

Vibration massage in cellulite reduction and body modelling

Zastosowanie masażu wibracyjnego w redukcji cellulitu i modelowaniu ciała

ABSTRACT

Lipodystrophy is a skin disorder of a multifactorial background. It mostly appears in women aged 31-39, on the thighs and buttocks. There are many cellulite therapies, however, to be satisfactory, multidirectional action is necessary.

The aim of the study was to assess the effectiveness of vibration massage, based on a survey conducted among 120 women who underwent vibrotherapy treatments.

Vibration massage is a non-invasive method of body shaping. Its effectiveness in reducing body fat and cellulite is often visible after several treatments. The very promising effects of the therapy are the subject of further research.

Keywords: vibrations, vibrotherapy, cellulite, adipose tissue, vibration massage

STRESZCZENIE

Lipodystrofia jest zaburzeniem skórny o wieloczynnikowym podłożu. Najczęściej pojawia się u kobiet w przedziale wiekowym 31-39 lat, na obszarze ud i pośladków. Istnieje wiele terapii cellulitu, jednak aby ich efekty były zadawalające, konieczne jest wielokierunkowe działanie.

Celem pracy była ocena skuteczności masażu wibracyjnego, na podstawie przeprowadzonego badania ankietowego wśród 120 kobiet, u których wykonywano zabiegi wibroterapii.

Masaż wibracyjny jest nieinwazyjną metodą modelującą sylwetkę. Jego skuteczność w postaci redukcji tkanki tłuszczowej i cellulitu często widoczna jest już po wykonaniu kilku zabiegów. Bardzo obiecujące efekty terapii są przedmiotem dalszych badań.

Słowa kluczowe: drgania, wibroterapia, cellulit, tkanka tłuszczowa, masaż wibracyjny

INTRODUCTION

Nowadays, non-invasive body-shaping treatments reducing cellulite and adipose tissue, are becoming more and more popular [1]. Most surgical methods are associated with the risk of complications, pain, scarring, hematomas, swelling, and bacterial infections. According to research conducted in 2013 among the American population, which consisted of 200 women aged 31-50, it was determined that since 1997 the interest in non-invasive body-shaping treatments has increased by 521%. It has also been estimated that the interest in non-invasive methods of body-modelling is growing by 21% annually [2].

Female-type cellulite is an edematous-fibrous-sclerotic change in the subcutaneous adipose tissue. This skin defect affects about 80-98% of the female population and is most often located on the buttocks and thighs. On the surface of the skin, there are irregularities and thickenings which are visible and palpable when touched. There are three types of cellulite. Water cellulite is palpable and hard when touched, it adheres very strongly to the muscles, and the skin within the lesions is tense [1]. On the other hand, fatty cellulite during palpation is soft, papular changes are located in the deep layers of the subcutaneous tissue. Finally, mixed cellulite combines

the features of water and fat cellulite. A diet rich in fats and carbohydrates, smoking cigarettes, and alcohol, and lack of physical activity are factors that aggravate the symptoms of cellulite [3, 4]. In the prevention of cellulite, physical activity is extremely important, which has a positive effect on the condition of the skin. The work of the muscles, which allows movement, supports the work of the circulatory system. During physical activity, the muscles contract, causing blood to be pushed through the vessels against the forces of gravity, putting a strain on the heart (muscle pump). An insufficient amount of movement limits the work of the muscle pump. Lack of physical activity causes the muscles and tendons to sag and shrink, which increases the volume of adipose tissue. Regular exercise also helps to maintain an adequate fat mass, which is crucial because excessive fat deposition in the subcutaneous tissue contributes to the aggravation of cellulite [5].

Popular treatments used to reduce cellulite and adipose tissue are cryolipolysis, vacuum massage, lymphatic drainage, ultrasounds, and carboxytherapy. More and more often, cosmetology offices offer treatments that use vibrations to shape the body [6-8]. Vibrotherapy was initiated in manual massage, which has been known for thousands of years and has been used to reduce tissue swelling [9, 10]. The tonic vibration reflex is a long-term contraction of the muscles as a result of being subjected to vibrations. Vibrations with a frequency of 30-100 Hz activate the receptors of muscle spindles, tendons, and skin. Spindle discharges are sent through nerve fibers to the spinal cord, where the activation of polysynaptic reflex arcs leads to muscle contraction [11, 12]. The Vater-Pacini corpuscles, which are located in the deep layers of the skin, tendons, and joint capsules, are responsible for the sensation of vibrations.

