapy. In comparison to LDM, NIRS is more sensitive in detecting the tissue in-flow changes as it can penetrate much deeper in the sample.^{40–42}

Applying a continuous pressure for approximately 1 min at specific hyperalgesic points helps to reduce both local as well as propagating pain.^{13,43} Acupressure results in acute reduction in pain sensitivity and pressure pain sensitivity (PPS).⁴⁴ In most of the surgical process, acupressure aids in preventing surgical haemorrhage and accelerating the healing process.⁴⁵ In summary, acupressure helps to decrease tissue adhesion, promote relaxation and regional blood circulation, increase parasympathetic nerves activity and intramuscular temperature along with reduction in neuromuscular excitability.⁴⁶

2.3. Acupressure and devices

A wide range of portable acupressure devices (elastic or inelastic bands, mats with protruding plastic points) are available in market. These devices are designed by considering the patient comfort and ease of application. By considering the patient need numerous device generating electrical impulse and vibrational energy based devices are available to serve the purpose. A list of patented devices is given in Table 1. Most of the available devices exert the constant

Table 1
Types of patented acupressure devices.

Patented Devices	Description	References
Acupressure foot board	Foot board consist of multiple pressure rods extending upwardly and positioned at reflex points within outlines of average foot sizes. Pressure rods are made up of plastic, wood, jade, ocher, or metallic magnetic material. These rods are activated electrically also (Fig. 2A).	48
Acupressure device for fingers	Inner surface of device is casted with plurality of projections for creating pressure at the end of the finger. It helps to enhances blood circulation by creating negative (anions) ions (Fig. 2B).	49
Acupressure and reflexology clamp	Clamp helps to deliver incrementally variable and reproducible quantities of pressure to specific body positions and maximizing the effective relief with interchangeable pressure delivery tips (Fig. 2C).	50
Acupressure device for treating insomnia	Device applies pressure to correct the ionic imbalance of the treatment zone to produce calming/soothing effect (Fig. 2D).	51
Automatically modulating acupressure device	Device helps to automatically modulate the pressure over the wrist (P6 acupoint) for treatment of nausea and vomiting (Fig. 2E).	47
Adjustable foot acupressure and pain relief platform	Massage grains of pain-relief board provide novel massage and pain relief through stimulating the acupressure points on the soles of feet. Excellent analgesic effect can achieved through it (Fig. 2F).	52
Electrical pulse acupressure system	Device is placed over an outer ear of a human being. It employs both the physical pressure and an electrical pulse at acupuncture joint (Fig. 2G).	53
Finger acupressure apparatus	It consists of a pair of upper and lower pressing plates configured with adjustable distance. It helps to provide pressure against fingers or the palm muscle for physical therapy purposes (Fig. 2H).	54
Hand-held acupressure device	It consists of a semi-rigid ball attached to a rigid tube by means of an elastic cord. It helps the ball to freely-roll in all directions over a limited distance for the purpose of effectively applying pressure onto the various acupressure points to treat targeted muscle spasms (Fig. 2I).	55
Massage footwear	It is footwear with projections on inner sole for massaging the underside of the foot (Fig. 2J).	56
Opto-mechatronic acupressure pen	An opto-mechatronic acupressure pen capable of provide non-intrusive stimulation for therapeutic treatments without piecing the skin (Fig. 3K).	57
Quantitative acupressure device	Non-invasive device provide precise and repeatable therapeutic pressure to the skin and underlying tissue. Digital controller connected to device monitor helps to the measured applied pressure (Fig. 3L).	58
Spinal acupressure device	It is a central fabric panel belt fixed with opposed elastic panels Projections from the belt are positioned to apply pressure to the L1–L4 acupressure points associated with lower spine (Fig. 3M).	59
Acupressure instrument for applying rolling pressure to the human body	Device supply rolling pressure on various acupoints of the human body (Fig. 3N).	60
Acupressure device for ear	Device exerts pressure on acupoints of external ear for the treatment of various disorders (Fig. 3O).	61
Detachable acupressure device	It is a wristband with projections for applying acupressure against joint region (Fig. 3P).	62
Acupressure ring	Rings provide acupressure due to projection extending inwardly from the inner surface of the ring. Ring consists of visual indicator to assess the function (Fig. 3Q).	63
Acupressure apparatus for treatment of soft tissue injuries	It is a multi-purpose method and device comprising a plurality of pins. Device helps to provide relaxation and reenergizing of an injured or tired body. It also treats the soft tissue injuries (Fig. 3R).	64
Acupressure clip	It is a clip which provides the pressure at LI-4 acupoint to relieve the headache pain (Fig. 3S).	65
Acupressure apparatus with foot control	Applied pressure to the LI4 acupressure points on both hands (Fig. 4A).	66
Point pressure therapy device	Device made up of spherical mounted ball to provide drag across the skin of a patient, rather than roll (Fig. 4H).	67
Acupressure gloves	It provides self-applying acupressure. Interior of glove fitted with nodules positioned over acupoints to provide therapy to hands, wrists and fingers. User can apply direct pressure from exterior of the glove.	68
Roller type hyperthermo radiative mat	It helps to enhance effects of the hot compress and acupressure to the user.	69

level of pressure at specific pressure point. Due to the limitation of nerve accommodation, the action potential is stimulated for shorter time which diminishes quickly. This leads to short term benefits which may not be sufficient enough to cause the desirable effects but may lead to adverse side effects. This challenge of short term benefits is overcome by applying automatically modulating acupressure devices.⁴⁷ Various patented devices are given in Figs. 2–4.

