ACUPUNCTURE IN THE TREATMENT OF MELASMA

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ABSTRACT

Melasma is an acquired and symmetrical hypermelanosis, which occurs due to a pigmentary disorder, characterized by brown color, which appears on the face. Its pathophysiology is little known. The treatment is based on substances that have a depigmenting effect. Acupuncture is a therapeutic system that has been used in China for more than 2500 years in the treatment of diseases, in which needles are inserted into skin points in order to initiate physiological responses of repair and regulation in the body. Traditional Chinese Medicine relates the pathogenesis of Melasma to the dysfunction of Zang Fu organs, the imbalance of energy (Qi) and blood (Xuē). It considers both hyperpigmentation and all other symptoms of the patient, symptoms that correspond to patterns of Liver Qi stagnation, Spleen deficiency and Kidney deficiency of Yin and Yang. Most of the studies obtained results favorable to the use of acupuncture in the treatment of melasma. Although acupuncture is a beneficial and safe treatment for women with melasma, the heterogeneity of the studies hinders the meta-analysis and the evidence is still insufficient to reach conclusions about its efficacy. Thus, more studies and better designed trials are needed to achieve the necessary reliability.
INTRODUCTION......................................................................................................... 4

CHAPTER I - Melasma ........................................................................................................ 5
1.1 Development of melasma ...................................................................................... 5
1.2 Treatment of melasma ........................................................................................... 6

CHAPTER II - Acupuncture ........................................................................................... 8
2.1 Physiology of acupuncture .................................................................................... 8
2.2 Aesthetic acupuncture ........................................................................................... 9

CHAPTER III - The treatment of melasma with acupuncture ..................................... 10
3.1 Syndromes related to melasma .............................................................................. 10
3.2 Acupuncture points for the treatment of melasma ................................................ 12
3.3 Different acupuncture techniques ........................................................................ 12

CHAPTER IV - Scientific Evidence ............................................................................ 14

CONCLUSION........................................................................................................... 16

REFERENCES............................................................................................................. 17
INTRODUCTION

Melasma is a change in skin color. It is considered a common acquired dermatosis, resulting from the hyperactivity of clones of hyperfunctioning melanocytes in a restricted epidermal area, resulting in a melanic hyperpigmentation, mainly caused by ultraviolet radiation (VANZIN, 2011).

Clinically, it is characterized by brownish spots, mainly located on the face, although it may also affect the cervical, anterior thoracic and upper limbs region. Women in fertile and intermediate phototypes represent the most affected populations. Much of its pathophysiology remains unknown, being related to genetics, hormonal factors, use of medicinal drugs, cosmetics, endocrinopathies and photoexposure (VANZIN, 2011).

The prevalence of melasma varies according to gender, degree of sun exposure, skin type and ethnicity. Most cases occur in women, mainly because of hormonal influences such as pregnancy, thyroid disease and oral contraceptive pills (RERKSUPPAPHOL, 2015).

There are several treatments for melasma, such as depigmenting agents, chemical peels, dermabrasion and laser (JAHARA, 2016).

Acupuncture is a branch of complementary and alternative medicine that treats several conditions, among them melasma. The World Health Organization recognized acupuncture as a promising therapeutic modality for the treatment of melasma, although few controlled trials have been published. There were many variations in the treatment protocols. The points used can be divided into two groups, on the face and body (RERKSUPPAPHOL, 2015).

The diversity of treatments and substances used in the treatment of melasma and the variation found in studies and clinical practice, without the cure being presented, demonstrate the need for studies that increase the use of safe and effective techniques.
CHAPTER I
THE MELASMA

Melasma or Chloasma is an acquired and symmetrical hypermelanosis, which occurs due to a pigmentary disorder characterized by a brown color, which may appear on the cheeks, forehead, upper lip and nose (SARKAR, 2016). It is a change in skin pigmentation, considered common in dark-skinned populations (ABDEL-MEGUID, 2017). It may affect both sexes, but it is more observed in women, which may be associated to the gestational period, genetic influences and frequent exposure to ultraviolet radiation (STEINER, 2009).

