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## Review article

## Revisiting reflexology: Concept, evidence, current practice, and practitioner training

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## ABSTRACT

Reflexology is basically a study of how one part of the human body relates to another part of the body. Reflexology practitioners rely on the reflexes map of the feet and hands to all the internal organs and other human body parts. They believe that by applying the appropriate pressure and massage certain spots on the feet and hands, all other body parts could be energized and rejuvenated. This review aimed to revisit the concept of reflexology and examine its effectiveness, practices, and the training for reflexology practitioners. PubMed, SCOPUS, Google Scholar, and SpringerLink databases were utilized to search the following medical subject headings or keywords: foot massage, reflexology, foot reflex-otherapy, reflexological treatment, and zone therapy. The articles published for the last 10 years were included. Previous systematic reviews failed to show concrete evidence for any specific effect of reflexology in any conditions. Due to its non-invasive, non-pharmacological complementary nature, reflexology is widely accepted and anecdotal evidence of positive effect reflexology in a variety of health conditions are available. Adequate training for practitioners is necessary to ensure the consistency of service provided.

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## 1. Introduction

Reflexology is a systematic practice in which applying some pressure to any particular points on the feet and hands give impacts on the health of related parts of the body.<sup>1</sup> Each point of the pressure acts as the sensors on the feet and hands and is links with different parts of body specifically.<sup>1</sup> These sensors will be stimulated by applying the reflexology technique in order to improve the blood and energy circulation, give sense of relaxation, and maintain the

homoeostasis.<sup>2</sup> Reflexology session can be improved by other elements such as aromatherapy, peaceful music, and good environment settings.<sup>3</sup> There is a term in reflexology called reflex zone therapy. Reflex zone therapy is where the body is divided into ten longitudinal zones from head to toe. In the reflex zone therapy, there are five zones on both sides of the body in which each zone diverge down the particular arm, and also continue straight down the body and down the particular leg to line up with a toe on the respective foot. Practitioners usually choose the suitable technique to be applied to the reflex zone therapy to gain optimized efficiency and impact. Reflexology is a complementary therapy instead of an alternative therapy to other treatments which patient already has based on reflexology maps.<sup>2</sup> Complementary therapies nowadays are applied in many of palliative care or to alleviate a problem without dealing with the underlying cause in order to make patient's emotional, physiological, and spiritual health improve and increase the value of their life.<sup>4</sup> Two methods of reflexology that have been accepted internationally are Ingham method and Rwo Shur method. The first method does not use any tools in its practice and the second method utilizes the use of tools such as a wooden stick.<sup>2</sup> There are five theories that support how reflexology gives

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impacts to body health.<sup>5</sup> First and second basic theories are related to energy. Energy theory advocates that body parts can communicate using electromagnetic fields and the communication can be blocked based on the surrounding respectively.<sup>6</sup> Third and fourth theories indicate that energy flow can be restored and the fourth is about the pathway which is blocked can be opened.<sup>7</sup> The last theory proposes that reflexology can break up the lactic acid crystal that usually deposited in the feet and allow energy to flow efficiently.<sup>5</sup>

Modern reflexology technique has been used since 60 years ago and now more scientific and clinical research have been conducted because of their positive effects in reducing and alleviating the symptoms associated with certain diseases. Reflexology gives benefits to certain groups of people and generally does not cause any harmful effects as long as certain precautions are taken by the patients with certain medical circumstances. Each person has a different body system condition, so results from reflexology treatment could differ from one person to another.<sup>8</sup> Based on latest research conducted, reflexology seems to be effective in helping the body systems to return to its natural state.<sup>1</sup> One of the most significant current discussions in reflexology is its effectiveness in tackling several symptoms of diseases.<sup>1</sup> The level of disease conditions and pain are reduced as the patients receive reflexology treatment. It has been suggested by a Swiss study that patients who have undergone reflexology sessions showed a significant decrease in the amount of medication needed.<sup>1</sup> As a complementary therapy, reflexology seems to work better with conventional treatment to treat certain diseases.<sup>8</sup> The most significant current discussions in reflexology practice are related to the aspect of health, safety, and hygiene. Other than that, the principles and practice of reflexology as a complementary therapy is important to make sure the application of this therapy is reliable.

## 2. History of reflexology

Earliest discovery of reflexology was found in Egypt based on the observation of daily life activities including the medical practices.<sup>1</sup> Other studies have reported that reflexology emerges from China for the last 5000 years ago but there is no documentation found, so with the finding of hieroglyphic mural in the pyramid located in Saggara, reflexology is considered as a part of Egyptian culture from 2330 BC.<sup>3</sup> At the late of 14th century, reflexology was already applied throughout the Europe with another name; zone therapy.<sup>9</sup> Father of modern reflexology, Dr. William Fitzgerald (1872–1942) has discovered that zone therapy has been used by Aboriginal American.<sup>9</sup> Jenny Wallace from North American Indians tribes used pressure at the feet as one of the sources of healing process.<sup>9</sup> Fitzgerald study has brought reflexology practice to be widely used in the United States.<sup>3</sup> The discovery of zone therapy was developed from the finding of pressure applied on many parts of body such as hands, nose, ears, and many more can relieve pain sensation.<sup>10</sup> Dr. Joe Shelby Riley from Washington has conducted many studies of therapy including reflexology and has used this therapy for many years.<sup>9</sup> Eunice Ingham (1879–1974) has worked together with Dr. Riley in 1930's as the therapist and work greatly to help people understand reflexology.<sup>8</sup> She shared the technique of reflexology with others by writing many books such as "Stories the Feet Can Tell, Stories the Feet Have Told, and Stories the Feet Are Telling".<sup>9</sup> Reflexology has greater recognition after the emergence of another eminent woman in this therapy world with her book; "Helping Yourself with Foot Reflexology" which reached more than 500,000 copies sold.<sup>9</sup>

## 3. Benefits of reflexology

Reflexology has been chosen by most people to treat their body health problems because it offers high level of safety and

effectiveness. It also offers natural treatment without consuming drugs and it is easy to use.<sup>1</sup> Learning reflexology and its application is quite easy, there is no limitation for people to apply it anytime and anywhere.<sup>1</sup> Its effectiveness in treating the root of some diseases may lead to many benefits in health concern such as it helps in easing day-to-day stresses and alleviates the effects from injury and illness.<sup>1</sup> However, it is not used in diagnosing processes.<sup>11</sup>