2.4. Types of acupressure

Acupressure techniques have been classified in various types depending upon its origin, method and combination with other techniques.⁷⁶

2.4.1. Shiatsu (Japanese acupressure)

Initially shiatsu was originated in China and popular as 'Anma' therapy and then it was brought to Japan.⁷⁷ In Japan, acupressure is well known as 'shiatsu'. In shiatsu, pressure is applied using thumb, elbow or knee perpendicularly to the skin at acupoints along with passive stretching and joints-rotation.⁴ Disease diagnosis is performed through body touch by gentle application of pressure across the complete body physiology.⁷⁸ Finger pressure (tsubos),⁷⁷ finger massage,⁷⁹ palms and heels are employed to apply pressure and stimulate specific points along the meridians of the body to cure the pain.⁸⁰ Across the globe and specifically in European countries, shiatsu is practiced in various styles, philosophical approaches and theoretical bases. Zen Shiatsu, Macrobiotic Shiatsu, Healing Shiatsu, Tao Shiatsu, Seiki, Namikoshi Shiatsu and Hara Shiatsu are the known shiatsu techniques prevalent in Britain.⁸¹ Watsu is a shiatsu which involves use of warm water and routinely employed for pain reduction, improvement in blood circulation. Watsu is also helpful for patients suffering from orthopaedic problems.⁷⁷

2.4.2. Jin Shin Do's (Body-mind acupressure)

Jin Shin Do's is amalgamation of western psychology with Japanese acupressure, Chinese acupuncture theory and Taoist

philosophy technique. Body-Mind acupressure provides platform for the pain-management with unique mental health consoling.⁸²

2.4.3. Auricular acupressure (AA)

In 1950, Dr. Paul Nogier, a French neurosurgeon hypothesized the somatotopic correspondence of specific parts of the body to specific parts of the ear.⁸³ AA is non-invasive therapy performed on outer ear to treat numerous ailments.^{84,85} The present-day AA therapy practiced worldwide is based on Dr. Nogier's principles. World Health Organization (WHO) considers AA therapy as a form of micro-acupuncture that can affect the whole body.⁸⁶ AA practice is based on the theory that specific points on the auricles correspond to major organs of the body and thus, therapeutic effects on the corresponding target organ can be achieved by manipulating the auricular acupoints.⁸⁷

2.4.4. Tapas acupressure technique (TAT)

TAT is well-known as 'Power therapy'.⁸⁸ In TAT, mind and body interventions are achieved via tapping or holding specific acupoints with specific mental imagery for treatment of wide range of medical and psychological maladies.⁸⁹

3. Ayurveda and acupressure

Marma chikitsa is the oldest technique of Indian surgery and recognized from the Vedic era. Acupoints are known as 'Marma' in Ayurveda. There are 107 vital points on human body which are known as Marma points. These points are spread over the flesh, veins, arteries, tendons, bones and body joints.⁹⁰ Based on the effect of trauma, *Marmas* are categorized into 5 groups as shown in Table 2. Marma points work depending on the nature, types, constituents and effect of trauma as well as are centred on various physical properties (Fig. 5).⁹¹

4. Acupressure applications

CAM therapies provide a platform which plays a paramount role in human health and welfare.²⁰ Acupressure alleviates wide range of

