

The use of mud in cellulite reduction. Case report

Wykorzystanie borowiny w redukcji cellulitu. Opis przypadku

ABSTRACT

Mud is a natural, organic and mineral raw material used in the cosmetic industry, rehabilitation and wellness. In cosmetology, it is mainly used in the prevention of cellulite and stretch marks, and in skin care.

This study aimed to evaluate the effect of mud and caffeine treatments on cellulite reduction. A 49-year-old woman with confirmed cellulite on the back of her thighs underwent a series of ten mud treatments. The first effects were observed after just five treatments.

The results of the study confirm that the mud, in combination with caffeine, has a beneficial effect on reducing visible bumps on the skin. The disadvantage of the treatment may be the unpleasant smell.

Keywords: mud, peat, caffeine, cellulite, heat therapy, lifestyle

STRESZCZENIE

Borowina to naturalny surowiec organiczno-mineralny znajdujący zastosowanie w przemyśle kosmetycznym, rehabilitacji oraz w odnowie biologicznej. W kosmetologii wykorzystywany jest przede wszystkim w profilaktyce cellulitu i rozstępów oraz w pielęgnacji skóry.

Celem pracy była ocena wpływu zabiegów z wykorzystaniem borowiny i kofeiny na redukcję cellulitu. 49-letnią kobietę, u której potwierdzono występowanie cellulitu na tylnej części ud poddano serii dziesięciu zabiegów borowinowych. Pierwsze efekty zaobserwowano już po pięciu zabiegach.

Wyniki badania potwierdzają, że borowina w połączeniu z kofeiną, wpływa korzystnie na zmniejszenie widocznych nierówności na skórze. Wadą zabiegu może być nieprzyjemny zapach.

Słowa kluczowe: borowina, torf, kofeina, cellulit, ciepłolecznictwo, styl życia

INTRODUCTION

Mud, also known as medicinal peat or peloid, is a natural, organic and mineral raw material. It was formed around 10,000 B.C. by humification of plants in humid areas, with little oxygen and bacterial involvement [1]. Poland has rich resources of peat deposits. The 90% of them are low peat bogs, and the rest are high peat bogs, which are found in the mountains of southern Poland [2, 3].

Examination of the physico-chemical properties of peat allows scientists to classify it as a medicinal deposit. The ten-grade scale developed by van Post (H1-H10) describes the degree of humification, i.e. the degree of peat decomposition [4]. H1 undecomposed peat is colourless and is characterised by the release of pure water during extrusion. In subsequent stages, the extruded water takes on an increasingly darker

colour and the peat mass is more homogeneous. The last step, H10, is a completely decomposed peat, without any plant structure, with the whole peat mass squeezed between the fingers without any water being released. Peat with a humification degree of H4-H10, in which 35-40% of the biological components are decomposed, has the best healing properties. Another factor is the water absorption capacity of the peat, which allows an assessment of how much water can be absorbed by the dry mass of the raw material. High peats are characterised by high water absorption, containing about 10-15 g of water per gram of dry matter. Moreover, mud has a high heat capacity and low thermal conductivity, making it possible to perform treatments with the raw material heated up to 50°C. This allows for the gradual and consistent release of heat. Additionally, it exhibits absorption characteristics. [4].

Curative effect of peat

The therapeutic action of peat is based on several mechanisms of action: thermal, mechanical and chemical.

- The thermal, or thermic, action induces significant tissue warming, yet the organism perceives this heat relatively faintly. This leads to a widening of blood vessels and facilitates the flow of blood and lymph. The heat also has the effect of reducing muscle tension, increasing the range of movement in the joints and relieving pain. During heat treatments, sweat is produced and substances such as mineral salts, fats, cholesterol and uric acid are excreted with the sweat [1, 5].
- The mechanical effect consists of pressure, caused under the weight of the mud mass. This has the effect of stimulating the outflow of venous blood and lymph and the absorption of exudates. It also has a soothing effect on painful conditions and shows a relaxing effect [6-8].
- The peat shows healing properties due to the presence of bitumen, and humic acids, humin acids in its composition. They affect the autonomic nervous system, smooth muscles and mucous membranes. They also influence the quantity and quality of joint fluid, which is thought to reduce friction in the joints [4, 9]. Humic acids have anti-inflammatory, anti-oedematous, antimicrobial and astringent effects on the skin and mucous membranes. In addition, they enhance metabolic processes and intensify cellular respiration. By forming complex combinations with various compounds, they inhibit prostaglandin synthesis and the activity of many enzymes, including hyaluronidase [9, 10].

