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Reflexology

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Abstract

Reflexology is the practice of applying pressure to particular points on the ears, hands and feet to impact the health of specific parts of the body. It is a form of complementary therapy that is used for diseases and conditions that have long lasting symptoms and need pain management. In reflexology, each pressure point acts as a sensor on the feet and hands and is linked with organs, glands and muscles in specific parts of the body. It involves the idea that a force or energy is flowing along paths, called meridians, in the body to all organs and any kind of blockage in this flow will lead to an impairment of function. The purpose of reflexology is to normalize the body's function, break down tension, alleviate stress, and improve nerve function and blood supply throughout the body. The specific physiological mechanisms of reflexology are unknown, however, this practice has shown benefits in a wide variety of medical conditions.

Keywords

Reflexology, Alternative Medicine, Massage

Disciplines

Alternative and Complementary Medicine | Analytical, Diagnostic and Therapeutic Techniques and Equipment | Medicine and Health Sciences

Comments

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Reflexology

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INTRODUCTION

Reflexology is the practice of applying pressure to particular points on the ears, hands and feet to impact the health of specific parts of the body (Embong et al., 2016). It is a form of complementary therapy that is used for diseases and conditions that have long lasting symptoms and need pain management (Ozdelikara et al., 2018). Reflexology originated out of China in about 4000 BC and the first recorded history of reflexology in practice took place in Egypt in 2330 BC (Joseph et al., 2004). It is an ancient practice constructed around the idea that all body structures are interlinked with specific reflex points on the hands and feet (Hudson et al., 2015). It is stated in traditional Oriental medicine that on the entire human body, there is no area that can be stimulated by pressure and massage without causing a physiological response in the body (Lu et al., 2011). In the 1930s, Eunice Ingham, a nurse and physiotherapist who is considered the “Matriarch of Western reflexology”, published detailed maps of reflex points on the feet and established training for medical professionals (Mackereth et al., 2009).

In reflexology, each pressure point acts as a sensor on the feet and hands and is linked with organs, glands and muscles in specific parts of the body (Chen et al., 2019). The purpose of reflexology is to normalize the body’s function, break down tension, alleviate stress, and improve nerve function and blood supply throughout the body (Hughes et al. 2011). Reflex points on the left foot correspond to the relevant organs on the left side of the midline, like the stomach, and points on the right foot correspond to relevant organs on the right side of the midline, like the liver (Rollinson et al. 2016). Zone maps of the hands, feet, and ears have been created to pinpoint where reflex points are located (Bagheri-Nesami et al. 2014). Foot reflexology is centered on the idea that massage of a certain spot stimulates the flow of energy in

the body to a specific area, which can decrease sympathetic nervous system arousal, relieve anxiety and enhance relaxation (Ozdelikara et al., 2018). The specific physiological mechanisms of reflexology are unknown, however, this practice has shown benefits in a wide variety of medical conditions (Embong et al., 2015).

MASSAGE AS REFLEXOLOGY

Massage is an important aspect of reflexology. There are several key differences between massage therapy and reflexology. Both practices involve small movements applied to specific areas of the body, although massage is usually performed on larger muscles. When the reflex points are stimulated by reflexology massage, it may stimulate blood flow, nerve impulses, the release of endorphins, the release toxins stored in muscles and organs, and coordinate physiological functions (Bagheri-Nesami et al. 2014). Reflexology provides massage of specific reflex points on the ears, hands, and feet and it is believed that these body parts are connected or the mirror of specific organs and regions of the body (Ozdelikara et al., 2018). Reflexologists believe that when combined together, reflexology and massage have mechanical effects that improve circulation, remove waste products from the body, improve joint mobility, relieve pain and reduce muscle tension (Kaur et al., 2012). Both reflexology and massage are manual methods used to encourage health and healing.

ENERGY

Reflexology of the feet involves the idea that a force or energy is flowing along paths, called meridians, in the body to all organs and any kind of blockage in this flow will lead to an impairment of function (Embong et al., 2016). The energy theory advocates that body parts can communicate using electromagnetic fields and this communication can be blocked. Stimulating

reflexology points can break blockages in the channel flow and cause a release of energy (Babajani et al., 2014). Measuring the electrical conductance can detect the energy distribution of the meridian system (Tsai et al., 2017). Measuring the electrical energy of the skin and its resistance has been used previously to determine the location of meridians (Longhurst, 2010). When there is sympathetic activity, secretions from sweat glands will increase skin conductance and decrease resistance. This shows that there is an increase in electrical conductance with sympathetic activity (Tsai et al., 2017).