Stress contributes up to 80% for the development of any illness. Other 20% of stress will influence other conditions.<sup>1</sup> Reflexology offers common benefits and one of them is reducing stress by applying pressure to the specific area at feet and hands which may induce general relaxation while relaxing the targeted area concurrently.<sup>1</sup> Reflexology is one of the ways to interrupt the pattern of repetitive stress that people usually have according to their lifestyle.<sup>1</sup> They will operate more effective with a number of reflexology sessions because the first application will intervene the stress operation and further sessions will improve the body condition.<sup>1</sup> Besides, reflexology also allows the body to get off from any stress in everyday life.<sup>1</sup>

Pain is a stressor in the body system and any injury occurs to any part of the body will cause the whole system to be stressed.<sup>1</sup> Endorphin is a body's natural pain-relieving chemical will be released as a response to reflexology. Endorphin teaches the body how to adapt any injuries. Those who practice reflexology in their life believe that healing from any injuries comes from the role of reflexology.<sup>3</sup>

It generally improves body health condition and well-being in terms of physical, emotional, and spiritual level.<sup>11</sup> In simple sentence, people choose reflexology because

1. The treatment is free from any drugs and chemical, and it is a wide option for many health problems.<sup>1</sup>
2. Its ability to reduce pain.<sup>11</sup>
3. It helps body to maintain the dexterity and locomotion ability.<sup>8</sup>
4. It promotes general sense of relaxation especially overused or tired hands, feet, and the whole body parts.<sup>2</sup>
5. It stimulates the release of body's pain-relieving chemicals.<sup>1</sup>
6. As a prevention from any illness.<sup>2</sup>
7. It promotes recovery process from any injury particularly at any region at hands and feet.<sup>1</sup>

## 4. Maps of reflexology

Different maps representing the body reflex areas on the palms and feet are presented in this section.

A series of banded reflex area on the top of the left hand represents the left hand side of the body from the top left side of the head to the knee. Specifically, reflex area for lymph glands, groin, and fallopian tubes encircled the wrist<sup>1</sup> (Fig. 1).

This reflex area represents the right side of the body. There is an invisible point at the base of the hand's long bones which is called as waistline.<sup>1</sup> This line divided the hand into two parts. The upper back reflex area lies on the above of the line whereas lower back, hips, and internal organs located below it<sup>1</sup> (Fig. 2).

This reflex area is related to the left side of the body. Reflex area of the spine lies inside whereas the shoulders are positioned outside.<sup>1</sup> The head and neck reflex area are located on the fingers with the tailbone near the wrist<sup>1</sup> (Fig. 3).

Two sides of the body have different internal organs. This makes each reflex area is specifically for certain organs. This reflex area represents the right side of the body. For example, the reflex area for liver is only available on the right side of the palm<sup>1</sup> (Fig. 4).

The reflex area of spine lies on the inside part of the top left foot whereas shoulders on the outside.<sup>1</sup> Lung, chest, breast, and upper back assemble in one reflex area<sup>1</sup> (Fig. 5).

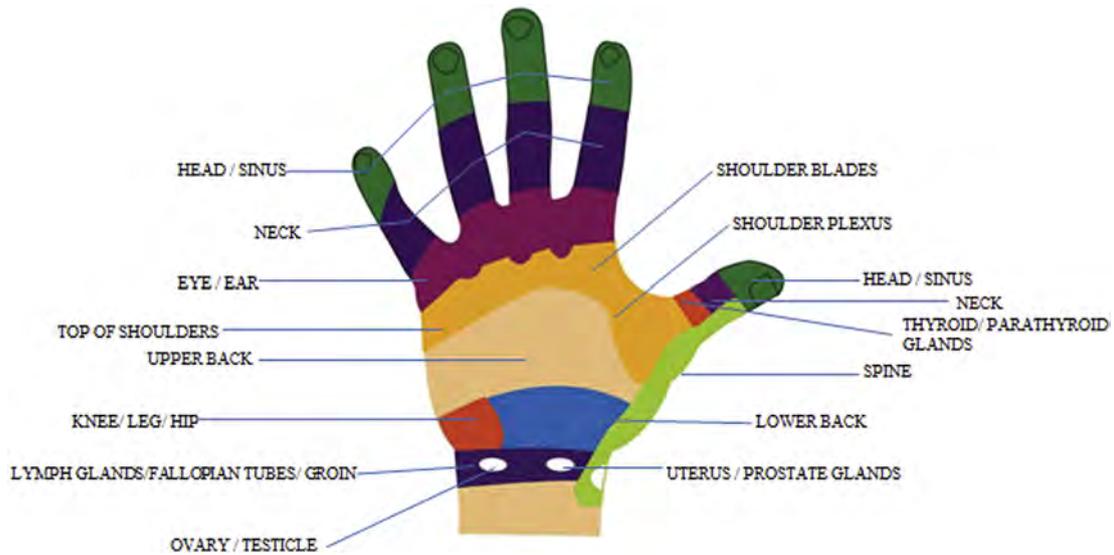


Fig. 1. Top of left hand.

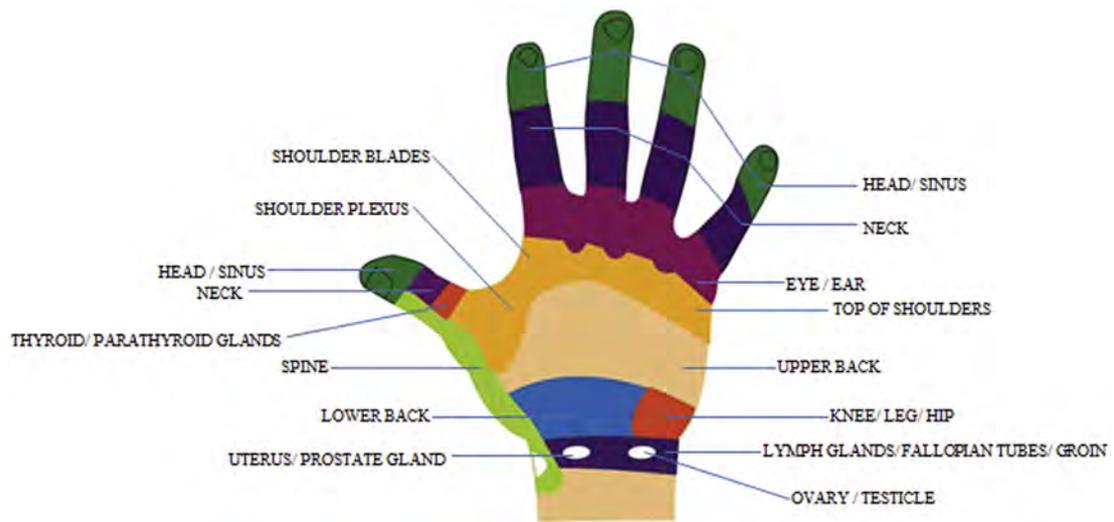


Fig. 2. Top of right hand.