The use of peat in cosmetology

Peat has been found to be used in cosmetology, especially in the prevention of cellulite and stretch marks. It also has a positive effect on oily and combination skin and dull

complexions. The amino acids, fulvic acids and phenolacids contained in the raw material have a stimulating effect on the skin, especially in case of allergy. They also exhibit antioxidant effects by neutralising the damaging effects of free radicals [10]. As a result, they are recommended for people who are struggling with the onset of skin ageing processes. Increasing the elasticity and reducing the dryness of the skin is influenced by the bitumen contained in the mud, which activates the synthesis of collagen and elastin. Mud treatments also have a soothing effect on irritation, remove symptoms of skin tension and fatigue and have a slimming effect [6, 10, 11].

For facial treatments, peat is used in the form of creams, masks, patches or by performing iontophoresis. For body treatments, on the other hand, mud is used in the form of masks, compresses, wraps or baths. It can also be used in shampoos for demanding or oily skin [5, 10].

Contraindications to the procedures include cancer, pregnancy, hyperthyroidism, hypertension, post-myocardial infarction conditions and heart defects, conditions after fresh trauma, advanced vascular atherosclerosis, diabetes, endometriosis and age under 18 [10].

CASE DESCRIPTION

A 49-year-old woman presented to the cosmetology practice with a cellulite problem on her thighs. A palpation examination was performed in two positions: lying and standing. The examination consisted of palpating a section of thigh skin with the middle finger and thumb. In the lying position, a smooth skin surface was visible, but when the skin fold was grasped, visible cellulite appeared. In contrast, in the standing position, the skin lesions were visible without squeezing the skin fragment. This indicates stage III cellulite according to Nürnberger's four-stage scale. The client's skin had little elasticity and depressions and irregularities were visible, indicating a flaccid form [12].

After a visual assessment of the client's skin, an interview was conducted noting the information on the client card. During the interview, she shared the information that she was a mother of two children. To date, she did not have problems with cellulite, but as she got older, she started to notice a loss of skin elasticity and her thighs were showing increasing aesthetic changes. She also mentioned that she enjoyed sunbathing, but rarely used or only applied a little protection in the form of sunscreen with SPF15. Her physical activity was limited to a 40-minute bike ride once a week, and she additionally attended a swimming pool once a week during the winter months. Dietary issues were also asked during the interview. The client did not have a strict diet, she ate regularly, however, her meals were not nutritionally balanced, and she drank about 1.5 litres of water per day. She worked as a senior salesperson in a large grocery shop, which was associated

with stress. She did not perform anti-cellulite treatments, nor did she exfoliate the skin of her lower limbs. She used a moisturising lotion once in a while, usually after depilating her legs or after sunbathing.

MATERIAL AND METHODS

A body composition test was performed using a Tanita BC-418 device and the results are shown in Table 1. The circumference of the thighs was also measured at a point midway between the upper edge of the hip joint and the upper edge of the knee cartilage. The thigh circumference was 52 centimetres; the client's height was 170 cm.

Table 1 Electrical bioimpedance test results

	Result	Desired
Body weight	72.7 kg	52.8 kg ~ 71.4 kg
Muscle mass	24.4 kg	23.8 kg ~ 29.0 kg
Fat mass	27.9 kg	12.4 kg ~ 19.9 kg
PBF (body fat percentage)	38.4%	18.0% ~ 28.0%
FFM (fat-free mass)	44.8 kg	43.0 kg ~ 52.6 kg
TBW (total body water content)	32,7l	31.7l ~ 38.7l
BMI	25.2 kg/m ²	18.5 kg/m ² ~ 23 kg/m ²
BMR (Basal Metabolism Rate)	1337 kcal	1458 kcal ~ 1700 kcal
Visceral fat (visceral fat index)	13 level	1 level ~ 9 level

Source: own elaboration

The treatment plan consisted of a series of 10 mud-pack treatments at weekly intervals. The Połczyn-Zdrój peat slice derived from the "Bronowo" deposit in the municipality of Połczyn-Zdrój was used. The slices contained peat of the high type so with an intense degree of humification and natural water saturation. They consisted of 99% organic components, especially humic ones. The pH level was 4.8-5.7. The product had been granted concession No. 44/92 by the Minister of Health and Environmental Protection, while the National Institute of Public Health (PZH) had issued the therapeutic certificate for mud No. HU-20BL-1/2008.