It is believed that neural paths in every part of the body can be related and connected to the feet (Ozdelikara et al., 2018). The massaging of soft tissue in a specific spot releases energy in a specific part of the body. This is thought to reduce stress and anxiety, as well as enhance relaxation by increasing the circulation of energy and opening blocked channels. Energy flow causes high levels of attention, good mood, loss of perception of time, and the ability to focus more on a task (Zavarize et al., 2016). The doctrine of the energy balance of meridian structures and ancient reflexology ideologies have become of increased interest to modern medical professionals today (Riad et al., 2013).

ROLE OF AUTONOMIC NERVOUS SYSTEM

The autonomic nervous system is believed to be an integral component of reflexology. The autonomic nervous system controls body processes that are not under conscious control, such as heart rate, breathing and blood pressure (Bruna et al., 2017). It is comprised of the sympathetic nervous system for “fight or flight” responses and the parasympathetic nervous system for “rest and digest” responses. These can fluctuate depending on psychological and physiological conditions. In reflexology, pressure is used to release strain on the skeletal

muscles, which can have a favorable impact on the relaxation and peace of mind (El-Refaye et al., 2017). Sympathetic activity is inhibited by this relaxation, which allows for the activity of the parasympathetic nervous system to take over. The vagus nerve, which is an important part of the parasympathetic nervous system, is a key component to the autonomic nervous system.

Reflexology has been shown to have positive effects on anxiety, stress, heart rate and blood pressure, all of which are modulated by autonomic nervous system function (Hughes et al. 2011).

BENEFITS ON THE ENDOCRINE SYSTEM

The massaging of the reflex points involves a parasympathetic nervous system response induced by the stimulation of pressure receptors in the skin (Diego et al., 2009). The effects of massage therapy on neuroendocrine factors may be brought about by the stimulation of dermal and subdermal pressure receptors that are innervated by vagal neurons. Depending on the pressure exerted during a reflexology session, there may be an increase in sympathetic activity with increased light pressure, whereas with moderate pressure there may be an increased parasympathetic activity (Diego et al., 2009). This suggests that the moderate stimulation of dermal pressure receptors creates an increase in efferent vagal activity. These vagal neurons project to structures involved in autonomic nervous system regulation. Mechanoreceptors, like pacinian corpuscles, within the dermis are innervated by vagal afferent fibers. The parasympathetic nervous system function can specifically affect neuroendocrine function. The increase in parasympathetic activity evoked by deep pressure may explain the diverse benefits that come with the therapy (Diego et al., 2009). A study by Hanjani and colleagues (2015) that focused on the effects of reflexology on women in labor noted that there was a decrease in epinephrine and norepinephrine and an increase of endorphins and inner oxytocin. This induced

uterine muscle contractions which led to a shorter duration of delivery. Reflexological massage also increased production of endorphins and enkephalins. These natural pain killers that can improve mood and relieve pain (Embong et al., 2015).

BENEFITS ON ANXIETY AND STRESS

Patients with anxiety or stress typically experience an elevation in sympathetic nervous system activity and decreased activity in the vagus nerve (Lu et al., 2011). It is hypothesized that reflexology could reverse these symptoms. In the theory of reflexology, the solar plexus, a complex of ganglia and nerves of the sympathetic nervous system located in the pit of the stomach, will calm and relax the entire nervous system, specifically the heart, kidneys and endocrine glands (Hughes et al. 2011). Studies on the effects of reflexology on anxiety in patients following coronary artery bypass surgery (CABS) focused on the reflex points for the solar plexus, hypothalamus gland, pituitary gland, lungs and adrenal glands (Bagheri-Nesami et al., 2014; Abbaszadeh et al., 2018). These reflex points are located on the sole of the foot and are associated with reduction of anxiety (Abbaszadeh et al., 2018). Researchers found that this method was effective in relieving anxiety in CABS patients. Studies have shown that foot reflexology had a statistically significant effect on the level of anxiety of patients (Hughes et al. 2011; Abbaszadeh et al., 2018). Anxiety scores also decreased for patients with Multiple Sclerosis after similar reflexology treatments (Ozdelikara et al., 2018; Mackerth et al., 2009). The release of endogenous opioids, like endorphins, stimulate a positive feeling in the body and can work to decrease sympathetic activity.