This reflex area relates to the right side of the body including arm and leg. There is a waistline at the point halfway down each foot.<sup>1</sup> The upper back and all organs related to it are positioned above this line whereas lower back and internal organs are located below the line.<sup>1</sup> The lymph gland and groin reflex wrap around the ankle<sup>1</sup> (Fig. 6).

This map represents the reflex area of the right side of the body. For example, shoulder reflex area relates to the right shoulder. Liver reflex area is much larger on the right side compared to the left side due to the position of the liver itself which is mostly on the right side of the body<sup>1</sup> (Fig. 7).

It represents the reflex area of the left side of the body with certain organs involved. The reflex area of heart, stomach, and pancreas are larger on the left sole compared to the right sole because these organs are generally located on the left side of the body<sup>1</sup> (Fig. 8).

## 5. Reflex zone therapy

Reflex zone is the region in the zone therapy that illustrates its interconnection with the whole parts of the body. Pressure applied

to this region will help specific organ or particular part to alleviate the pain and symptoms of a disease. According to the theory, there is an invisible pathway that runs along the body in a vertical form based on the lines instead of reflexology maps in which each point on the soles of hand and feet correspond to a specific organ. Reflex zone therapy (Fig. 9) represents five zones in both sides of the feet.<sup>12</sup> This zone is running along the whole body parts from top of the head until the tips of the toes and fingers and the whole body is divided into ten reflex zones.<sup>12</sup> Each zone interconnects with different parts of the body.<sup>10</sup> Reflex zone therapy-specific organ relationship is presented in Table 1 and Table 2.

## 6. Practice in Malaysia

Currently, the learning centre which provides training for reflexology is very limited. Normally anyone interested to learn reflexology will learn about reflexology through apprenticeship. Recently, Stella In, a local Malaysia training centre offers certification of training in reflexology. This institute was established by the Ministry of Tourism Malaysia as one of the centres of excellent

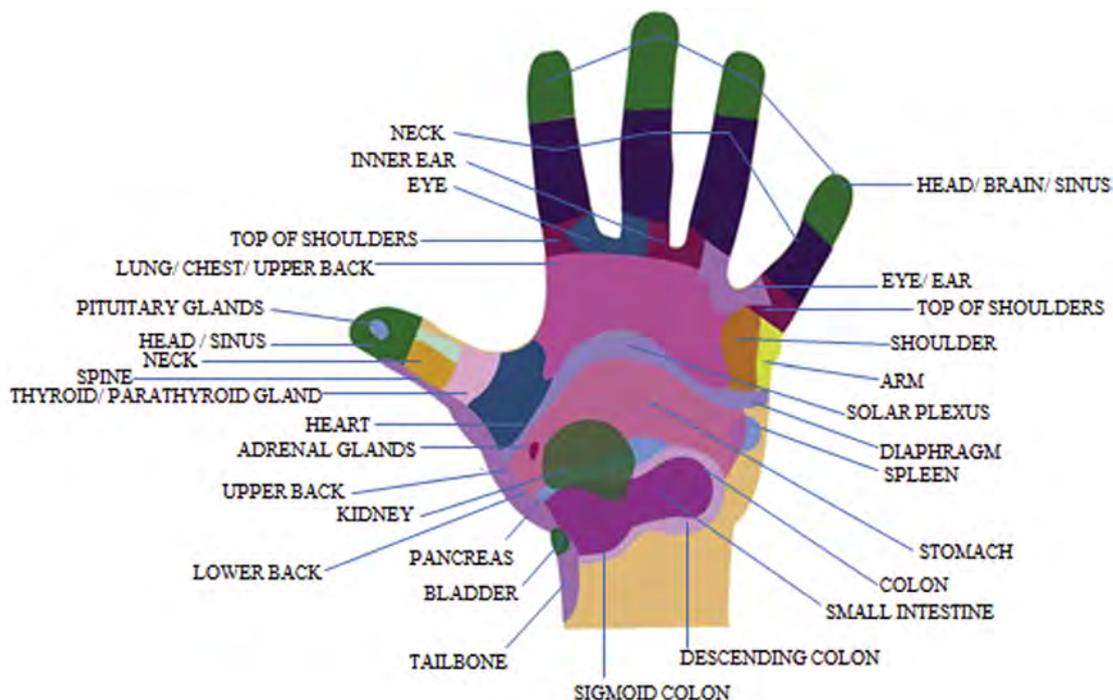


Fig. 3. Left palm.