The client was given a questionnaire to complete for a subjective assessment of her skin condition before and after the treatment, which consisted of 5 questions. Before proceeding to the main stage of the treatment, an exfoliation of the skin affected by cellulite was performed. A coffee scrub was used, which had been previously prepared by a cosmetologist. A volume of approximately 1 cup of fine white sugar, half a cup of coffee grounds completely dried and half a cup of fractionated coconut oil were combined. All ingredients were mixed and transferred to a glass jar with a lid. After 2 weeks, the scrub was repeated. Before the treatment, the mud was

properly prepared by heating. The patch was placed in a bowl of water at 40°C for 15 minutes. It is important not to exceed the designated values, as too high temperature (above 60°C) could lead to the destruction of the biological values and the violation of the physical and chemical properties of the mud. While the peat was being heated, the client was scrubbed in a lying position. Exfoliation was performed on the areas of cellulite. The cosmetic was rubbed in circular motions for about 10 minutes, 5 minutes for each leg. The client was then asked to wash off the residue of the scrub on her skin in the shower. The skin was dried thoroughly with a towel and proceeded to the main treatment stage. One slice of mud was applied to each part of the thigh affected by cellulite, then the thighs on which the patches were placed were wrapped in cling film for additional heat generation.

After both thighs were wrapped in foil, the client was covered with a blanket to generate additional heat. After 20 minutes, the mud was removed, and the woman was then asked to move to the shower to rinse off any remaining mud on the skin. The skin was dried with a towel. At the end of the whole procedure, an anti-cellulite butter containing coffee and caffeine was applied.

After the treatment, recommendations for home care and dietary changes were given to the client. It was pointed out to avoid eating highly processed foods and to limit salt intake. Meals were recommended to be eaten at regular times and the amount of water drunk was supposed to be approximately 2.5 litres per day. Physical activity should have been increased to a minimum of three days a week. It was also recommended to perform dry brushing every evening to increase the effects, and after bathing it was recommended to apply an anti-cellulite lotion containing caffeine, common ivy or Centella Asiatica.

RESULTS

No change related to the appearance of cellulite was observed after the first treatment. The first visible effects of improved skin tone and firmness were observed after five treatments. However, after the entire series, a reduction in the number of bumps and a decrease in cellulite grade from III to II was observed (Fig. 1). After each treatment, a visual increase in the hydration of the treated area was noticeable.

After the treatment series was completed, the electrical bioimpedance test was performed again (table 2). The treatment did not significantly affect the results. The thigh circumference did not change. The client was asked to complete the questionnaire again to subjectively assess the state of her skin after the treatment (table 3).

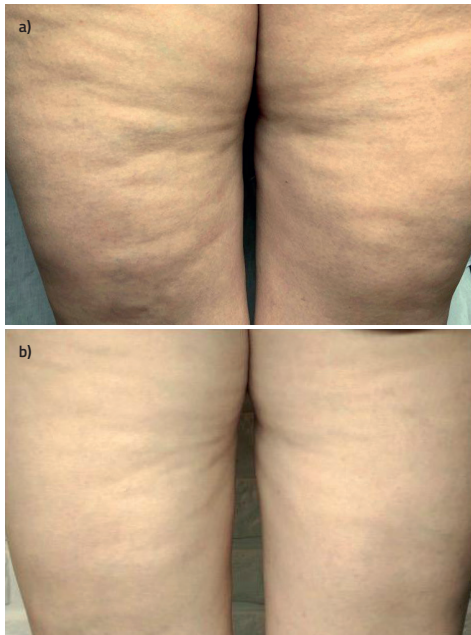


Fig. 1 Image of the patient's thighs before and after the series of treatments
Source: Own archive

DISCUSSION

In the prevention of cellulite, peat is most commonly used in the form of a wrap. For this purpose, the peat is heated beforehand, which allows a strong overheating of the tissues, dilating blood vessels and facilitating blood and lymph flow. As a result, the nutrition and oxygenation of the cells is increased. In addition, it influences the removal of harmful metabolic substances. The heated peat is applied to the areas affected by cellulite and then wrapped in cling film to stop the heat from escaping from the warm peat. The application of the peat mass also generates pressure, which stimulates venous blood and lymph outflow and has a relaxing effect [10].