1.1 Development of melasma

Its pathophysiology is little known, but it is known that exposure to ultraviolet rays and action of the hormone melanostimulant increases the number of melanocytes, cells responsible for the production of melanin (GUIRRO, 2004).

Melanin is produced by melanocytes and stored in melanosomes, located between keratinocytes (RERKSUPPAPHOL, 2015).

Melanocytes make up the protection of the skin against the aggression of ultraviolet rays, darkening the skin for the dispersion of these harmful rays. They are dendritic cells that have extensions, which stretch to reach the nearby keratinocytes. They are located at the junction of the dermis with the epidermis, between the germinative and spiny layers (JAHARA, 2016).

Melanin is the main biological pigment involved in cutaneous pigmentation (MIOT, 2009). This pigment originates from the hydroxylation of tyrosine, which is transformed into 3,4-dihydroxyphenylalanine (DOPA). The enzyme tyrosinase oxidizes DOPA to dopaquinone, resulting in eumelanin or pheomelanin (JAHARA, 2016).

These two types of melanin coexist in all skins, but usually in dark skins there is predominance of eumelanin, a dark brown pigment, and in light skin the predominance is feomelanina that has its lighter coloration (JAHARA, 2016).

The increase in tyrosinase activity and the size of the melanosome is what determines a higher production of melanin (JAHARA, 2016). Melanosome is a highly specialized elliptic organelle in which synthesis and deposition of melanin and storage
of synthesized tyrosinase occurs. The functional alteration of the melanocyte and the hyperproduction of melanin originate the spot, called melasma. This alteration of skin color can occur due to genetic predisposition, emotional factors, endocrine diseases, sun exposure, pregnancy, use of hormones, cosmetics and phototoxic drugs (MIOT, 2009).

The differential diagnosis is made based mainly on the symmetrical distribution of the lesions, constant characteristic of the pathology. The two main face melasma patterns are: facial center, which affects the central region (including the lips and nose) and malar, which includes zygomatic regions. Another less frequent pattern is the mandibular one (MAIA, 2011).

1.2 Treatment of melasma

The treatment for melasma has always been challenging and discouraging, since its main objective is prevention, bleaching of lesions and reduction of the affected area and this is not always achieved effectively (MIOT, 2009; STEINER, 2009).

The aim is to delay the proliferation of melanocytes and to inhibit the formation of melanosomes. Therefore, broad spectrum photoprotection with protection against ultraviolet rays A and B are fundamental (MAIA, 2011).

Currently the major depigmenting agents used in the treatment of melasma are substances that inhibit tyrosinase, such as hydroquinone, tretinoin, azelaic acid and kojic acid; substances that make non-selective suppression of melanogenesis, such as corticosteroids; substances that remove melanin, such as chemical peels; the laser, intense pulsed light that causes thermal damage and microdermabrasion (STEINER, 2009).

The first line of treatment currently indicated is the combination of hydroquinone with steroids and tretinoin, however prolonged use results in side effects. Other chemical compounds and extracts of natural agents such as ascorbic acid, azelaic acid, kojic acid, trexamic acid and arbutin are used, however variations in results and adverse effects result in low frequency of use. The second treatment option is chemical peels. When the patients do not respond to the previous treatments or can not be treated by them, laser, pulsed light and dermabrasion are used selectively, since they
present a risk of worsening of the condition, called the rebound effect (RERKSUPPAPHOL, 2015).

Current studies reveal that therapeutic combinations have been shown to be more effective in treating this pathology (MAIA, 2011).

It is recommended concomitantly to the patients undergoing the above treatments to suspend the use of contraceptive pills, perfumed cosmetics and phototoxic drugs (STEINER, 2009).
CHAPTER II
ACUPUNCTURE

Acupuncture (AC) is practiced all over the world and has grown considerably in recent years in the West. In Asia, AC is an important part of traditional medicine. Most patients seek AC for analgesia. Up to 10% of patients use AC for treatment of eczema, psoriasis and acne. There are numerous clinical trials and case reports of patients using AC in the treatment of atopic dermatitis and itching, urticaria, herpes zoster in various stages, psoriasis, acne, melasma and hyperhidrosis and in wound healing (BERG-WOLF, 2017).