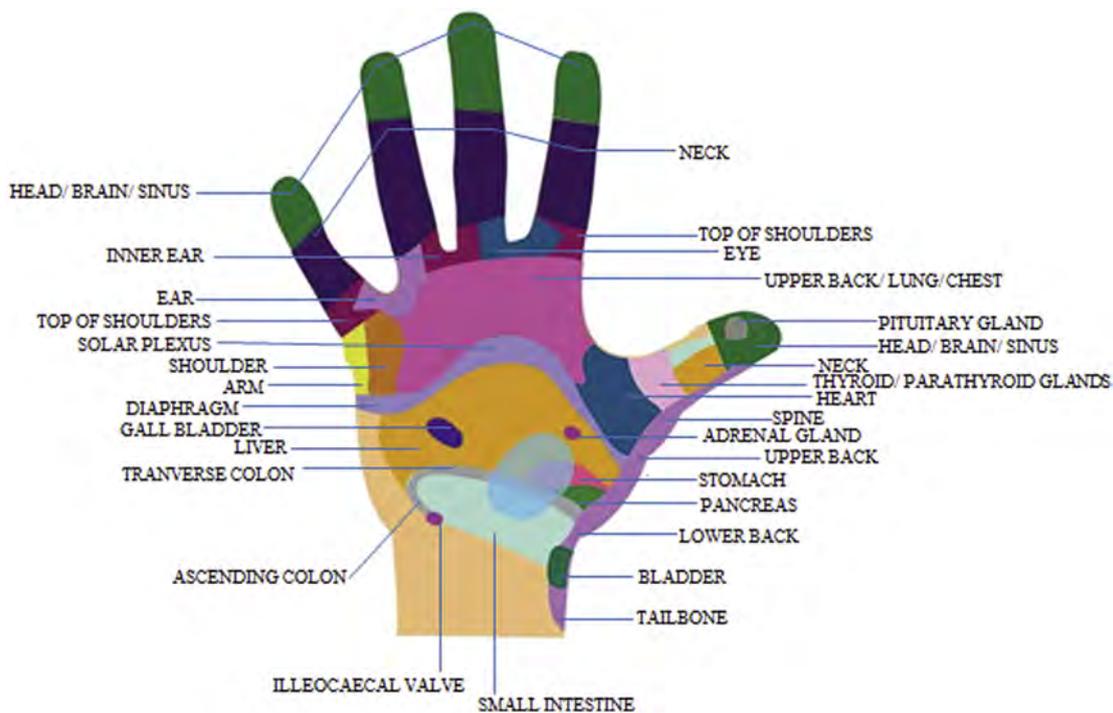


Fig. 4. Right palm.

which offers spa therapy training, specifically for Malaysian, with full job guarantee at any officially approved spa organizations. This institute offers certified qualification of national/international diploma in reflexology foot massage course. Learning about the body zones, feet reflexes, and reflexology techniques which can improve blood circulation, removal of toxins from body, and help to increase the energy level are offered in this course. The teaching techniques include theory and practical.<sup>14</sup>

Another centre called CEPP Wellness Centre also offers 5 days of training courses on reflexology. The tutors in charge for this short course have the qualification as a professional therapy from International Therapy Examination Council, UK (ITEC) which holds a diploma in aromatherapy and holistic massage. They are very committed in helping participants to get the certificate. During this course, different aspects of reflexology theory such as the anatomy of the feet, including bones and muscles, reflex zones of

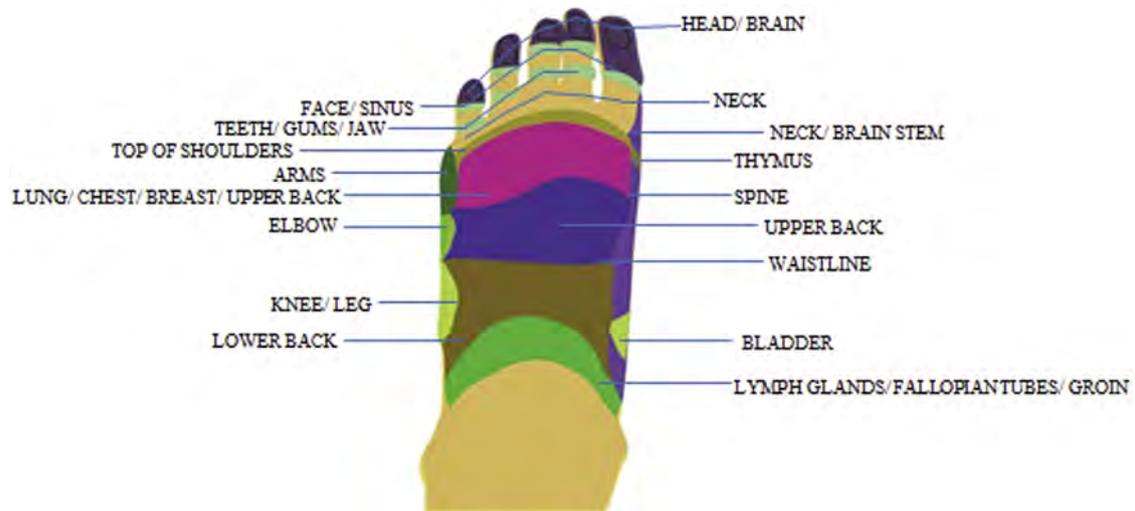


Fig. 5. Top of left foot.

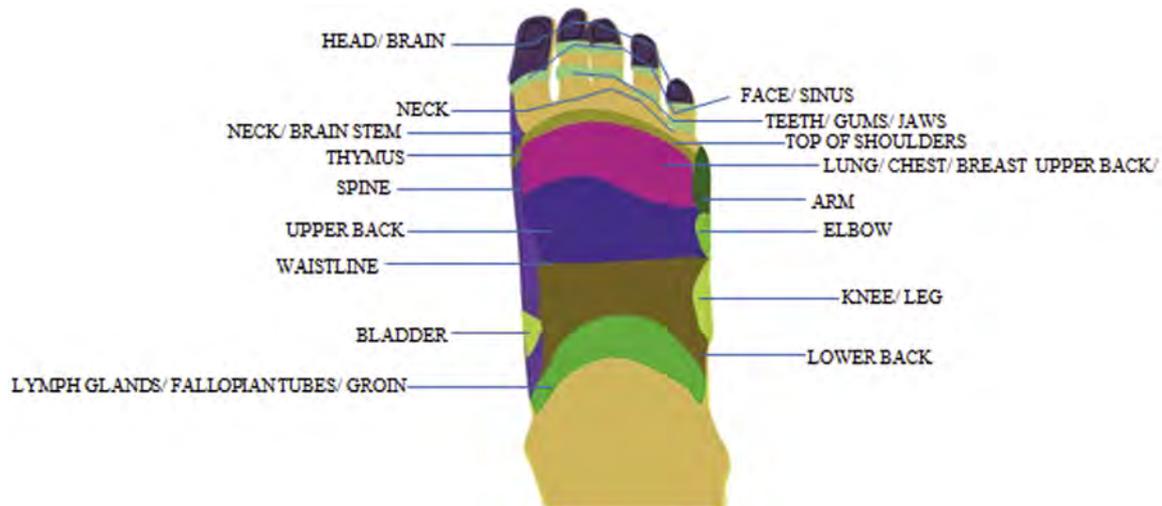


Fig. 6. Top of right foot.

the feet, and others. This course also applies theory and practical session.