A natural, organic, mineral raw material, peat is widely used in cosmetics, rehabilitation and wellness due to its rich composition, which includes both organic and inorganic substances. In cosmetology, peat is used in the prevention of cellulite and stretch marks and in the care of oily, combination and ageing skin. Peat delays the ageing process of the skin and prevents it from sagging. It is used in various forms such as, for example, wraps, baths and masks [10].

A study conducted by Amuso et al. on a group of 60 women with the presence of cellulite on the thighs and buttocks involved the use of seaweed mud for 4 weeks. Photographic, clinical, anthropometric and satisfaction assessments were made of the subjects before and after the treatment. A reduction in the severity of cellulite, a reduction in oedema, inflammation and less body fat were demonstrated. Improvements in proband comfort and satisfaction with the results were also noted [11].

In contrast, in a 2024 systematic review, the authors pointed out the great potential of peat products, which was not fully

Table 2 Summary of pre-treatment and post-treatment electrical bioimpedance test results

	Results	
	Before the treatment	After treatment
Body weight	72.7 kg	72.9 kg
Muscle mass	24.4 kg	25.3 kg
Fat mass	27.9 kg	26.8 kg
PBF (body fat percentage)	38,4%	36,8%
FFM (fat-free mass)	44.8 kg	46.1 kg
TBW (total body water content)	32,7l	33,7l
BMI	25.2 kg/m ²	25.2 kg/m ²
BMR (Basal Metabolism Rate)	1337 kcal	1365 kcal
Visceral fat (visceral fat index)	13 level	13 level

Source: Own sources

Table 3 Questionnaire for subjective assessment of skin condition before and after treatment

Question	Answer	
	Before the treatment	After treatment
How do you assess the overall condition of your skin? (Scale: 5 - very good, 4 - good, 3 - satisfactory, 2 - unsatisfactory, 1 - bad, 0 - very bad)	2	5
How would you rate the firmness of your skin? (Scale: 5 - very good, 4 - good, 3 - satisfactory, 2 - unsatisfactory, 1 - bad, 0 - very bad)	1	4
How would you rate your skin's hydration level? (Scale: 5 - very good, 4 - good, 3 - satisfactory, 2 - unsatisfactory, 1 - bad, 0 - very bad)	4	5
How do you assess your skin tone? (Scale: 5 - very good, 4 - good, 3 - satisfactory, 2 - unsatisfactory, 1 - bad, 0 - very bad)	3	4
How would you rate the number of visible nodules? (Scale: 5 - a lot, 4 - many, 3 - moderately, 2 - few, 1 - very few, 0 - not at all)	5	2

Source: Own sources

exploited [13]. Further research is needed to understand the therapeutic properties of this type of preparation. The results of an in-house study confirm that peat has a beneficial effect on reducing visible bumps on the skin. An electrical bioimpedance test was performed to check whether the peat acts only superficially on the epidermis or whether it also affects deeper layers. After the treatment, a slight change in

the results was observed. Fat mass decreased by 1.1 kg, while adipose tissue content decreased by 1.6%. The total body weight remained the same, as the patient did not change her lifestyle, did not increase her physical activity and did not change her daily diet. From the results of the questionnaire, the client is satisfied with the results produced by the treatment series.

CONCLUSIONS

1. Mud treatments have a beneficial effect on the reduction of cellulite lesions.
2. The therapy carried out led to a reduction in the proband's body fat.
3. Treatment sensations were positive apart from the peculiar smell of the mud.

SUMMARY

Peat is a natural, organic, mineral raw material used in rehabilitation, wellness and cosmetology. The therapeutic effect of peat is based on thermal, mechanical and chemical action. In cosmetology, it is mainly used in the form of creams, masks, patches, compresses, wraps and baths. The ingredients contained in the raw material show stimulating, antioxidant properties. They activate collagen and elastin synthesis slowing down the skin ageing process. The peat has a positive effect on the reduction of unevenness on the skin and brings positive effects in the therapy of cellulite and stretch marks, which makes its use in combined treatments enhance the potential of this raw material and the effects of the therapy.

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