AC is a therapeutic system that has been used in China for over 2500 years in the treatment of diseases. In Chinese, the practice is called Zhen Jiu. The word acupuncture is derived from Latin and means "piercing the skin". Needles are inserted into points and regions located on the skin in order to initiate physiological repair and regulation responses in the body (BERG-WOLF, 2017).

The needles can be left in place or stimulated manually or with electric current (electroacupuncture) (BERG-WOLF, 2017).

2.1 Physiology of acupuncture

The mechanism of action of acupuncture is not completely understood. Most evidence indicates that their effects are mediated by the stimulation of sensorial / neural pathways and by stimulation of the local connective tissues where the needles are placed. Some specific effects of acupuncture are the release of neurotransmitters, cytokines, and growth factors (BERG-WOLF, 2017).

Pain modulation occurs through complex interactions with the peripheral nervous system, spinal cord and brain, when endogenous cells and opioid substances are released. Adenosine, a neuropeptide with antinociceptive properties, has also been found to mediate the effects of acupuncture. In addition, this technique has an effect on the limbic system, an important processing center for the sensation of chronic pain (BERG-WOLF, 2017).

AC releases neuropeptides and hormones, including b-endorphin, serotonin, oxytocin, adrenocorticotropic hormone, gonadotrophin releasing hormone,
corticotrophin releasing hormone, cholecystokinin and acetylcholine, as well as insulin, resulting in immunomodulation, anti-inflammation, and changes in nerve activity autonomy (BERG-WOLF, 2017).

Acupuncture increases levels of nitric oxide in the blood and local tissue, providing regulation of blood flow (BERG-WOLF, 2017).

In trained hands, acupuncture is very safe. The reported adverse events were dizziness, local pain and bruises (BERG-WOLF, 2017).

2.2 Aesthetic Acupuncture

By the 1970s, aesthetic acupuncture came about with the same principle of the traditional version, that is, the introduction of needles into specific points of the body to circulate and harmonize energy. Since Chinese medicine sees the individual as a whole, a single spot may indicate some disarray in the organism (MAIA, 2011).

In Asia, throughout history, dermatological diseases are treated with acupuncture. Ancient studies suggest the treatment of acne, atopic dermatitis, psoriasis, warts and ulcers (BERG-WOLF, 2017).

Acupuncture has now been used to treat both acute herpes zoster rash and its sequelae. There is a growing popularity in the use of acupuncture in cosmetic applications, helping to eliminate nasolabial folds and decrease facial flaccidity, but no clinical trial has reported its efficacy compared to control therapies (BERG-WOLF, 2017).
CHAPTER III
Treatment of melasma with acupuncture

According to Traditional Chinese Medicine (MTC), the pathogenesis of Melasma is closely related to the dysfunction of the Zang Fu organs, the imbalance of the Qi and the Xuê. MTC considers hyperpigmentation and all the patient's symptoms, which together correspond to syndromes. The patterns presented are mainly stagnation of Liver Qi, Spleen deficiency, Kidney Yin deficiency and Kidney Yang insufficiency (HU, 2008; RERKSUPPAPHOL; FENG, 2010).

3.1 Melasma-related syndromes

Stagnation of Liver Qi
This type of melasma has brownish or reddish spots. The accompanying symptoms are excess liver, distending sensation, pain in the chest and hypochondrium, irregular menstruation, white lining on the tongue, bitter taste in the mouth, depression, irritation, darkening of the spot in the premenstrual period (MACIOCIA, 2014; HU, 2008).