VIBRATION MASSAGE

Vibration massagers use vibration technology that propagates along the treated area of the body. The resulting vibrations affect the muscle tissue as well as cause gradual warming and lymphatic drainage. Vibrations favour the flow of body fluids toward the heart and affect the removal of metabolic products (toxins, bacteria, viruses), which contributes to the restoration of proper lymph circulation in the body [3, 13, 14]. Therefore, vibrations have found their application in the treatment of obesity. It has also been observed that the vibrations performed in the vicinity of the nerve plexuses and along the course of the nerves reduce the increased excitability [14, 15]. The use of vigorous vibration stimulates muscle fibres, which increases muscle tone, and thus increases the growth and efficiency of muscle tissue [12]. The vibrations affect the smooth muscles of the blood vessels, resulting in their dilatation, increase in blood pressure, and slowing down the heart rate [14-16]. Relaxing a large number of muscles gives relief from ailments, but also has a relaxing

effect on the human body. On the other hand, the effect of vibration on the nervous system reduces the perception of pain [3]. Vibration massage is a slimming massage that combines a classic massage with the use of a device that generates vibrations. Such massage affects adipose tissue, which is made of cells filled with fat. The action of vibration accelerates the breakdown, fragmentation, and removal of fat cells, which undergo a faster burning process [13, 14]. On the other hand, the subcutaneous tissue is made of fibrous connective tissue. Between its fibres there are clusters of fat cells. Disturbances mainly in the subcutaneous tissue cause the formation of nodules and depressions on the surface of the skin, which resemble the "orange peel" characteristic of cellulite [4, 6]. A treatment using a vibrating massager can help reduce cellulite and accelerate and facilitate the removal of intercellular fluids. It stimulates the flow of lymph and blood in the vessels [12, 17]. As already mentioned, through the action of vibrations, the muscles are stimulated to intensive work, and the metabolism is stimulated, as a result of which toxins are excreted from the body. Under the influence of vibration, physical stimuli improve the elasticity and tension of tissues [3, 11, 18]. Metabolic balance affects the proper functioning of fibroblasts, which significantly affects the production of elastin and collagen. Under the influence of massage, tissue hormones such as serotonin and beta-endorphin (happiness hormones), and histamine (a hormone responsible for dilating blood vessels) are released. Massage shapes the figure and improves general well-being [3, 14].

Indications and contraindications for the treatment with the use of vibrations

Expected effects after the treatment with the use of vibrations:

- reduction of any type of cellulite,
- damage and breakdown of fat cells,
- skin firming all over the body,
- reducing the circumference of given body parts,
- removal of excess water from the body,
- stimulation of circulation and oxygenation of tissues,
- increase in red blood cells,
- improvement of metabolism,
- reduction of excessive muscle tension,
- increase in the blood supply to the muscles,
- stimulation of the nervous system.

Contraindications to the treatment using vibrations are:

- blood circulation disorders,
- acute inflammations,
- hypertension,
- thrombophlebitis,
- skin changes, such as ulcers,
- surgery of blood vessels (up to 2 months),
- acute states of muscular or osteoarticular degeneration,

- varicose veins,
- plastic surgeries in a given area,
- pregnancy,
- bone fragility,
- uncontrolled chronic diseases [13, 16].

AIM OF THE STUDY

The aim of the study was to assess the effectiveness of vibration massage in body shaping among female respondents who underwent this procedure.

MATERIAL AND METHODS

As a research tool, an original survey was used, containing 23 single-choice questions, the first 2 questions contained demographic data, and the remaining 21 questions concerned the vibration treatment. 120 people (women) took part in the survey.

