Original Article

Effectiveness of Chinese cupping massage during the initial stage of lipodystrophy (case report)

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Abstract:

Our studies focus on the so-called hard cellulite, i.e. cellulite of „young and slim women”. A subject of the study was a 23 years old female patient (BMI – 18.1) with stage 1 lipodystrophy on posterior surfaces of thighs and on the buttocks diagnosed with thermovision tests. During 6 weeks, 19 Chinese cupping massages were conducted using 10-cm rubber cup and a lubricant comprising of a mixture of jojoba oil (97%) and grapefruit essential oil (3%). Every massage lasted for 15 minutes (7–8 minutes for each thigh). Thermovision tests were carried out according to the ASTM E1213-97(2009) standards of the European Association of Thermology using a thermovision camera Flir E6. Infrared thermography is a completely non-invasive technic and it enables to detect and visualise distribution of body temperature. For the purposes of medical diagnostics, it is more important to learn temperature distribution and visualise its gradient than the measured temperature values themselves. The Chinese cupping massage therapy increased temperature of the studied area from 31.7–31.8°C to 32.7–33.6°C. Differences between maximum and minimum temperatures significantly decreased from 6.3°C to 2.7°C on the posterior surface of the right thigh and from 7.5°C to 5.0°C on the posterior surface of the left thigh. This may be indicative of a more even blood flow distribution in the examined body area. In addition, elimination of stage 1 cellulite symptoms according to thermovision criteria was observed. Additional analysis of how a single Chinese cupping massage treatment influences the studied body area allowed to understand the essence of its high effectiveness in improving blood circulation in the studied area showing lipodystrophic changes. A singular Chinese cupping massage influences heat emission of the studied area significantly more than manual massage with the same lubricant. In our opinion using thermovision to assess the effectiveness of massage treatment of cellulite can significantly increase its effectiveness, because it allows more precise identification of problematic areas at the initial stage of lipodystrophy and determination of temperature distribution before and after the treatment. This way it enables indirect assessment of blood circulation of the area affected by lipodystrophy..

Key words: lipodystrophy –cellulite - Chinese cupping massage –thermovision

Introduction

Cellulite is a very common problems in the modern world. Until recently the issue of lipodystrophy or cellulite was recognised only in cosmetology, while dermatology did not recognise this problem. A common part of the definition of cellulite of all the mentions in the literature is that cellulite is a defect of adipose tissue consisting in oedematous, fibrotic, and sclerotic changes of hypodermis. Symptoms include uneven and dimpled skin surface of thighs hips, knees, buttocks, and arms as well as bumps and swellings (orange peel effect) (Janda K., Tomikowska A., 2014; Artkop J., Ekiert-Polguj A., Budzisz E., 2016; Godoy José Maria Pereira de, Ana Carolina Pereira de Godoy, and Maria de Fatima Guerreiro Godoy, 2017; Ariza Alfredo Ernesto Hoyos, 2018; Bojarska-Hurnik S., 2019).

Our study focused on the so-called hard cellulite, i.e. cellulite of “young and slim women”. This type of cellulite includes flat changes in the hypodermis. The most commonly affected areas include buttocks, thighs, and back of knees and it can be painful when pressed. It mostly affect women under 25 years old and those highly physical active. In such case skin is smooth and firm and the changes in a form of the orange peel effect are visible only after squeezing a skin fold (Friedmann Daniel P, Garrett Lane Vick, and Vineet Mishra, 2017; Conti Giamaica, Nicola Zingaretti, Domenico Amuso, Elena Dai Prè et al., 2020). This form of lipodystrophy is usually observed in a population of young women in the age of 25–30 years (up to 90%) and it usually results in lower self-esteem and quality of life (Janda K., Tomikowska A., 2014; Alizadeh Zahra, Farzin Halabchi, Reza Mazaheri, Maryam Abolhasani, and Mastaneh Tabesh, 2016; Artkop J., Ekiert-Polguj A., Budzisz E., 2016; Amore Roberto, Domenico Amuso, Vincenza Leonardi, Andrea Sbarbati et al., 2018; Bojarska-Hurnik S., 2019; Modena Débora Ap^a O., Caroline Nogueira da Silva, Talita C. P. Delinocente, Tatiane Bianca de Araújo et al.,

2019). It is commonly known that the sooner any pathological changes are diagnosed the easier and more effective it is to treat them. Diagnosis of cellulite is based on an interview, physical examination, and detailed diagnostics using specialised equipment. According to specialists in the field of aesthetic medicine and cosmetology, thermography is one of the most reliable methods for determination of cellulite stage at an early phase of its development. Computed thermography measures and registers heat emission enabling to determine cellulite's stage of advancement. Using this method for diagnosing changes and tracking therapy progress is a valuable supplement of conducted tests. It also enables full visualisation of pathological changes and localisation of the affected areas (Janda K., Tomikowska A., 2014). Tokarska K. et al. (2018) discriminate four stages of cellulite. Early in the development of lipodystrophy thermograms show hyperaemic centres clearly surrounded by ischaemic areas (stage 1) or hyperaemic centres indistinctly differentiated from surrounding ischaemic areas (stage 2) (Vincent C., Szubert M., Dębowska R., Bazela K., Eris I., Różański L. et al., 2006; Janda K., Tomikowska A., 2014). However, skinpathological changes are not visible. In those cases it is best to start a therapy as soon as possible as this will allow to stop the process of orange peel effect development.