According to Chinese medicine, unexpressed anger obstructs the circulation of Qi that is stagnant and does not reach the facial region. The clear Q.I has to get to the head and the impure Q.I has to be eliminated. This stagnation creates fire that in turn destroys the Xuê and the organic liquids, with that the skin can not be nourished nor humidified making itself vulnerable. Treatment consists of promoting the flow of Qi and promoting blood circulation (MACIOCIA, 2014; HU, 2008).

Spleen and Stomach Deficiency
The melasma related to this pattern presents yellowish-brown color, which arises mainly in the zygomatic and forehead regions. The main symptoms are poor appetite, weakness, pale menstruation, pale tongue, white or sticky coating and weak pulse (HU, 2008).

This deficiency is related to overwork and irregular food intake, resulting in spleen deficiency and fluid retention. Moisture obstructs the flow of Qi, transforming the clear and ascending Qi into cloudy and descending, forming the spot (MACIOCIA,
2014; HU, 2008). The principle of treatment is in strengthening the function of the Spleen to remove moisture (HU, 2008).

**Kidney Yin Deficiency**

In this type of pattern the melasma stain is grayish or dark, usually butterfly-shaped. Some related symptoms are dizziness, tingling, pain and weakness in the knees and lumbar, heat in the hands and insomnia. Menstruation can be anticipated and dark red, the tongue, red and with little coating (HU, 2008).

It has a higher occurrence in the elderly and people with essence deficiency. The essence is stored in the kidney under the tutelage of the kidney yin, which is responsible for nutrition and humidification of the whole body. Without nutrition and hydration the skin becomes fragile and vulnerable to the appearance of spots (MACIOCIA, 2014; HU, 2008).

The causative factors are mainly overwork, which affects the kidney; or indulgence in sexual activity, which consumes essential Qi. With Kidney Yin deficiency fire rises and damages the skin (MACIOCIA, 2014; HU, 2008).

Treatment consists of nourishing Yin, reducing fire and removing stagnation of blood to eliminate hyperpigmentation (HU, 2008).

**Kidney Yang Insufficiency**

The spot of this pattern shows gray-black, butterfly-like coloring on the zygomatic areas and / or cheeks. The main causative factor of this type is a frequent sexual activity, which damages the Kidney; or prolonged illness due to lack of nutrition and care, which causes Yang-Qie consumption and weakness, resulting in the formation of internal cold, which does not heat up Qi and blood, resulting in blood stasis and facial pigmentation (HU 2008). Often accompanied by pain in the joints of the hip and knees, cold hands and feet, clear and abundant urine, delayed menstrual cycle, dark menstruation accompanied by clots, pale tongue with white coating and slow and deep pulse. Warming the Yang to tone the Kidney would be the beginning of the treatment in this case (MACIOCIA, 2014; HU, 2008).
3.2 Acupuncture points for the treatment of melasma

Considering the studies that are analysed in this work, the most commonly used body points for treating melasma, pacifying the liver and strengthening the spleen, regulating Qi and blood circulation, were Sanyinjiao (Ba6), Zusanli (E36), Xuehai (Ba10), Hegu (IG4), Taihong (F3), Qihai (VC6), Neiguan (CS6) and Shenmen (C7) (HU, 2008; RERSUPPAPHOL, 2015; FENG, 2010; CHAI, 2015).

The Neiguan (CS6) can calm the heart and mind, mainly combined with the Shenmen (C7). Hegu (IG4) regulates Qi (energy) and Xue (blood) and when combined with Taichong (F3), can regulate Liver Qi and balance Yin and Yang. Xuehai (Ba10) activates the flow of Qi and promotes blood circulation. Zusanli (E36) regulates and tones the Spleen and Stomach, when combined with Sanyinjiao (Ba6) reinforces the function of strengthening the Spleen and regulates the flow of Qi (HU, 2008).

Suggested ear points were Liver, Spleen, Kidney, Shenmen, Subcortex, Endocrine, and Cheek. The lung point can be added by dominating skin and hair (HU, 2008).

The use of local points (face) can accelerate circulation in the region, improve metabolism and regenerate cells to decrease hyperpigmentation.