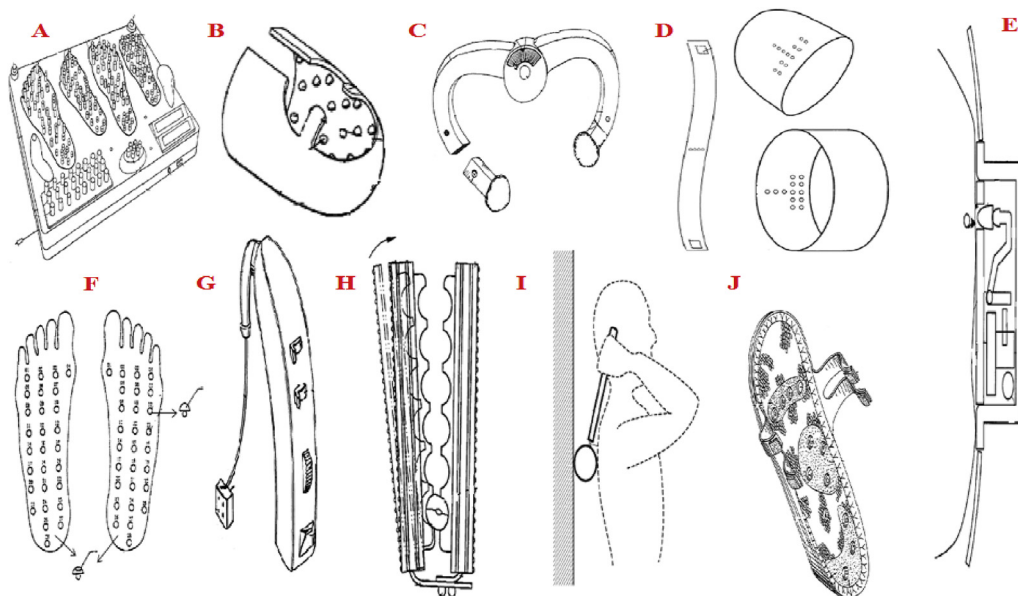


Fig. 2. Patented devices (A–J). Acupressure device name: **A.** Acupressure foot board, **B.** Acupressure device for fingers, **C.** Acupressure and reflexology clamp, **D.** Acupressure device for treating insomnia, **E.** Automatically modulating acupressure device, **F.** Adjustable foot acupressure and pain relief platform, **G.** Electrical plus acupressure system, **H.** Finger acupressure apparatus, **I.** Hand-held acupressure device, and **J.** Massage footwear.

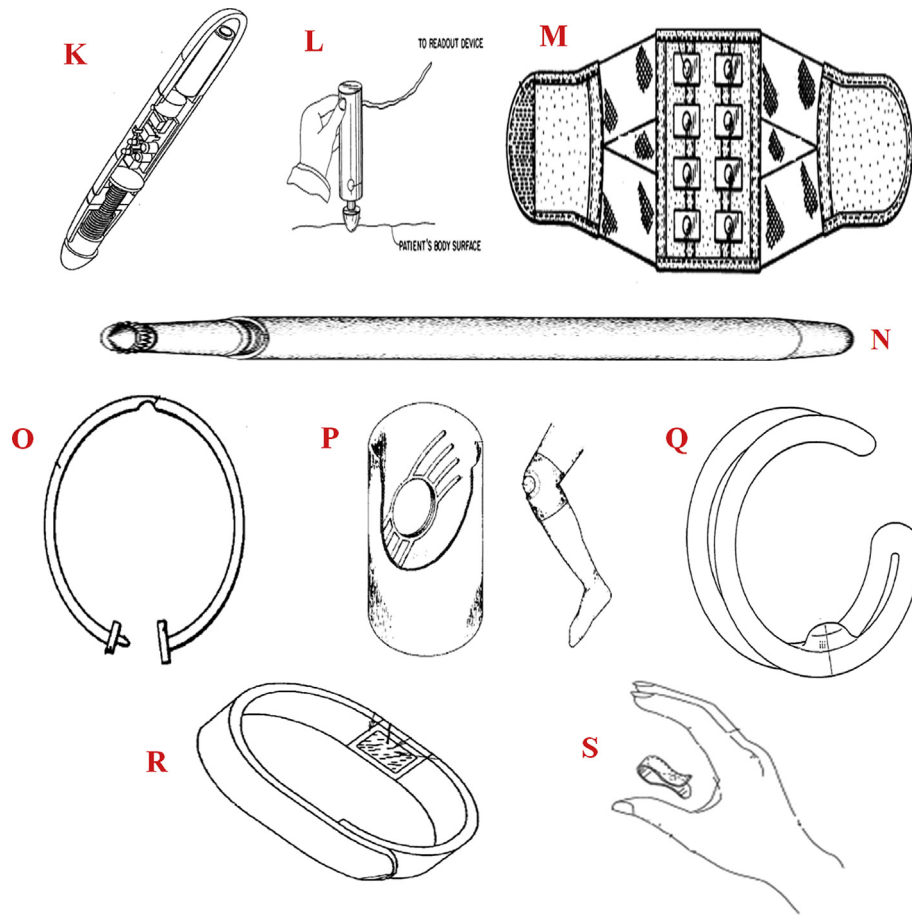


Fig. 3. Patented devices (K–S). Acupressure device name: **K.** Opto-mechatronic acupressure pen, **L.** Quantitative acupressure device, **M.** Spinal acupressure device, **N.** Acupressure instrument for applying rolling pressure to the human body, **O.** Acupressure device for ear, **P.** Detachable acupressure device, **Q.** Acupressure ring, **R.** Acupressure apparatus for treatment of soft tissue injuries, and **S.** Acupressure clip.

disease conditions ranging from immune ailments to emotional disorders. It is a complementary treatment which effectively relieves diverse pains while managing multiple symptoms in a variety of patient population.^{92,93} Both, acupuncture and acupressure are effective, safe, simple and economical therapies but acupressure is more people-compliant due to its non-invasive and needle free nature.^{94,95} Acupressure is more compatible to pharmacotherapy due to ease of self-administration. It plays a vital role in pain restoration, promotion of psychological well-being as well as patients' quality of life.⁹⁶ People who are not yet comfortable with needles or when there is need of stimulating more delicate acupoints, acupressure therapy is preferred. Acupressure assists the practitioner to identify the specific acupoints prior to acupuncture with needle. The best part about acupressure is that it provides safe, gentle and emotional touch for promoting the wellbeing in human population.