For theory session, the teaching includes principle of reflexology, physiological effect of reflexology, various reflex points of the feet, chart theory, zones and cross reflexes, relationship of reflex points to body organs, using reflexology for health and complementary treatment as well as contraindications to reflexology. On the other hand, for practical session, the teaching includes the methods to examine the feet, good hygiene practice, and arrangement of treatment sessions, treatment practicality, assessment and documentation of the client's treatment, consultation as well as individualization of client's conditions.<sup>15</sup>

Another institute that offers a short course of reflexology is Karisma Institute which is a specialist training institute. This institute is registered with the Ministry of Human Resource and Ministry of Tourism Malaysia. This institute offers many courses that are geared towards meeting the market needs. For those who registered as participants at this institute, they are supplied with registration kits which consist of foot reflexology book, reflexology

zone poster, massage cream, and towel. This institute offers 10% lecture class on theory and 90% practical session with demonstration. The overall contents of this short course are introduction to reflexology, human physiology, organs function, consultation, treatment, and entrepreneurship.<sup>16</sup>

Ministry of Health realized that there is a need to control and regulate the practice of reflexology and its centre in Malaysia. Thus in 2011, MOH released a good practice guidance on reflexology.<sup>2</sup>

## 7. Practice in the United Kingdom

International Institute of Reflexology has been conducting reflexology training and course. This institute has acceptable qualification and has been teaching for over 50 years to the highest professional standard. This institute teaches the original Ingham method and it is taught only by tutors who have approved licence from the IIR to ensure that authenticity is maintained. All the graduates have international and European recognition for their training by the addition of City and Guides Level 3.

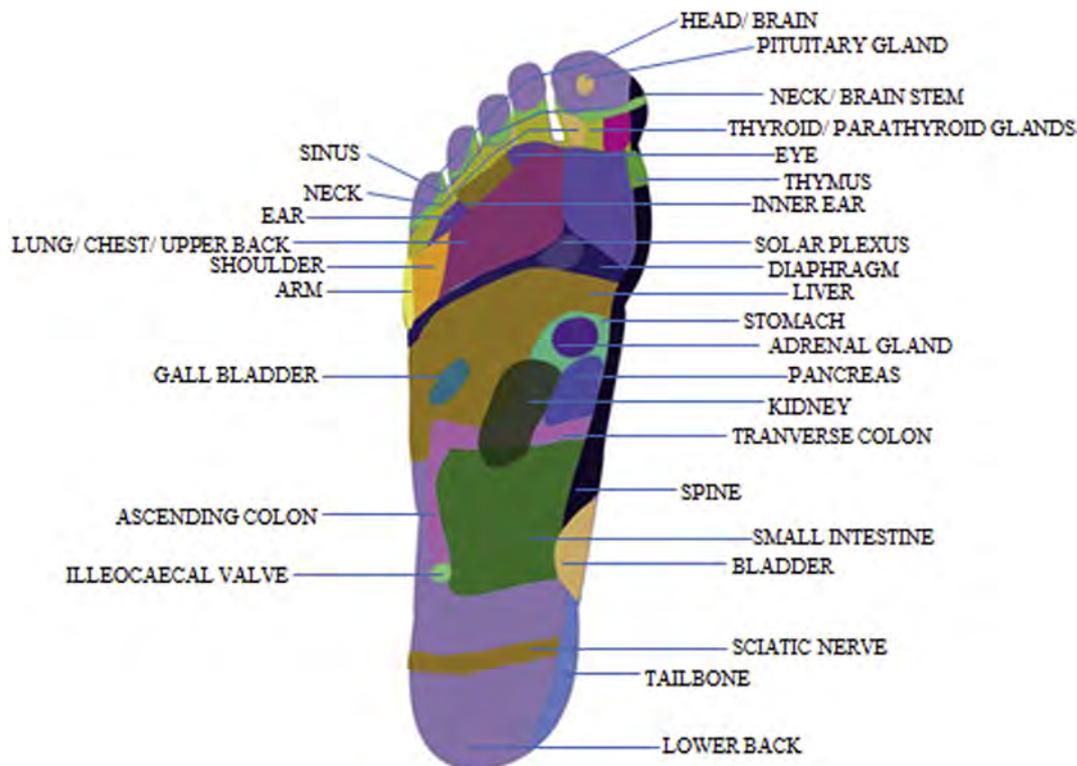


Fig. 7. Right sole.



Fig. 8. Left sole.

This institute offers level 3 diploma reflexology course, reflexology introduction, bridging course, anatomy and physiology, limbic reflexology, neuroflexology, and vertical reflex therapy.

The course is accredited by ITEC. This institute conducts this course with external written exams set and marked by the awarding body.<sup>17</sup>

## 8. Practice in Australia

In Australia, Melbourne Polytechnic offers reflexology course for the students and accredited with Diploma of Reflexology. In this course, students will learn the skills to assess and treat the body, supporting its search for natural balance and well-being. It also

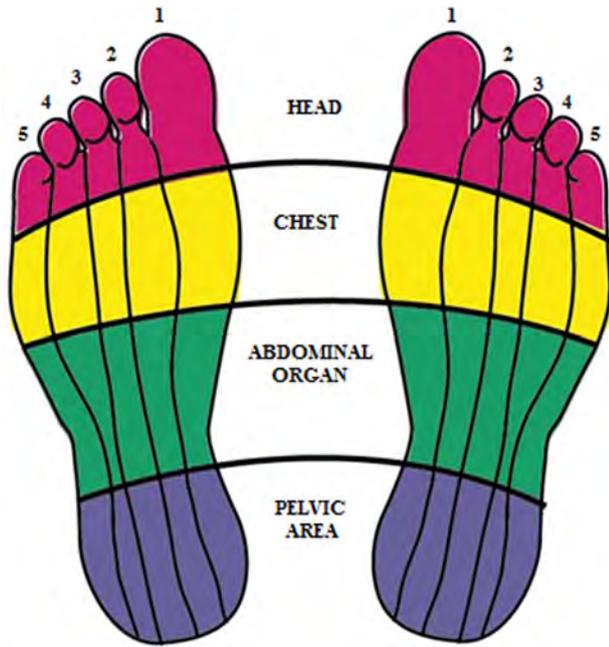


Fig. 9. Zone therapy reflex.

includes how to develop specific skills in reflexology techniques, learn to provide clients with basic dietary guidance, and learn the necessary health terminology about chronic disease. The qualification from this institute is valid for the membership of national organization such as the Reflexology Association of Australia and also can be used for further studies in complementary medicine.

Diploma of Reflexology has two specializations: Diploma of Clinical Reflexology and Diploma of Chi-Reflexology. These diplomas offer four main modules which include lymphatic drainage reflexology, therapeutic ethics, reflexology for specific group, and home visits.<sup>18</sup>

The Australian School of Reflexology and Relaxation has been rated as Australia's leading specialist reflexology school. It is described as an institution that develops the skills to help others maintain their health condition by reflexology and gives the opportunity to own a business and mentoring and ongoing support are included. Practitioners graduated from this school are

encouraged to set up a business in multimodality or home-based clinics, aged-care or disability services, and corporate or spa industries.