BENEFITS ON PAIN

Physiological processes related to pain are also regulated by the action of the autonomic nervous system (Bruna et al., 2017). A study by Babajani and colleagues (2014) looked into whether reflexology massage would decrease the level of pain during chest tube removal after open heart surgery. Foot reflexology on the point corresponding to the heart was effective in reducing pain due to chest tube removal. One theory is that the practice of reflexotherapy works in ways that may cause an increasing pain relief over time (Abbaszadeh et al., 2018). A study that investigated the effects of foot reflexology on elderly patients with back pain showed that the treatment reduces lower back pain and increase functional capacity (Bruna et al., 2017). Patients who have undergone reflexology sessions have shown significant decreases in the amount of medication they require (Embong et al., 2016). A study by Khorsand and colleagues (2015) on the effect of reflexology on pain control and medication consumption after an appendectomy showed that there was a notable decrease in pain intensity and medication use after reflexology. Reflexology, in addition to medication, may be recommended for reducing pain (Dalal et al., 2014; Pinto et al., 2012). In a study looking at the effects of foot reflexology on women in menopause, it was concluded that foot reflexology was an effective technique that improved the quality of life and reduced menopausal symptoms (Pinto et al., 2012). One of the theories that explain this decrease in pain is the gate control theory of pain, which states that activating touch receptors of an area of pain will diminish the painful response because they enter the same spot in the spinal cord and the signal will be confused by the competing stimuli (Hashemzadeh et al., 2019). Major plexuses of the lymph system are located in the hands and feet and compression in these areas can stimulate lymphatic movement, which helps to move toxins and waste out of the

body (Hanjani et al., 2015). This enhancement of the immune system can further intensify pain relief. Reflexology is used in a variety of different medical conditions in order to relieve pain and improve the standard of living.

BENEFITS ON HEART RATE

Heart rate variability is a simple and noninvasive measure of autonomic impulses and is a quantitative marker of sympathetic and parasympathetic balance (Bruna et al., 2017).

Reflexology is known to be beneficial in stabilizing heart rate (Joseph et al., 2004). In patients with varying medical conditions, reflexology is used to improve blood flow and the efficiency of the heart. The massaging of reflex points produces an increase in pressure on the walls of blood vessels in the lower extremities. These blood vessels will have more strength to contract and enhance circulation of blood back to the heart. Subsequently, the heart will work more efficiently to provide the body with circulating blood. A study by Hughes and colleagues (2011) concluded that reflexology led to a higher synchronization between heart rate and respiration. In a study by Kaur and colleagues (2012), there was an increase in the number of participants with a regular heartbeat after reflexology intervention. A study by Chen and colleagues (2019) studied the effects of foot reflexology on heart rate variability in collegiate football players. Researchers found that foot reflexology massage increased cardiac parasympathetic activity and enhanced autonomic nervous system balance. They concluded that reflexology can be used as recovery after exercise. Reflexology has benefits in stabilizing and regulating heart rate (Chen et al., 2015).

BENEFITS ON BLOOD PRESSURE

It has been reported that reflexology has positive effects on the baroreceptor reflex sensitivity and blood pressure (Kaur et al., 2012). A theory of reflexology is “neuro theory” where reflexology and foot massage alter the baroreceptor reflex sensitivity by stimulation the sensory nervous system in the feet (Lu et al., 2011). Baroreceptors sense pressure changes by responding to changes in the tension of the arterial wall. Foot reflexology is shown to provide a significant reduction in baroreceptor reflex sensitivity and a significant improvement in oxygen saturation level. A study by El-Refaye and colleagues (2017) tested the response to foot reflexology on postmenopausal hypertension. They specifically focused on the solar plexus, pituitary, heart, liver, adrenal and kidney reflex points. There was a significant decrease in diastolic and systolic blood pressure compared to pretreatment blood pressure, as well as an increase in oxygen saturation. Those who had repeated sessions were noted to have even lower blood pressure readings, which could be due to a connection to the vagus nerve which regulates restfulness and calmness. These findings show that there are immediate effects of foot reflexology on systolic and diastolic blood pressure and provides immediate relief to patients. Reflexology helps patients maintain blood pressure homeostasis by creating changes in autonomic flow (Kaur et al., 2012). A study by Hughes and colleagues (2011) discovered that there were significant reductions in both systolic and diastolic blood pressure during mental stress following a session of reflexology. These studies of reflexology massage indicate its positive effect on reducing blood pressure and heart rate.

PSYCHOLOGICAL EFFECTS

The practice of foot reflexology involves human touch and the psychosocial benefits of reflexology have shown to be beneficial. Notably, it is a way to enhance the doctor-patient interrelationship. It has been suggested that the positive effects experienced from reflexology could be due to the nature of relationships developed between patients and reflexologists, rather than specifics of the intervention itself (Hudson et al., 2015). Conversely, a study by Flynn and colleagues (2011) used a robotic device that performed reflexology on breast cancer patients. The device can identify reflex locations on a patient's foot and can target specific reflexes rather than providing a generic stimulation. The device separated the human factor from the stimulation of specific reflexes and still caused an improvement in symptom management. This separation is important to uncovering of the specific mechanisms behind reflexology. A study by Nakamaru and colleagues (2008) investigated the cortical relationship between activity in the somatosensory area and sensory stimulation of reflex areas on the foot. This was able to be done using functional magnetic resonance imaging (fMRI). The activated cortical areas during the stimulation of each reflex area were consistent with the somatotopic representation of the corresponding parts in the somatosensory area. Previous fMRI studies of acupuncture revealed the somatotopic mapping of acupoints on the forearm, hand, leg and foot and part of the visual processing areas, which were activated when an acupoint related to visual function was stimulated. Those results indicated that acupuncture had some effects that were not exclusive to sensory stimulation. The results from this study support that claim and indicate that a neuroimaging approach may be a useful procedure for examining the underlying effects of this alternative medical practice (Nakamaru et al., 2008). In a study by Sliz and colleagues (2012),