4.1. Acupressure for women health

Acupressure has proved as a holistic medical toolbox for rejuvenating women health. In female population, acupressure benefits by resolving various menstrual and pregnancy related problems. Acupressure at sanyinjiao point (SP6) work as self-manageable approach to improve women's general health.⁹⁷ Pelvic massage i.e. acupressure though the vagina helps to control hormonal problems, orgasmic malfunctioning in woman.^{98,99} It facilitate various problems like lower back ache,¹⁰⁰ overactive bladder,¹⁰¹ urodynamic stress¹⁰² and active phase of labour pain.¹⁰³ SP6

point acupressure helps to improve the symptoms of dysmenorrhoea in both spasmodic and congestive types.¹⁰⁴ It also offers effective relief from primary dysmenorrhoea.^{105–107} Continuous use of SP6 point acupressure is effective in relieving pain and menstrual distress level resulting from dysmenorrhoea.¹⁰⁸ SP6 and SP8 points acupressure helps to reduce pain severity of dysmenorrhoea up to 2 h after application.¹⁰⁹ Single point LI4 (Hegu),¹¹⁰ LV3 (Taichong)^{111,112} acupoint acupressure also helps to effectively reduce menstrual pain during primary dysmenorrhoea. Collateral meridian acupressure therapy (CMAT) is effective in relieving the associated symptoms of dysmenorrhoea and has to produce a long-lasting effect on dysmenorrhoea.¹¹³ AA is also useful to reduce the pain, anxiety, stress related to peri and early postmenopausal female patients.^{114–116} It helps to relieve the pain of primary dysmenorrhoea.¹¹⁷ With interactive internet instruction, AA helps to reduce the distress in menopause and improve self-care behaviours.¹¹⁸ LI4, SP6 and LI4 acupressure is known to decrease the pain and duration of labour without any adverse effects.^{119,120} KI21 (Youmen) point acupressure more effectively reduces nausea and vomiting occurring in pregnancy.¹²¹ Pericardium 6 (P6) or Neiguan point acupressure relieves morning sickness in pregnant women.¹²² It reduces the frequency of nausea in early pregnancy; in fact it is equivocal with pyridoxine (vitamin B6) without any evidence of teratogenicity.¹²³ Guoshu acupoint pressure therapy is effective on acute mastitis during lactation.¹²⁴ BL32 (Ciliao) acupoint acupressure provide maternal supportive care by reducing delivery pains.¹²⁵ Korean hand acupressure (K-K9) is effective

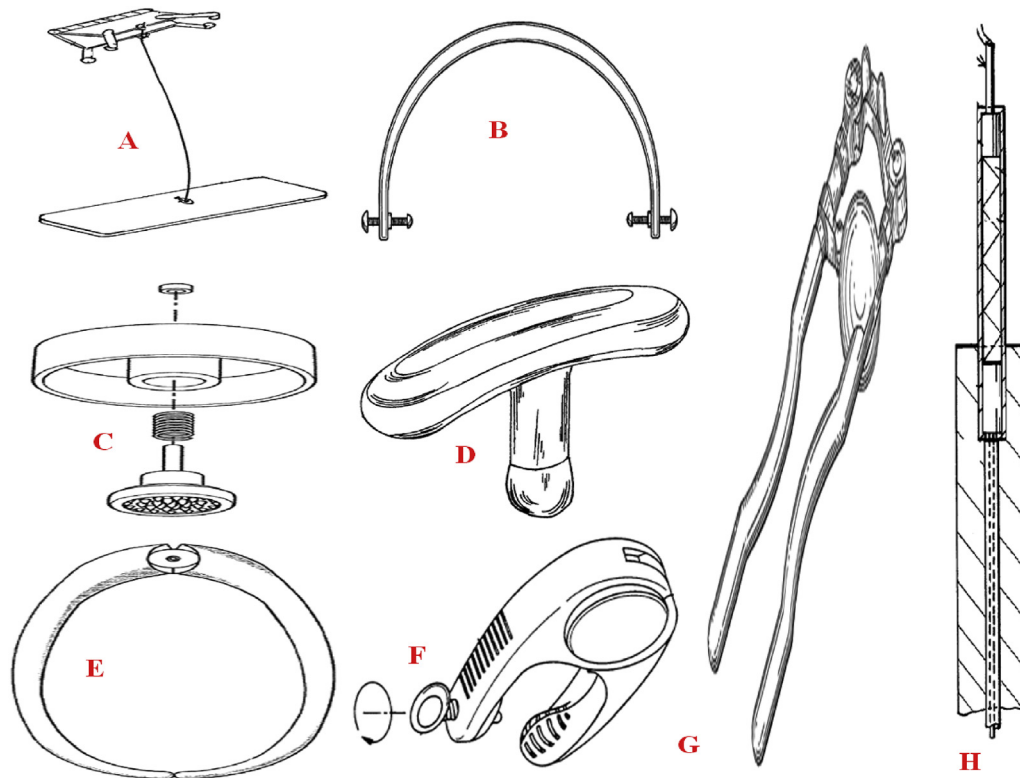


Fig. 4. Patented devices (A–H). Acupressure device name: **A.** Acupressure apparatus with foot control, **B.** Acupressure head clamp⁷⁰, **C.** Acupressure element for cupping device⁷¹, **D.** Handheld acupressure applicator⁷², **E.** Hinged handheld acupressure device⁷³, **F.** Non invasive pain relief apparatus⁷⁴, **G.** Acupressure device⁷⁵, and **H.** Point pressure therapy device.