The survey was conducted among the clients of the Yasumi Institute of Health and Beauty in Mielec, who decided to perform a vibration massage with the Pneumatic Slim device in order to model their figure. The examination was performed after the completion of the treatment series. Body massage included the front and back of the upper and lower limbs, buttocks, back, and abdomen, lasted 60 minutes, and was performed 2-3 times a week. The parameters of the vibration stimulus were 70 Hz, and the vibration speed was 4200 rpm. Country of manufacture of the device: Korea, distributor of the device: Yasumi Kalisz.

RESULTS

120 women took part in the survey. Among the respondents, a significant part was women aged 31-39 (35%) and 26-30 (30%), while a smaller proportion were women aged 40-49 (20%) and 18-25 (10%). The smallest age group included women aged 50 and over (5%) (Fig. 1).

For the majority of respondents (60%), the main reason for body-shaping was the desire to reduce body fat and cellulite. On the other hand, the smallest part of the respondents decided to shape the figure due to the lack of effects as a result of performing other body modeling treatments (5%) and lack of time for physical activity (5%) (Fig. 2).

All respondents participating in the survey had not previously used the Pneumatic Slim treatment, as well as other body-shaping treatments practiced in a beauty salon.

Among the participants during the procedure, the main attention was paid to body areas such as the buttocks (40%) and thighs (40%). The smallest part of the respondents decided to model the whole body (10%), waist (5%), and abdomen (5%) (fig. 3).

Before the vibration massage treatment, all respondents did not use any other body modeling treatments, and during a series of massages, they used only the Pneumatic Slim device.

A significant part of the respondents (80%) used a rational diet in terms of calorific value for the period of the procedure (Fig. 4).

People participating in the study (80%) did not use additional exercises performed at home or in the gym when using the device (Fig. 5).

The vast majority of the respondents (90%) used the vibration massage treatment three times a week, while the remaining part of the respondents (10%) attended the treatment twice a week (Fig. 6).

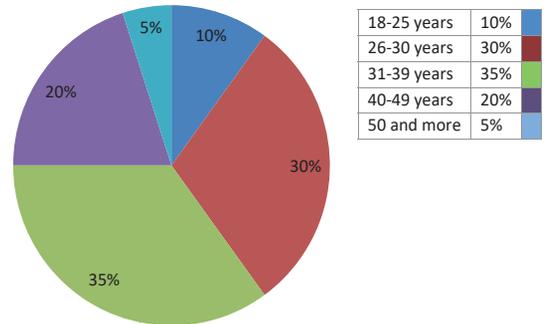


Fig. 1 Age range of respondents. Source: Own study.

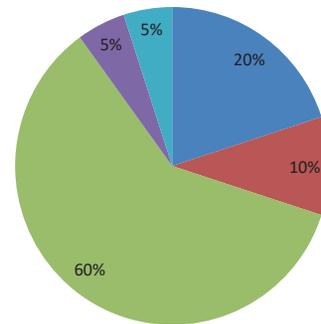


Fig. 2 What made you choose a body contouring treatment based on vibration technology? Source: Own study.

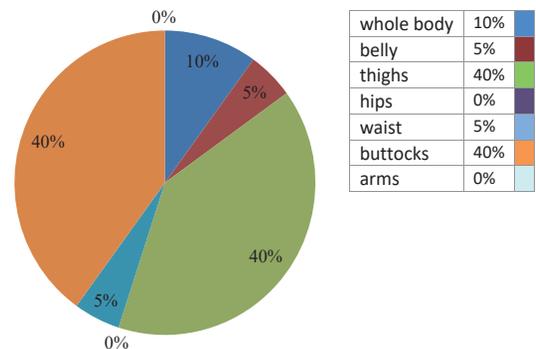


Fig. 3 Parts of the body - To which area of the body was particular attention paid during the procedure? Source: Own study.

The research group also answered the question about the number of treatments performed in a series of treatments, in 90% of people the treatment series of Pneumatic Slim massage consisted of 10 treatments, while 10% of respondents completed a series of treatments with 6 massages (Fig. 7).