The best results in fighting cellulite are achieved with comprehensive actions taking into consideration different aspects of cellulite formation. Cellulite requires long-term treatment. Aside from cosmetic methods, other methods should be implemented, but first of all patient should make lifestyle changes. Physical activity plays a crucial role, especially in the case of people with sedentary lifestyle. Among cosmetic methods used to treat cellulite the following are the most popular: local applications of plant-based cosmetics; sea baths and algotherapy; compresses with paraffin; aromatherapy; massage using different devices (endermology); lymphatic drainage; body wrapping (Kasprzak W., Mańkowska A., 2010; Pilch Wanda, Olga Czerwińska-Ledwig, Joanna Chitryniewicz-Rostek, Magdalena Nastalek, 2019).

Massage is traditionally used in anti-cellulite therapies (Kasprzak W., Mańkowska A., 2010; Konkol J., 2011; Janda K., Tomikowska A., 2014). Chinese cupping massage therapy is one of the oldest lymphatic drainage methods used to improve circulation and lymph evacuation in the massaged area. It will undoubtedly improve the condition of skin affected by early stages of cellulite. The technique of the Chinese cupping massage originates from traditional medicine. In China vacuum therapy has been known for 3000 years. Treatments involving massage with negative pressure and acupressure are considered one of the oldest therapeutic methods. Back then they were used for healing purposes — relieving back and muscle pain. Nowadays such massage is mainly used to reduce cellulite, stretch marks and improve skin quality. At first the massage was conducted with hollow horns. First mentions and documents concerning the procedure of using the cups originate from the ancient Egypt. Hippocrates was the one who introduced cups to Europe. At first the cups were manufactures from horns, later bamboo, glass, and finally rubber. Currently, also devices creating vacuum during the cupping massage are being developed (Kowza-Dzwonkowska M., Kawa M., Orlikowska A., 2014). The Chinese cupping massage influences the body in two ways: reflexologically and mechanically. The dome-shaped cups are made of special, elastic rubber and there is an opening at their bottom. Different sizes are available, from 25 to 65 cm in diameter, for massaging different areas of the body. The bulge forming as a result of suction can have from 1 to 3 cm (Trybulec B., Orzechowska S., 2015). The vacuum created during the massage improves blood and lymph circulation, thus, increases oxygen supply to cells. Another effect is increased removal of toxins, metabolic waste products. Blood vessels dilate, facilitating absorption of active ingredients of used formulations. Moreover, the mechanisms involved in the massage of such type facilitates the process of lipolysis and this results in reduced cellulite, evened-out skin surface and colour, and better-shaped figure. Chinese cups also influence deeper skin layers, stimulating and activating its immunity. Activated fibroblasts increase the production of elastin and collagen that are responsible for firmness and elasticity of the skin. Besides the therapeutic results, the massage also helps to relax and relieve stress. It is beneficial to have this massage done after an exhausting workout or after a hard day of sedentary work. One needs to remember, however, that it is an intense massage and it might cause bruising at first, that is why it might not be present for some people, for patients with low pain threshold it might even be painful (Mańkowska A., 2011; Zwinczewska D., 2018). In our opinion, assessing the effectiveness of this therapy would be much easier if thermovision was used, especially in cases of women with early stages of cellulite impossible to notice visually and palpably, however, clearly visible on thermograms.

The aim of this paper was to analyse the influence of Chinese cupping massage on the skin affected by early stages of lipodystrophy of hypodermis when the changes are not visible with the naked eye but it is possible to detect them with thermovision tests.

Material & methods

Participants

Our studies were conducted on a 23 years old female patient (BMI 18.1) whose lifestyle was not very active due to sedentary job and limited spare time for physical activity or sports. The subject usually followed healthy diet, however, occasionally (1–2 times a week) she also ate fast food. The patient was diagnosed with visible stage 1 lipodystrophy located on her upper thighs and buttocks with slightly lumpy skin changes visible when squeezing a skin fold between two fingers. It was possible to notice stretch marks on the buttocks that appeared during puberty as a result of the process of growing. The study was granted an ethical approval by the

Bioethical Commission of Kazimiera Milanowska College of Education and Therapy – by the resolution no. 006/2018/2019 of 10.05.2019.