Table 2
Various *Marmas* and their points.

<i>Marmas</i>	Marma points
Sadya pranahara (fatal) marma	19
Kalantara pranahara (delayed fatal) marma	33
Vishalyaghna (fatal after removal of foreign body) marma	03
Vaikalyakara (disabling) marma	44
Rujakara (painful) marma	08

method for reducing postoperative nausea and vomiting in women after minor gynaecological laparoscopic surgery.¹²⁶

4.2. Acupressure for men healthcare

Similar to women population, acupressure is also helpful in male by work out various sexual problems. The Ren Mai (Conception/Directing Vessel – CV/DV) opens on the midline between anus and scrotum in men. Between anus and posterior labial commissure in women. Acupressure on these points help to improve men's sexual health. They help to resolve problems like infertility and impotence. Ren-6 Qihai is a cardinal point when treating impotence, infertility, prolapse of the bladder or uterus. They are one of the most vital tonification points on the human body. Bladder (BL) 31 to 34 points are also helps to treat genital disorders in men i.e. impotence and prostatitis.¹²⁷

4.3. Acupressure for containment of side effects

P6 point acupressure is well known for controlling nausea, vomiting related to various disease conditions. It helps to improve chemotherapy-induced nausea, vomiting and anxiety.^{128,129} P6 acupressure and acustimulation wrist bands effectively relieves

nausea in many patients.¹³⁰ It effectively reduces the morning sickness, motion sickness and gastric tachyarrhythmia symptoms along with termination of paroxysmal supraventricular tachycardia.^{122,131–133} It moderates vomiting in patients undergoing appendectomy and has proved to be as effective akin to ondansetron (4 mg, i.v.) in preventing postoperative nausea after laparoscopic cholecystectomy.^{134–136} It helps to treat patients with acute vertigo.¹³⁷ P6 acupressure device is effective in improving neurovegetative symptoms and it can be routinely applied to acute vertigo and during labyrinth stimulation.¹³⁸ Sea-Band is the elasticized band available commercially to apply pressure to P6 point as it shows antiemetic action and can be used effectively for treatment of nausea and vomiting in pregnancy.^{12,139} Wristbands are used to reduce the chemotherapy-induced symptoms in gynaecological cancer patients and decrease to antiemetic use after chemotherapy by producing acupressure at point P6.¹⁴⁰ P6 point acupressure reduce the postoperative signs within 24 h after strabismus (surgery to corrects eye muscle function) surgery.¹⁴¹ Pericardium meridian point acupressure helps to treat migraine-associated nausea.¹⁴² P6 acupressure helps to nullify the opioids-induced nausea and accelerate the recovery of patients who are using patient-controlled analgesia after surgery.¹⁴³

Acupressure is well known for controlling the symptoms for patients undergoing chemotherapy. Finger acupressure helps to decrease nausea in breast cancer women undergoing chemotherapy.¹⁴⁴ AA shows positive effect in controlling nausea in children undergoing cancer chemotherapy.¹⁴⁵ Acupressure helps to decrease Persistent Cancer-Related Fatigue (PCRF) in breast cancer patients.¹⁴⁶ Self-administered relaxation acupressure is a another option to control PCRF.¹⁴⁷ Acupressure with or without essential oils also helps to overcome PCRF in patients undergoing chemotherapy for lung cancer.¹⁴⁸ Acupressure at ST36 (Zusanli) acupoint improve a patient's comfort in colorectal cancer.¹⁴⁹ AA with laser

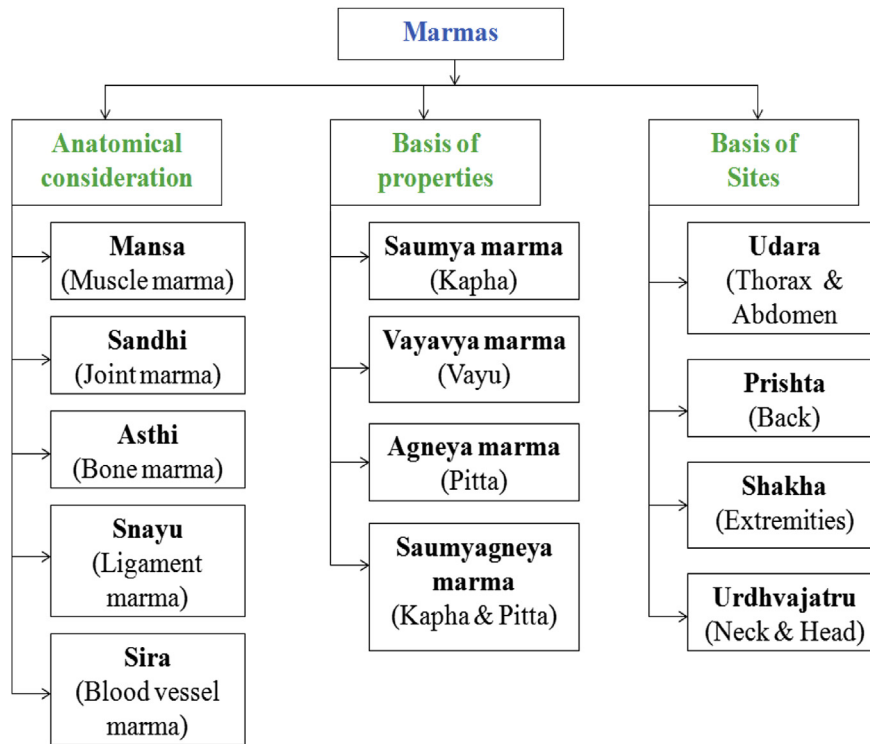


Fig. 5. Classification of *Marmas* points based on anatomy, site and properties.