During the body-shaping treatment with a vibrating massager, as many as 80% of the respondents did not feel any unpleasant sensations. The rest felt pain (10%) and burning (10%) and burning (10%) (Fig. 8).

20% of the respondents felt pain after the second vibration massage, and 80% of the respondents did not feel pain after any of the treatments (Fig. 9).

After the end of the massage with a vibrating device, all people felt increased pressure on the bladder and the appearance of bruises on the body.

During the Pneumatic Slim treatment, as many as 90% of the respondents noticed the first visible effects after 3-4 treatments (Fig. 10).

The vast majority of respondents (75%) indicated that the first visible effects after using the device were skin smoothing and firming. The remaining part of respondents noticed a reduction in cellulite (10%), a reduction in body fat (10%), and a reduction in the feeling of water retention in the body (5%) (Fig. 11).

Respondents (90%) who underwent the treatment for body shaping noticed visible effects of the massage. The remaining research group (10%) did not notice a beneficial effect on body-shaping after performing the vibration massage (Fig. 12).

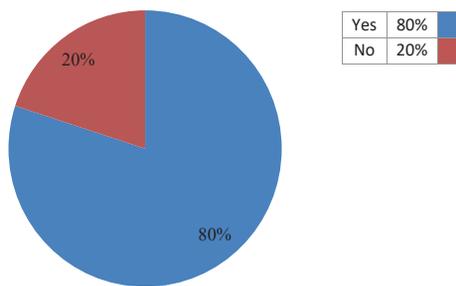


Fig. 4 Did you follow a rational diet in terms of calories during the therapy? Source: Own study.

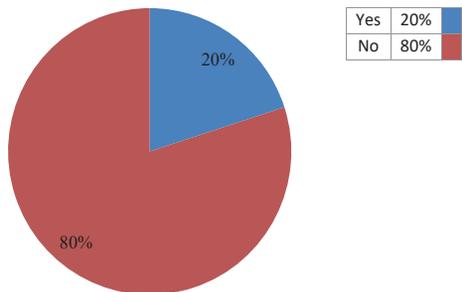


Fig. 5 In addition to the body-shaping procedure, did you use any additional exercises performed at home or in the gym? Source: Own study.

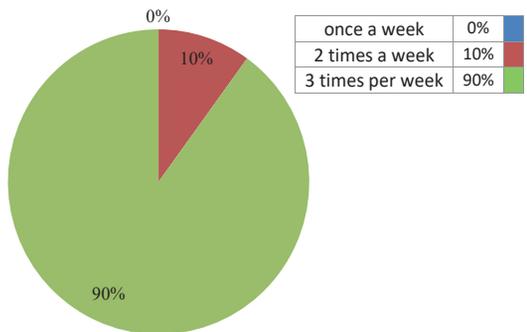


Fig. 6 How often were vibrotherapy treatments performed? Source: Own study.

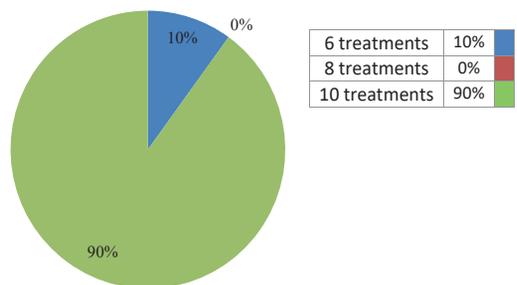


Fig. 7 How many Pneumatic Slim treatments did the series consist of? Source: Own study.

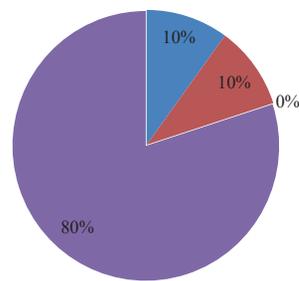


Fig. 8 What did you feel during the procedure? Source: Own study.