Procedure

Patient was subjected to a Chinese cupping massage with a mixture of jojoba plant oil and grapefruit essence oil as a lubricant. The grapefruit oil was chosen due to its anti-cellulite properties (Romer M., 2009). Detailed examination confirmed that patient's skin was not couperose, also no varicose veins were found. During the treatment, the patient was not pregnant nor menstruating and did not suffer from elevated body temperature of unknown origin, cancer, haemophilia nor any communicable disease. All contraindications of the Chinese cupping massage were excluded. Written consent to participate in the study was obtained from the patient before conducting the first massage form a series of Chinese cupping massages and thermovision tests. Researchers also informed the patient on the benefits and risks resulting from participation in the study. Every part of the study was completely invasive.

The study lasted 6 weeks with 4 treatments conducted every 2 days during the first week. Next 5 weeks included series of 3 treatments per week conducted every 3 days. In total the study included 19 treatments. Every massage lasted for 15 minutes (7–8 minutes for each thigh).

Before the massage, a mixture of jojoba oil (97%) and grapefruit essence oil (3%) was applied to the massaged area (buttocks and posterior surface of thighs). Applying oil is essential as it facilitates sliding of the cup on the skin. Negative pressure is created by holding the cup with both hands with the index and middle fingers placed on the lower edge of the cup and pressing its top with thumbs.

This way the air is squeezed out of the cup. The cup held this way is then placed on the required spot and released. The cup should suck onto patient's skin. Next step is making longitudinal and circular motions towards lymph nodes and heart. The cup has to be moved against the skin all the time and cannot be kept in one place (Pelc K., Smaga S., Zielińska K., 2012). Every thigh (left and right) was massaged for 7–8 minutes with 10-cm rubber Chinese cup.

Data collection and analysis

Before, after and during (after selected massages) the anti-cellulite therapy, thermovision tests were conducted with a thermovision camera FLIR E6 in order to examine the effectiveness of the treatments and determine the cellulite's stage.

In 1800 an astronomer Sir Frederick Wiliam Herschel discovered infrared radiation when studying differences between different colours of light. He discovered that temperature of colours increased from the violet to the red part of light spectrum. After noticing this dependence, Herschel measured the temperature just behind the red part of the spectrum, in an exact spot where sunlight was no longer visible. As it turned out, this exact spot had the highest temperature (Flir, 2014).

Heat is the source of every infrared radiation, thus, every physical body with temperature above the absolute zero emits radiation. Thermovision camera's optics focuses infrared radiation emitted by a body on the infrared detector. Then the detector sends the information to electronics converting the signal into images. The images can be viewed through the eyepiece or on a LCD screen (Flir, 2014; Bauer J., MdNazmulHoq, John Mulcahy, Syed A. M. Tofail et al., 2020).

Infrared thermography is a completely non-invasive technic and it enables to detect and visualise distribution of body temperature. For the purposes of medical diagnostics, it is more important to learn temperature distribution and visualise its gradient than the measured temperature values themselves. Currently, the so-called classic thermography is the most commonly used. This test is carried out in stable environment and patient thermo-dynamic conditions (Cholewska A., Stanek A., Sieroń A., Drzazga Z., 2012).

In order to assess temperature contrasts based on the obtained thermograms, different physical stimuli are used. Stimuli used in medicine, among others, include increased oxygen pressure and low temperatures used in cryotherapy. The said stimuli alter metabolic cycles, thus, they influence the thermic map of tissues and improve diagnostic value of thermograms (Cholewska A., Stanek A., Kwiatek S., Sierań A., Drzazga Z., 2011). Thermovision tests were conducted according to the ASTM E1213-97(2009) standards of the European Association of Thermology (ISO, 2009; Polish Committee for Standardization, 2010).

Results

Thermography conducted before the Chinese cupping massage therapy confirmed preliminary diagnosis of stage 1 lipodystrophy on posterior surfaces of thighs and on the buttocks (Fig. 1). Figure 1 clearly shows that the studied area (within ellipses) includes hyperaemic centres surrounded by ischaemic areas. Mean temperatures of the studied areas on the right and left thigh were almost the same (31.8°C and 31.7°C). Differences between maximum and minimum temperatures amounted to 6.3°C and 7.5°C, respectively, what can indicate a highly uneven blood supply. Moreover, significant "blotchiness" was observed, allowing to determine stage 1 lipodystrophy (see Fig. 1).

Fig. 1. A thermogram of posterior surfaces of thighs and buttocks of the subject before the Chinese cupping massage therapy.