acupuncture plays a significant role in preventing the spasm of jaw muscle and facial paralysis following cancer therapy.¹⁵⁰ Acupressure with magnetic sticker improved the digestive functions and quality of sleep in gastro enteric tumour patients.¹⁵¹

4.4. Acupressure for obese population

Acupressure was found to be effective in maintaining body weight. Acupressure alone or in combination with other therapies was used to control the body mass index (BMI). Acupressure and cognitive behaviour therapy helps to improve the lifestyles in obese people.¹⁵² AA alone is used to treat overweight along with controlling abdominal obesity, changes of waist circumference and waist-to-hip ratio in young adults.^{153,154} AA is normally combined with various treatments like *Sinapsis alba* seeds,¹⁵⁵ Japanese magnetic pearls or vaccaria seeds¹⁵⁶ and transcutaneous electrical acupoint stimulation (TEAS)¹⁵⁷ to control BMI in obese people. Auricular point acupressure (APA) is also effective method to control BMI, blood pressure, total cholesterol, triglyceride and leptin or adiponectin.¹⁵⁸ TAT helps to prevent weight regain following successful weight loss.¹⁵⁹

4.5. Miscellaneous applications of acupressure

Nursing professionals may promote and enrich patients' comfort in clinical set up through acupressure.¹⁶⁰ Besides, acupressure is also used to treat emergency conditions like coma, pain, cough as well as asthma.¹⁶¹ Acupressure is alternative non-drug therapy in spinal anaesthesia,¹⁶² lumbar spine surgery¹⁶³ and also aids in controlling postoperative nausea and vomiting in patients undergoing spinal anaesthesia.^{164,165} In addition to physical discomfort, acupressure helps to improve mental health of patients. AA and acupressure using the National Acupuncture Detoxification Association protocol (stimulation of 5 points in each ear, sympathetic

nervous system, liver, kidney and lung) benefits by improving mental health benefits.¹⁶⁶ This protocol is well-known as *Acu Detox* technique. Acupressure helps to recover patients from psycho-geriatric problems and general psychological distress.¹⁶⁷ It is a non-pharmacological intervention which helps to enhance memory functions and as adjunct treatment for traumatic brain injury.¹⁶⁸ It also overcome sleep disturbances in patients affected by cognitive disorders i.e. insomnia and other sleep disorders and patients suffering from Alzheimer's disease.¹⁶⁹ It also improves the quality of sleep in elderly people.¹⁷⁰

In critical conditions like coma, acupressure helps to resolve the respiratory malfunctions. It is known to elevate the weaning indices of tidal volumes and rapid shallow breathing index in coma patients perusing mechanical ventilation.³⁶ Acupressure is effective as alternative non-drug therapy in various critical conditions like end-stage renal disease COPD for pulmonary rehabilitation via reduction in dyspnoea and stroke.^{171–173} As compared to the contact pressure stimulation (PS), acupressure can exert better therapeutic effects due to improved microcirculatory blood-flow perfusion.⁴¹ In haemodialysis patients, acupressure rectifies the pruritus condition.¹⁷⁴ In paediatric population, it resolves paediatric nocturnal enuresis.¹⁷⁵ In school children, it effectively reduces the physical stress.¹⁷⁶ Acupressure decreases the pressure pain in ischaemic heart disease.⁴⁴ Additionally, acupressure helps to treat various disease complications like angina pectoris,¹⁷⁷ knee osteoarthritis,^{95,178} distal radial trauma,¹⁷⁹ thirst intensity¹⁸⁰ and chronic headache.¹⁸¹ Acupressure is recognized to desensitize patients against potential allergens.⁷⁷ Different types and pharmacological applications of acupressure are given in Table 3.

5. Limitations

As a self-healing technique, acupressure is performed individually by most of the patients. Proper diagnosis and selection

Table 3
Types and pharmacological applications of acupressure.