3.3 Different Acupuncture Techniques

**Surrounding needle method**

It is a classic technique, often used for skin disorders, muscle and joint pain. A method that accelerates local blood circulation and helps eliminate pathogenic factors (CHAI, 2015). Acupuncture needles are used near melasma and needles around the lesion (surrounding the dragon), with needles with transverse penetration and tip towards the center of the spot (HU, 2008).

**Rapid needling for stitches on the back**

Applied in 13 points on the bladder meridian, B13, B15, B18, B20 and B23, used to regulate Lung, Heart, Liver, Spleen and Kidney. The needles are removed after handling without retention (CHAI, 2015).
**Intensive needling**

The needles are inserted and manipulated for 1 minute every 10 minutes in the lesion region (CHAI, 2015).

**Method of tonification and sedation**

With a holistic approach, it considers that the reasons for the development of Melasma and concomitant symptoms are related and all are a consequence of the same pathological process. In addition to toning and sedating functions for rebalancing, it adds individualized points to achieve greater effectiveness (CHAI, 2015).
CHAPTER IV
SCIENTIFIC EVIDENCE

Most of the studies obtained results favorable to the use of acupuncture in the treatment of melasma.

Patients with melasma tend to have hemodynamic abnormalities. Recent studies have found that acupuncture treatment can regulate various hormones and antioxidants that are linked to the pathogenesis of melasma (RERKSUPPAPHOL, 2015).

The differentiation of each patient according to the presented pattern has been widely adopted, but the complexity of reproduction in a randomized trial led to a study, done with Thai women, to establish points in a simplified protocol that were used in all patients with melasma, without considering the etiology. The points used were Qihai (CS6), Hegu (IG4), Sanyinjiao (Ba6), Xuehai (Ba10), Zusanli (E36), Taichong (F3), combined with the surrounding needling technique. This trial also achieved a success rate comparable to individualized treatments. More than 90% of participants had a decrease in the area of melasma and 66% presented attenuation in pigmentation (RERKSUPPAPHOL, 2015).

Regarding the choice of facial or body points, the Rerksuppaphol study demonstrated that they are equally effective, but facial acupuncture is statistically significant in reducing melasma pigmentation (RERKSUPPAPHOL, 2015).

According to Feng, 2010, the combined use of acupuncture and herbal medicine produces therapeutic effects in the treatment of melasma (FENG, 2010).

A systematic review published in 2015, evaluated randomized controlled trials, which verified the efficacy of acupuncture in the treatment of melasma in relation to other conventional treatments. Acupuncture was compared to treatments with tranexamic acid, with vitamin C and tamoxifen, azelaic acid 20%, hydroquinone, vitamin A and no treatment. It was possible to identify that in 7 out of 8 studies, acupuncture obtained a better result than conventional treatments, with a higher healing rate (reduction of the lesion greater than 90%) and a significant effective rate (reduction of the lesion greater than 30%). However, it was not possible to perform meta-analysis, due to the heterogeneity of the trials and the non-significant samples (CHAI, 2015).
A review paper from 2017 on the efficacy of acupuncture in skin diseases found that there was no difference between Chinese women treated with vitamin C and E with Chinese women treated with acupuncture. However, there were significant differences in both treatment groups compared to no treatment whatsoever (BERG-WOLF, 2017).

A 2007 study compared acupuncture with pulsed light acupuncture in the treatment of melasma. 50 cases of melasma treated with acupuncture and pulsed light and 46 cases of melasma treated with acupuncture alone were analysed. There was a significant difference between the groups (P <0.05), which revealed that acupuncture associated with pulsed light, has an effect superior to the treatment performed simply with acupuncture (WEI, 2007).
CONCLUSION

Acupuncture treatment uses central and peripheral networks of the body, however, its mechanism is very complex and is beginning to be better understood. Although acupuncture is a beneficial and safe treatment for women with melasma, the heterogeneity of the studies hinders the meta-analysis and the evidence is still insufficient to reach conclusions about its efficacy. Thus, more studies and better trials are needed to achieve the necessary reliability.
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