Results of the effectiveness of the conducted Chinese cupping massage therapy with a mixture of jojoba oil (the base oil) and grapefruit oil (3%) are presented on Fig. 2. 19 treatments of the Chinese cupping massage increased the temperature of the studied area from 31.7–31.8°C to 32.7–33.6°C. The difference between maximum and minimum temperature significantly decreased after the therapy from 6.3°C to 2.7°C on the right thigh and from 7.5°C to 5.0°C on the left thigh. This indicates more even blood distribution in the studied area (see Fig. 2).

Additional analysis of how a single Chinese cupping massage treatment influences the studied body area allowed to understand the essence of its high effectiveness in improving blood circulation in the studied area showing lipodystrophic changes. A singular Chinese cupping massage influences heat emission of the studied area significantly more than manual massage with the same lubricant. Figure 3 illustrates that mean temperature after the manual massage with a mixture of jojoba oil and grapefruit oil (3%) directly after the procedure increased insignificantly, by 1.2°C on the right thigh. Whereas, after the Chinese cupping massage of the left thigh, mean temperature of the studied area increased to 36.9°C, what gives an increase by 3.0°C, while the maximum temperature amounted to 37.8°C (Fig. 4).

Fig. 2. A thermogram of posterior surfaces of thighs and buttocks of the subject after the Chinese cupping massage therapy consisting of 19 treatments.

Fig. 3. A thermogram after manual massage with a lubricant (taken immediately after 7-minute massage of the right thigh).

Discussion

Stage 1 lipodystrophy is characterised by a lack of visible changes of skin surface (Janda K., Tomikowska A., 2014). Results of histopathological studies indicate that stage 1 lipodystrophy is related to changes in blood vessels of the fat tissue – venous and lymphatic stasis develops. Reticular dermis thickens, permeability of capillaries increases, capillaries dilate, and micro-extravasation and fusiform micro-aneurysms of post-capillary veins develop. Adipocytes enlarge and create small clusters. Intracellular oedema appears leading to gradual degradation and then destruction of collagen and elasticin fibres (Janda K., Tomikowska A., 2014).

Fig. 4. A thermogram after the Chinese cupping massage with lubricant (taken immediately after 7-minute massage of the left thigh).

Traditionally, anti-cellulite therapy includes whole body massage or a massage of the affected area. The aim of this procedure is to even out subdermal irregularities caused by a dysfunction of connective tissue and uneven distribution adipose tissue (Kasprzak W., Mańkowska A., 2010).

Correction of body shape and reduction of cellulite is achieved thanks to: breaking down adipocytes due to mechanical stimulation of connective tissue, improving function of circulatory system, oxygenating the cells, removing toxins, reducing oedema, improving skin firmness through stimulation of collagen and elasticin production, warming up the skin and muscles through rubbing, changing appearance of the skin that becomes more radiant, smooth, and even-coloured thanks to better circulation and mechanically peeled off surface layers of epidermis (Konkol J., 2011).

Conclusions

Positive effects of Chinese cupping massage in a form of increasing and evened out temperature indicators of the studied body area with lipodystrophy are mainly based on the effects of lymphatic drainage that are clearly visible even after a single massage procedure. Lymphatic drainage is a massage of a particular type that improves lymph circulation. It consists in stimulating lymph circulation through pressing and gently manually pumping the lymph. It enables to quickly eliminate deposits and contaminants, improves circulation, and reduces oedemas (Kasprzak W., Mańkowska A., 2010; Pilch Wanda, Olga Czerwińska-Ledwig, Joanna Chitryńiewicz-Rostek, Magdalena Nastalek et al., 2019). Lymphatic drainage facilitates treatment and prophylactics of cellulite and is a great preparation for other aesthetic medicine and cosmetic procedures. Drainage should be an integral part of any complex anti-cellulite therapy as it helps to remove micro-oedemas, improves circulation of fluids and tissue metabolism. Some therapists use the effects of drainage in combination with other therapies, e.g. mesotherapy, pharmacotherapy and physical activity (Konkol J., 2011; ArizaAlfredo Ernesto Hoyos, 2018; ModenaDéboraAp^a O., Caroline Nogueira da Silva, Talita C. P. Delinocente et al., 2019). Vacuum created during the massage improves blood and lymph circulation, which in turn results in better oxygen supply to cells. Our study showed that increase in temperature in the massaged areas amounted to even 3°C. Whereas, manual massage with a lubricant results in lower increase in temperature, i.e. 1.0–1.2°C. Our thermovision studies on the influence of the classical manual massage showed that reaching such a high level of temperature increase in the massaged area is very difficult, and using a lubricant makes it almost impossible (M. Radziejowska; P. Radziejowski; 2019). In our opinion, using thermovision to assess the effectiveness of the massage in the cases of cellulite can significantly increase the said effectiveness, because it allows to precisely determine problematic areas during initial stages of lipodystrophy and temperature distribution before and after the therapy. Thus, it allows to indirectly assess the evenness of blood circulation of the area affected with lipodystrophy.

Conflict of interests – none.

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