The theory of this course will be delivered in class where the student attendance is compulsory whereas the practice session is home-based study. Diploma course of reflexology from this school covers most aspects needed in reflexology field including professional practices, counselling and communication skills, nutrition and other health modalities, practice management skills, and advanced techniques. This school also provides part-time reflexology course.<sup>19</sup>

## 9. Practice in Thailand

Reflexology in Thailand is abundantly offered even at spas, centres, markets, and chair beside the street because it is widely known as one of the most relaxing therapies. Colorado School of Thai Massage offers a short course of reflexology about the fundamental practice of Thai Foot Reflexology. For those who are interested, no bodywork experience required to join this course.

This short course only takes about 60 min to learn the routine of classic Thai Foot Reflexology, which is originated from Chiang Mai, Thailand, together with an instructor who teaches body mechanics and proper techniques. A basic knowledge of Thai Medicine theory, ancestors, well-known influential figures in Thai healing, and the history of Thai foot reflexology are also taught.<sup>20</sup>

Thai Yoga Massage School in Thailand also offers a foundation for the development of foot reflexologist. It has received authorization from Thai Ministry of Public Health. The course is taught by the vice president of Foundation for Development of Foot Reflexologist Thailand from the beginning until the end of the course. For those who have completed the course and pass the exam, they will be given a membership card of TYMS society which is authorized by Thai Government as the certification and qualification to become a practitioner in reflexology fields.<sup>21</sup>

Phussapa Thai Massage School also offers reflexology training course. The educational systems available for this course are basically the theory, practice, and examination. This institution has the authorization from Thai Ministry of Education. The main curriculum included in this course is the general subject of reflexology such as the history of foot massage, basic knowledge of reflexology map, safe and proper foot massage, necessary equipment, and advice after session. For the practice session, a full session of one-

**Table 1**

The relationship of left side of reflex zone with its corresponding organs.<sup>13</sup>

Meridian	Reflex zone	Corresponding organs
Line 1	Left thumbs and big toes	Pituitary, pineal, brain, hypothalamus, thyroid, sinuses, larynx, nose, trachea, tongue, oesophagus, thymus, heart, spine, pancreas, breast, small intestine and large intestine, prostate
Line 2	Left index finger and second toe	Brain, eye, adenoids, lungs, heart, stomach, spleen, pancreas, breast, small and large intestine
Line 3	Left middle finger and third toe	Brain, eye, lung, breast, stomach, spleen, pancreas, kidney, adrenal gland, small and large intestine
Line 4	Left ring finger and fourth toe	Brain, eye, lungs, breast, large intestine, ovaries
Line 5	Left little finger and fifth toe	Ear

**Table 2**

The relationship of right side of reflex zone with its corresponding organs.<sup>13</sup>

Meridian	Reflex zone	Corresponding organs
Line 1	Right thumbs and big toes	Pituitary, pineal, brain, hypothalamus, thyroid, sinuses, larynx, nose, trachea, tongue, oesophagus, thymus, heart, spine, pancreas, breast, small intestine and large intestine, prostate
Line 2	Right index finger and second toe	Brain, eye, lung, breast, liver, small and large intestine, adenoids
Line 3	Right middle finger and third toe	Brain, eye, breast, liver, gall bladder, kidney, small and large intestine, adrenal gland
Line 4	Right ring finger and fourth toe	Brain, eye, main lymphatic duct, breast, liver, lung, large intestine, ileo-cecal valve, appendix
Line 5	Right little finger and fourth toe	Ear

hour foot massage and cool down massage is taught. The examination will be in written and practice format. After the completion of whole school course, the certificate will be issued.<sup>22</sup>

## 10. Different applications of reflexology and the effects of reflexology

The findings by a recent study have confirmed the efficacy of reflexology by recording 31% of pain reduction among the patients with back pain. Quinn et al. reported that the pain intensity score decreased to an average extent in the experimental group.<sup>23</sup> Poole et al. demonstrated that there was a significant difference between the control and experimental groups before and after the reflexology treatment.<sup>24</sup>

A statistic has showed that there are more than 5000 registered reflexology centres in Malaysia. Currently, reflexology is a big industry in Malaysia with a huge unexploited potential for tourism and human capital, especially for disabled people. Owing to that, Ministry of Health has published the good practice guidelines for reflexology in 2011 to strengthen and govern its operations.<sup>2</sup> Different use of reflexology and the effect of reflexology are listed below:

### 1. Low back pain management

A study by an author found that patients who suffered from low back pain usually show good effect in terms of their pain management when they have reflexology as the complementary treatment.<sup>25</sup> In this study, the author used VAS scores to indicate the level of pain of the patient. The author added that this complementary treatment can be used as one of the treatment to reduce low back pain but further study on it must be conducted.<sup>23</sup>

### 2. Migraine/headache

Patients were referred to a physiotherapist for the six months and the effect of the therapy was recorded by several methods such as qualitative interviews, headache diaries, and questionnaire. The results came out with 55% of them experienced relief, 23% expressed no further recurrence of symptoms, and the rest 11% stopped taking their medications.<sup>26</sup>

### 3. Stroke

Stroke is the condition where the blood supply to the brain is interrupted because of some reasons that may cause many health problems.<sup>27</sup> It usually occurs due to blood vessels ruptures. Many patients have tried reflexology as the alternative therapy in order to recover from strokes. The practitioners believe that pressure that they exerted on a particular point on reflex areas may induce a positive outcome and physical changes to the body.<sup>28</sup>

### 4. Stress reduction

In 2000, Hayes and Cox published a paper in which they described that there are significant reduction in stress in which can be determine by measuring the heart rate, respirations, and mean atrial blood pressure of the patients who have about two to three sessions of five minutes foot massage.<sup>29</sup>

### 5. Multiple sclerosis

An author found that a patient who afflict multiple sclerosis and choose reflexology as the complementary treatment for a period of time had notable symptom relief. It is measured by considering

urinary symptoms, parenthesis, spasticity, and muscle strength as the parameters. All parameters showed a remarkable improvement except for muscle strength.<sup>30</sup>