the impact of reflexology, which is focused upon applying pressure to specific reflex points to invoke a beneficial response at distant body regions, was restricted to the retrosplenial/posterior cingulate cortex brain region, while acute Swedish massage activated two brain regions, the retrosplenial/posterior cingulate cortex and the subgenual anterior cingulate cortex. Cortical stimulation after reflexology differed from after a normal massage which could lead to the idea that reflexology has different underlying effects (Sliz et al., 2012).

Reflexology is a non-aggressive, simple, low-cost, and complication-free method that is generally relaxing and safe for everyone (Abbaszadeh et al., 2018). Sessions are usually short and at little expense, with no special equipment, and no medication required (Lu et al., 2011). Medical treatments have indicated to be an effective way of decreasing the symptoms, however, complementary therapies are now gaining popularity for being simple and cost effective (Pinto et al. 2012). There is a growing tendency towards medication-free methods of pain relief and alternative medicine is believed to reduce the negative effects that can come with medications (Khorsand et al., 2015).

SKEPTICISM AND INCONSISTENCIES

A great number of reflexologists use ancient concepts that do not coincide with the modern medical terminology of anatomy, physiology and biophysics (Riad et al., 2013). This reduces the trust of physicians and causes many professionals to be hesitant to use this form of alternative medicine. There is also an absence of a good theoretical basis that uncovers the mechanisms of interaction of the internal and meridian structures on the body's surface. Many studies have found that there was little to no difference in the effects of reflexology and foot massage. There are significant reductions in pain and anxiety in both, so it is difficult to conclude whether one is more effective than the other. Alternative medicine is increasing worldwide,

however, there are still many skeptics that do not believe they are effective forms of treatment (Riad et al., 2013). There is also much skepticism about the validity of complementary and alternative medicine.

Although reflexology has been shown to provide many benefits, there are still inconsistencies in findings. There is significant variation in the location of reflex points published in reflexology zone maps. Even the founder of western reflexology, Eunice Ingham, changed the location of many of the reflex points throughout her career and she provided no explanation as to how the existence of these pathways could be maintained if the mapped points changed locations (Rollinson et al. 2016). The reliability of most electrical devices for the detection of meridian energy appear to be low as well (Tsai et al., 2017).

Other studies have shown that reflexology had no effect on cardiovascular parameters (Rollinson et al. 2016). The average heart rate and respiratory rate has also been shown to not be affected by reflexology in some studies (Khalili et al., 2015). A study by Mackereth and colleagues (2009) looked into differences when given the treatments of reflexology and progressive muscle relaxation. There was evidence of positive effects in reducing anxiety in patients with Multiple Sclerosis in treatments directly following sessions, but less evidence of differences related to the interim time between treatments. Although there were benefits with both reflexology and progressive muscle relaxation training, it was difficult to distinguish which was more beneficial. Numerous studies found that foot reflexology had no significant effect on physiological parameters (Ebadi et al., 2015; Jones et al., 2013). Most studies of reflexology have small sample sizes and the number of reflexology therapists is low (Ozdelikara et al., 2018).

The discrepancies and variabilities in findings makes many question whether reflexology is a reliable form of medicine and therapeutic treatment.

FUTURE

Today, there is an International Institute of Reflexology that gives training on the ancient practices and how they provide pain relief (Rollinson et al. 2016). Medical professionals are still developing an understanding of the specific physiological mechanisms behind reflexology. If the processes behind reflexology are found to be physiologically correct, this practice could be used for the treatment of a variety of conditions in a safe, pharmacological-free way. Future studies with larger sample sizes could provide more information on the effects of reflexology (Zavarize et al., 2016). Investigating the effects of reflexology in a multitude of conditions can also provide information on the effectiveness of the practice (Abbaszadeh et al., 2018). Due to the exhibited efficacy for symptom management, promoting the availability of reflexology would be beneficial to patients (Wyatt et al., 2017). Whether viewed as a valid form of medical treatment or an ineffective form of pseudoscience, further research is needed to solidify which viewpoint is accurate regarding the therapeutic value of reflexology.

CONCLUSION

Reflexology is a form of complementary medicine that has become of increasing interest to medical professionals. Studies have shown that this practice has benefits in anxiety relief, pain relief, lowering blood pressure and improving the quality of life in suffering patients. The underlying mechanisms are unknown and further research is needed to investigate to fundamental processes of reflexology.

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