Type of therapy	Applications	References
Acupressure	UB32 (Ciliao) point acupressure effectively reduce the pain severity.	182
	SP6 (Sanyinjiao) and LI4 (Hegu) point acupressure leads to simultaneous release of lower and upper limb energy and results in the alleviation of pain.	183
	LI11 (Quchi) point acupressure helps to improve the pruritus and lichenification associated with atopic dermatitis.	184
	HT7 (Shenmen) point acupressure reduce higher preoperative anxiety in patients undergoing abdominal surgery.	185
	Jiaji point acupressure quickly relives symptoms of irritable bowel syndrome.	186
Acupressure followed by naturopathy	Helps to control blood sugar level in diabetes.	187
Acupressure or acupuncture stimulation equipment	Complementary use in treating insomnia.	188
Acupressure using an acupuncture pen	Reduce the fatigue in haemodialysis patients.	189
Acupressure, acupuncture and functional training.	Improve the physical capability and intelligence of infantile palsy children.	190
Perineal self-acupressure	It helps to improve the constipation, bowel function and provide the standard constipation treatment options alone.	191
Acupressure and acupuncture	It helps to improve cancer-related fatigue.	192
Valerian acupressure	HT7 (Shenmen), P6 (Neiguan), and KI11 (Yongquan) acupoints helps to improve the sleeping time and quality of ICU patients.	193
Massage-acupressure	Improve the conditions in children undergoing haematopoietic cell transplant (HCT).	194
	Promote relaxation, sleep and relieve stress among parents and enhance the sense of connection between parent and child undergoing HCT.	195
Acupressure, reflexology, or auricular acupressure	Shows significant effect in routine treatment of insomnia.	196
Sweet potato, footbath and acupressure massage (SFA)	Manage constipation and defecation in acute coronary syndrome patients	197
Acupressure combined with interactive multimedia	Helps to improve visual health and related knowledge in school children	198
Acupressure, acupuncture and massage.	Helps to improve conditions of patients in anorexia nervosa and sense of wellbeing also.	199
Acupressure or acupuncture.	Act as adjunct therapy for the treatment of anorexia nervosa.	200
Acupressure and yoga	Control blood pressure in patients with atrial fibrillation.	201
Acupressure and acupuncture	Helps to reduce pain and also increasing satisfaction with pain management.	202
Acupressure hypnotherapy, and transcendental meditation (TM)	Reduced blood sugar of type 2 diabetic patients.	203
Hand acupressure	Helps to reduces postoperative vomiting after strabismus surgery.	204
Magnetic acupressure large intestine (LI4) acupoint	Reduce the severe pain associated with this bone marrow aspiration and biopsy invasive procedure.	205
Active acupressure	Helps to reduce the heart rate very fast and no effect on blood pressure was found.	206
Acupressure (acustimulation) and acupuncture	In children undergoing adenoidectomy or tonsillectomy it helps to control postoperative vomiting.	207
Korean hand acupressure (K-K9)	Effective method for reducing postoperative vomiting in children after strabismus repair.	208
Korean hand acupressure point (K-D2) with capsaicin ointment	Effectively anaesthetist's armamentarium in the prevention of postoperative nausea and vomiting.	209
Acupressure wristband	It is an alternative for morning sickness in early pregnancy.	210
Alternating bi-lateral stimulation (ABLS), with ketamine, acupuncture/acupressure	Effective in prevented vomiting and Bi-Digital O-Ring Test (BDORT) safeguard the patients from unpredictable untoward side effects but also promoting calmness.	211
Pressure right acupressure device with antiemetic drugs	Effectively manage postoperative nausea and vomiting from 0 to 72 h in patient undergoing surgery.	212
Acupressure and acustimulation	Effectively manage symptoms related to Simulation Adaptation Syndrome (SAS).	213
Digital acupressure	Helps to increase capillary arteriolar flow in cerebral pia mater of the dog.	214
Acupressure wristbands	Reduce the level of nausea and vomiting experienced during chemotherapy treatment.	215
Auricular acupressure		
Auricular point acupressure (APA)	Helps to control cancer related pain due its analgesic effect.	216
	Helps to improve pain intensity and physical function in patients with chronic low back pain (CLBP).	217,218
Auricular acupressure (AA)	Reduces the opioids analgesia requirement and improves the knee motion in patients with total knee replacement (TKR).	219
	Improve patients' conditions in painful shoulder syndrome.	220
	Reduce anxiety levels associated with in vitro fertilization (IVF) and improve the outcomes of IVF partly through increasing the levels of neuropeptide Y in the follicular fluids.	29
	Improve postmenopausal insomnia by strengthening cardiac parasympathetic activity.	221
	In haemodialysis patients it helps improve sleep quality for severe insomnia.	87
	In patients with glaucoma it serve as complementary treatment to ameliorate intraocular pressure and visual acuity.	222
	Helps in smoking termination and the management of nicotine withdrawal symptoms.	223
	Improve vascular hypertension conditions by showing biphasic regulatory effects on sinus arrhythmia.	224
	Improve the absorption of naringenin and hesperetin in the extracts form <i>C. aurantium</i> L. in the human body.	225
	Alleviating postoperative pain, decreasing narcotic consumption and promoting early rehabilitation in perioperative period of knee joint replacement.	226
	More effective than herbal medicine, as effective as body acupuncture or antihistamine for short-term effect and more effective than anti-histamine for long-term effect in allergic rhinitis.	227
	Alleviating postoperative pain, decreasing opioids consumption and promoting early rehabilitation in perioperative period of total knee arthroplasty (TKA).	228
	It helps in smoking cessation in college students by decreasing CO, cotinine and nicotine dependence.	229
	Non-invasive alternative option for smoking cessation.	230
	Improve quality of life of Perennial allergic rhinitis (PAR) patients.	231
Ear acupressure	Improved visual health for children.	232