### 6. Peripheral neuropathy in diabetes mellitus

Previous research has showed that reflexology can reduce the peripheral neuropathy of a patient who suffers from type 2 diabetes mellitus.<sup>31</sup> 76 patients ranged from 40–79 years old were listed from public health centres in Busan City. Tactile response to monofilament and intensity of the symptoms of peripheral neuropathy were used as the variable outcomes in this study. Tingling sensation and pain were reduced and tactile was more sensitive to 10 g force monofilament.<sup>32</sup> The author added that the reflexology can be used as one of the interventions for encouraging foot care in patients who have diabetes mellitus.<sup>32</sup> It also can be measured based on glycaemic control and nerve conductivity which show improvement with reflexology.<sup>31</sup>

### 7. Asthma

20 asthmatic patients were chosen to be the subject for active treatment and another 20 patients were chosen to have reflexology session. According to a recent research conducted by the author, there are no significant differences between the groups having active session and placebo session of reflexology.<sup>33</sup> However, when the analysis of the symptoms diaries was carried out, the results showed that there were significant differences between both groups especially when it was conducted together with subconscious unblinding pattern of study.<sup>33</sup>

## 11. Evidence-based practice

From ten systematic reviews, it is safe to conclude that until now reflexology does not have sufficient evidence to support its clinical use.

There are also many conditions of patients where we need to avoid applying reflexology because it will give unwanted adverse effects.

### 1. Pregnancy but only for the first trimester period

Practitioners may be accused to have caused the case if there is unlucky miscarriage after the therapy. So practitioners must take the precaution steps by avoiding patients in their first trimester of pregnancy.

### 2. Diarrhoea and vomiting

Reflexology may cause overstimulation of the body system and may exasperate the condition of the infections. {Traditional and Complementary Medicine Division, 2011 #340}

### 3. Localized skin disease at hand, feet, and ears

Hand, feet, and ears are the area of reflexology. If there are infections on this area, reflexology can be hurtful and exasperate the existence conditions.<sup>2</sup>

### 4. Localized inflammation or swelling of the feet, hand, and ears

Similar situation will happen as the skin diseases worsen due to the practitioner's hand or finger motion on the area of therapy.<sup>2</sup>

### 5. Fever and any infectious diseases whether systemic or localized

In order to fight the infection, the body system which is already stressed will be over stimulated in the patient who suffers from any infections and at the same time having this therapy.<sup>2</sup>

#### 6. Continuing extreme negative reaction to reflexology

If the patient feels uncomfortable and their body health continuously worsens after having this therapy, it is advisable to reconsider the suitability of reflexology for the client.<sup>2</sup>

### 12. Challenges and limitation of research and the practice of reflexology

The literature on reflexology is only beginning to emerge since early 1990. Several methodological shortcomings in the previous studies of reflexology safety and efficacy are worth mentioning. Firstly, the number and the methods of reflexology treatment given are not standardized. Furthermore, most studies have small sample size (around 20 participants).

The recently increased demand for evidence-based practice challenges the researchers to provide a relevant but holistic assessment of reflexology. Despite the recent vast use of reflexology, minimal attention has been given to the ethical issues related to the research on reflexology. In the view of public health and safety, we argue that the research on reflexology should adhere to the same ethical requirements for all clinical research.

The proper design, control, and intervention protocols of research on reflexology remain debatable. The use of randomized controlled trials (RCTs) is the golden standard in assessing the efficacy of complementary therapies such as reflexology.<sup>34</sup> Verhoef et al. have described the challenges when researching complementary therapies: standardization of regimented treatment that limit the individualization of treatment; client's focus on health with restricted roles for disease treatment; ethical issues involving the recruitment and randomization due to participants pre-conceived belief on reflexology; practicality of applying sham reflexology; interference of psychological influence on rapport between patient-provider.<sup>35</sup>

### 13. Recommendation for future research

RCTs have a vital role in the assessment of efficacy in reflexology. However, they only address the effect of reflexology in which other pertinent issues are unexplored such as the mechanism of reflexology, psyche, and the experience of participants receiving reflexology. Nursing research has long used qualitative research to explore various health care phenomena. Similarly, qualitative approach can provide further understanding about the patient's perception and belief towards reflexology.<sup>4,36</sup> Qualitative research also assists in understanding the impact of the context and the process of reflexology intervention. A greater understanding of reflexology intervention has the potential to enhance the delivery of health care. Thus, it is argued that qualitative explorative methods combined with RCTs could potentially reveal the contributing factors of reflexology effect.

### 14. Proposed practice

Reflexology practice should be implemented as a complementary therapy in developed countries due to its functions which can give many benefits to body health condition. Recent lifestyles cause the body to adapt to so many stressful effects. With the basic of reflexology which can be done by ourselves, it helps to improve the performance in our life day by day.

In Malaysia, reflexology has been applied widely but without any certification and qualification from the Ministry of Health. Tighter control is needed to overcome this problem. Practitioners who conduct this therapy may not have the accurate knowledge about reflexology and may lead to any contraindication for certain conditions. The government should take serious enforcement about this practice among practitioners who are not certified. Each practitioner must have a proper training. The ministry of education could provide vocational training in the local community colleges throughout Malaysia to upgrade the skills and knowledge of reflexology practitioners.

Changes should be implemented immediately instead of in stages, so that patients can go to any reflexology centre without any doubt. The entire centres, spas or even small booth that offer reflexology treatment must obtain a certificate from the Ministry of Health. It is suggested that each centre to have a medical form about patient's details, medical history, and screening form. It is already issued by the Ministry of Health but none of the centres has ever applied.

To make sure all people are aware of this problems and benefits of reflexology, the Ministry of Health should organize awareness programs such as talks, offers class for reflexology practitioners with low fees, and campaign about the importance of having correct reflexology technique with recognized premises. A reflexology practitioner association is yet to be formed. Any case of problems happen related to reflexology in this country can be referred to this organization.

### 15. Conclusions

Reflexology practitioners and the professional association have advocated that reflexology is effective for general well-being maintenance and treatment of chronic diseases such as strokes, musculoskeletal disorders, and stress. Due to its soothing massage and non-drug complementary nature, reflexology is widely accepted by general public. Yet, numerous systematic reviews confirmed that strong evidence of the positive effects of reflexology postintervention are lacking despite plenty reported small-scale trial and anecdotal evidence of reflexology for some common ailments. Adequate training of practitioners and reflexology programme accreditation are to ensure correct and consistent services are provided.

### Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this article.