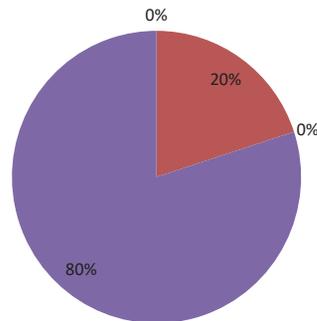
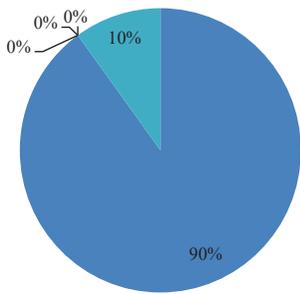


Fig. 9 After which procedure did you feel pain? Source: Own study.

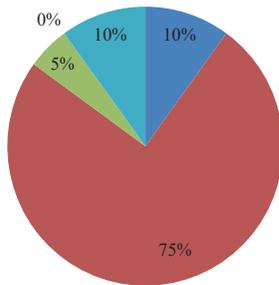
A definitely greater part of the respondents (90%) would decide to repeat the series of vibration massage treatments (Fig. 13).

Among the 120 people taking part in the survey, a significant part of the respondents (90%) were satisfied with the Pneumatic Slim treatment, while 10% of the respondents showed dissatisfaction with the body-shaping massage (Fig. 14).



after 3-4 treatments	90%
after 5-6 treatments	0%
after 7-8 treatments	0%
after 9-10 treatments	0%
after none of the treatments performed	10%

Fig. 10 After how many treatments did you notice the first effects? Source: Own study.



reduction of body fat	10%
smoothing and firming the skin	75%
reduction of water retention in the body	5%
loss of cm in the circumference of the treated body part	0%
cellulite reduction	10%

Fig. 11 What were the first visible effects after vibrotherapy treatments? Source: Own study.

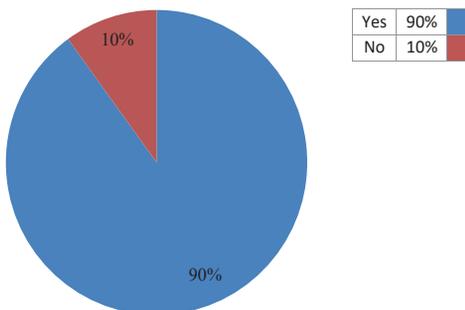


Fig. 12 Did you manage to achieve the intended effects? Source: Own study

As many as 90% of the respondents participating in the treatment with the use of a vibrating massager stated that the treatment was effective in body-shaping (Fig. 15).

A significant part of the respondents (90%) would recommend body modeling with the use of the Pneumatic Slim device (Fig. 16).

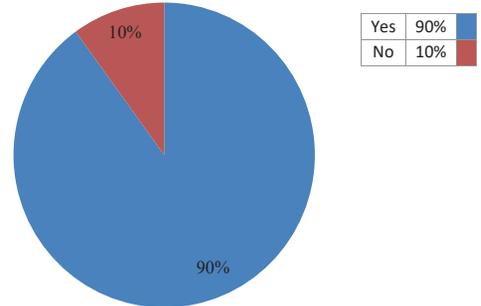


Fig. 13 Would you again decide to undergo a series of treatments based on vibrotherapy? Source: Own study.

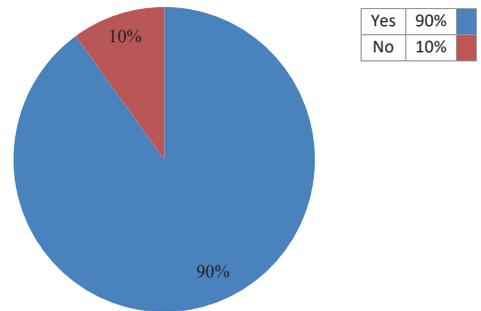


Fig. 14 Are you satisfied with the procedure? Source: Own study.

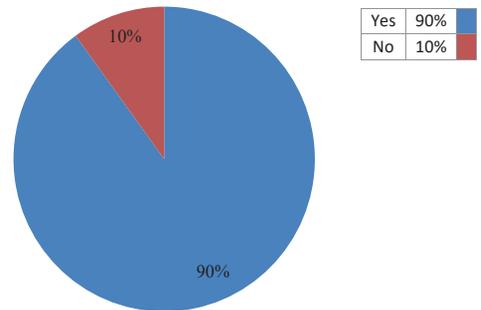


Fig. 15 Do you think that the treatment is effective in body-shaping? Source: Own study.