Table 3 (continued)

Type of therapy	Applications	References
AA with a low-calorie diet	Reduced plasma levels of leptin.	233
Ear acupressure and massage therapy	Showed better results than the control group in relation to pain, anxiety and depression.	234
Breathing-based integrative meditation and ear acupressure (IMEA)	Helps in outpatient treatment of cocaine addiction	235
AA with TEAS	It helps to decreased postoperative pain, the use of equianalgesic morphine and morphine-related side effects.	236
Integrative acupoint stimulation (IAS) with patient-controlled analgesia (PCA)	It is help in lumbar spine surgery and can be regarded as a component of multimodal analgesia.	
AA with magnetic pellets	In elderly residential it helps to manage constipation.	237

of appropriate acupoint is the most important task in acupressure. It is essential to take reliable counselling from professional therapist in serious disease condition. It is always better to consult professional acupuncturist in critical conditions involving lung, kidney, heart and other contagious diseases. With specialised techniques and modalities, related education in this field through accredited programs to professionals is essential.⁷⁹ Acupressure should be avoided after meals, alcohol consumption or after taking narcotics. One should not perform acupressure on skin if that is inflamed, injured, scarred or that has a rash.¹⁴

Even if acupressure is non-invasive and easily accessible technique, we have to take special precautions before applying it to pregnant women. Acupoints viz. SP6, SP4, LI4, S36, and points on the abdomen should be completely avoided in case of pregnant women.¹⁴ It was also found that ice massage provided more persistent pain relief in active phase of labour as compared to acupressure.²³⁸ AA was not effective in reducing the postpartum perineal pain in women during the first 48 h after delivery.²³⁹ Acupressure wristband was not enough effective in relieving the labour phase and post-delivery problems.²⁴⁰ Saberi et al reported ginger to be more effective than acupressure in relieving mild to moderate nausea and vomiting in pregnant women up to gestational phase.²⁴¹

Although acupressure modulates blood circulation of the body surface but still it is essential to know the microcirculation at deeper peripheral tissue level.^{40,41,242} In case of serious cardiac problems, individuals should avoid the use of acupressure as slight drop in blood pressure lead to undesirable effects.¹⁴ When hemiplegic shoulder pain occurs due to cardiac stroke, aromatherapy with acupressure is more effective in comparison to acupressure alone.²⁴³ Various acupressure mechanisms and devices are commonly used for containment of the prevailing side effects yet there use is limited. P6 point acupressure is less relevant in reducing the post-operative signs in women undergoing breast surgery, children with strabismus surgery as well as appendectomy.^{134,244,245} Acupressure fails to prevent chemotherapy-induced nausea and vomiting.^{246,247} Acupressure devices like Sea-Band applied to activate P6 point acupressure together with prophylactic ondansetron is not enough to reduce post-operative nausea and vomiting.²⁴⁸ Wristbands exhibited variable results in controlling the post-operative indications after urological endoscopic surgery.²⁴⁹ In case of surgical interventions, acupressure is unable to provide complete relief to patients due to lack of total symptom management in end-stage renal disease (ESRD).²⁵⁰ In tonsillectomy, pre-operative acupressure and acupuncture fails to overcome emesis in children.²⁵¹ Minute sphere acupressure activated P6 (Neiguan), ST36 (Zusanli), SP6 (Sanyinjiao) and SP4 (Gongsun) acupoints are completely avoided in post-abdominal surgery.²⁵² There are reports wherein auriculotherapy caused imaging problems and serious injury during magnetic resonance imaging (MRI) due to presence of magnets at specific locations of the ear pinna.²⁵³

Chronic schizophrenic patients undergoing AA are known to suffer from obesity problems.²⁵⁴

Selection and activation of specific acupoint and pressure to activate particular acupoint is of prime importance. Intensity of pressure has to be modulated in a specified way; high intensity pressure may damage any body part while low intensity pressure may prove inefficient to heal the pain. As significantly low intensity pressure remains inexperienced in patients, it is of less use in the patients. Simultaneous activation of two or more acupoints (LP/DP/TP) should be assessed for its effect on the human body. Selection, activation and pressure application at acupoints in special patient groups like paediatrics, pregnant and menstruating women is still an issue of debate.

6. Conclusion

From last few decades, CAM has fascinated the global health practitioners as well as patients due to several reasons including ease of application, effectiveness, economic aspects and many more. CAM therapies are the real culture specific remedies practised throughout the world. Acupressure is a non-invasive and non-pharmacological intervention with multidimensional roles and benefits. Current investigations substantiate the traditional claims and validate use of acupressure for painless treatment of numerous diseases. Present review appraised the different patented devices and practices with applications in the therapy of various acute and chronic ailments. With modern devices, one can tune intensity of the pressure also. In addition to pain-relief, acupressure devices offer generous advantage of absence of drugs, and consequently, no after adverse effects. To support acupressure (CAM) in the near future and expand CAM therapies, we have to shed more light upon therapeutic functionalities of acupressure and to encourage its practice across the hospitals.

Conflict of interests

The author has no conflicts of interest to declare.

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