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### References

1. Kunz B. *Reflexology Health at Your Fingertips: Hands-on Treatment for Vitality and Well-being*. 2003:160.
2. Traditional and Complementary Medicine Division. *Practice Guideline on Reflexology for Reflexologist Practicing in Malaysia*. Ministry of Health Malaysia; 2011. Available from: <http://tcm.moh.gov.my/v4/pdf/guideline/GPGOnReflexology2011.pdf>. Accessed 03.05.15.
3. Blunt E. Foot reflexology. *Holist Nurs Pract*. 2006;20:257–259.
4. Gambles M, Croke M, Wilkinson S. Evaluation of a hospice based reflexology service: a qualitative audit of patient perceptions. *Eur J Oncol Nurs*. 2002;6:37–44.

5. Cade M. Reflexology. *Kans Nurse*. 2002;77:5–6.
6. Kunz K, Kunz B. Understanding the science and art of reflexology. *Altern Complement Ther*. 1995;1:183–186.
7. Stephenson NL, Dalton JA. Using reflexology for pain management. A review. *J Holist Nurs*. 2003;21:179–191.
8. Dougans I. *Complete Illustrated Guide to Reflexology*. 2nd ed. London: Element; 2002.
9. Bisson DA. *N101-Foot Reflexology Course*. Ontario College of Reflexology; 2001.
10. Raddington DD. *History Dr. William H. Fitzgerald M.D.*; 2009. [http://www.reflexologyinstitute.com/reflex\\_fitzgerald.php](http://www.reflexologyinstitute.com/reflex_fitzgerald.php). Accessed 21.11.14.
11. Xavier R. Facts on reflexology (foot massage). *Nurs J India*. 2007;98:11–12.
12. Bhojraj H. *Zone Therapy & Reflexology Body Balance*; 2014. <http://bhojraj.tripod.com/zoner.html>. Accessed 21.11.14.
13. Minckler J. *Energy Balancing Zone Therapy*; 2014. <http://www.energybalancing.com/about/contact%20us.html>. Accessed 21.11.14.
14. Stella International. *Stella In International, Advance Aesthetic Academy*; <http://www.stella-in.edu.my/>. Accessed 04.12.14.
15. Othman NZ, Zainol NA, Taher ZM. In: Malaysia UT, ed. *A 5 Day Course Reflexology Massage*. UTM Skudai, Johor Chemical Engineering Pilot Plant Universiti Teknologi Malaysia; 2010. [http://www.cepp.utm.my/files/filestorage/31124\\_sc\\_reflexologymassage10.pdf](http://www.cepp.utm.my/files/filestorage/31124_sc_reflexologymassage10.pdf).
16. Institut Karisma. *Foot Reflexology*; 2014. <http://www.institutkarisma.edu.my/en-us/home.aspx>. Accessed 05.12.14.
17. International Institute of Reflexology. *The Only School Licensed to Teach the Original Ingham Method of Reflexology*; 2014. <http://www.reflexology-uk.net/site/>. Accessed 06.12.14.
18. TAFE) NNMlo. *Diploma in Reflexology*. 2014. Accessed 06.12.14.
19. Australian College of Chi-Reflexology. *Where the Wisdom of the East Meets the Practicality of the West*; 2012. <http://www.chi-reflexology.com.au/index.php>. Accessed 06.12.14.
20. Colorado School of Thai Massage. *Sharing the Art and Practice of Traditional Thai Healing*; 2014. <http://www.mettawellnesscenter.com/#!thai-foot-reflexology/c19kx>. Accessed 06.12.14.
21. Yoga Massage School of Thailand. *Thai Traditional Medical Services Society Bangkok Branch & Foundation for Development of Foot Reflexologist (Thailand)*. 2013. Accessed 06.12.14.
22. School PTM. *Reflexology*; 2009. [http://www.thaimassage-bangkok.com/nuat1\\_egl.htm](http://www.thaimassage-bangkok.com/nuat1_egl.htm). Accessed Dec, 2014.
23. Quinn F, Hughes CM, Baxter GD. Reflexology in the management of low back pain: a pilot randomised controlled trial. *Complement Ther Med*. 2008;16:3–8.
24. Poole H, Glenn S, Murphy P. A randomised controlled study of reflexology for the management of chronic low back pain. *Eur J Pain*. 2007;11:878–887.
25. Chen CK, Nizar AJ. Myofascial pain syndrome in chronic back pain patients. *Korean J Pain*. 2011;24:100–104.
26. Samuel C. *An Investigation into the Efficacy of Reflexology on Acute Pain in Healthy Human Subjects*. University of Portsmouth; 2011.
27. Conrad C. *Reflexology for Stroke Patients*; 2014. Available from: <http://www.livestrong.com/article/551967-reflexology-for-stroke-patients/>. Accessed 30.09.14.
28. Hall P. *Reflexology for Stroke Issue 81*; 2002. <http://www.positivehealth.com/article/reflexology/reflexology-for-stroke>. October 2002 2014.
29. Hayes JA, Cox C. Immediate effects of a five-minute foot massage on patients in critical care. *Complement Ther Nurs Midwifery*. 2000;6:9–13.
30. Siev-Ner I, Gamus D, Lerner-Geva L, Achiron A. Reflexology treatment relieves symptoms of multiple sclerosis: a randomized controlled study. *Mult Scler*. 2003;9:356–361.
31. Dalal K, Maran VB, Pandey RM, Tripathi M. Determination of efficacy of reflexology in managing patients with diabetic neuropathy: a randomized controlled clinical trial. *Evid Based Complement Altern Med*. 2014;2014:843036.
32. Jeong IS. Effect of self-foot reflexology on peripheral blood circulation and peripheral neuropathy in patients with diabetes mellitus. *J Korean Acad Fundam Nurs*. 2006;13:225–234.
33. Brygge T, Heinig J, Collins P, et al. Reflexology and bronchial asthma. *Resp Med*. 2001;95:173–179.
34. Miller L, McIntee E, Mattison P. Evaluation of the effects of reflexology on quality of life and symptomatic relief in multiple sclerosis patients with moderate to severe disability: a pilot study. *Clin Rehabil*. 2013;27:591–598.
35. Verhoef MJ, Casebeer AL, Hilsden RJ. Assessing efficacy of complementary medicine: adding qualitative research methods to the “Gold Standard”. *J Altern Complement Med*. 2002;8:275–281.
36. Ross E, Schulze S, van Niekerk MP. Facilitating phenomenological interviewing by means of reflexology. *Curationis*. 2005;28:69–81.