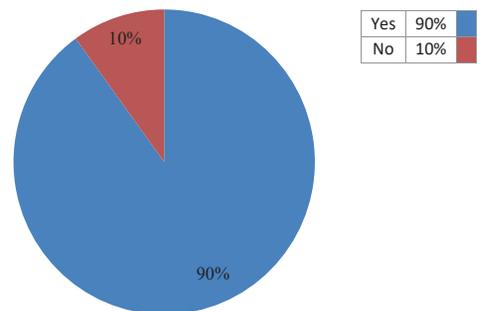


Fig. 16 Is the procedure recommendable for people looking for an alternative method of body-shaping? Source: Own study.

DISCUSSION

Vibration massage is a safe and effective method of eliminating adipose tissue, cellulite and revitalizing the skin. It is a procedure with a low risk of side effects. It uses vibration technology that has a positive effect on the human body, among others, by releasing tissue hormones (happiness hormones) [11, 12].

The women participating in the study indicated that the Pneumatic Slim treatment is effective in body modeling. The main reason for taking part in the study was the desire to reduce body fat and cellulite (60%). In the majority of respondents, the skin defect was visible in the area of the buttocks (40%) and thighs (40%). Most of the respondents (80%) used a balanced diet while using the modeling massage. Most of the respondents (90%) after the treatments noticed a significant improvement in skin firmness and cellulite reduction. In addition, the respondents were satisfied with the results obtained after the vibrotherapy treatment.

The results of the study can be compared to the results of a study assessing the impact of a ten-week vibration training to improve body composition and muscle strength in obese women. Researchers Milanese C. et al. conducted a study involving 50 obese women aged 40-50. The training lasted 10 weeks and took place twice a week. The aim of the study was to evaluate the effectiveness of the vibration platform in reducing body fat in obese women. The study participants tolerated the vibration training very well. The final results of the training showed that a vibration platform is an effective tool for improving body composition. Significant anthropometric and body composition variables were found in the individuals involved in the study. Based on the example of the above-mentioned article, it can be concluded that the vibrations generated in the vibrating platform also have a positive effect on the human body, contributing to the reduction of body fat [9].

The aim of the study conducted by Bothelo was to evaluate the effect of whole-body vibration on the reduction of cellulite. The study involved 42 women of different ages who had visible cellulite on their buttocks. The treatment consisted of 10 sessions. After the series of treatments, the results of the study confirmed that the training performed on the vibration platform provided an improvement in the reduction of cellulite on the buttocks. As a result of vibrotherapy to reduce skin defects, women participating in the training gained greater aesthetic satisfaction. The presented study results confirm the effectiveness of vibrations in the reduction of cellulite located on the buttocks and indicate satisfaction among women after the treatment with the use of vibrations [1].

On March 17, 2020, the first scientific article by Tadeusz Sadowski was published. The aim of the study was to evaluate the improvement in visible cellulite after using a vibrating device for 24 weeks. The study involved 40 women diagnosed with cellulite in the thigh area. After 12 weeks of continuous

massage, visible changes in the reduction of cellulite were noticed. The women were divided into two groups: a regression assessment group and a daily use assessment group. The final results of the study proved that continuous use of vibration massage has a positive effect on the reduction of visible cellulite. The results of the study presented in the above-mentioned article confirm the effectiveness of vibrations in body modeling [20].

A scientific paper published in the journal *ObesFakty* by scientists from the Department of Health Sciences at University College Antwerp describes a study that aimed to assess the effects of whole-body vibration combined with calorie restriction on body weight. 61 overweight or obese women in various age groups took part in the therapy. The total duration of the study was 12 months. The participants were divided into the following groups: control, diet, diet+fitness, and diet+vibration. The results of the study showed that in all groups using the whole body vibration (WBV) body weight loss was 5-10%. WBV training with calorie restriction contributes to achieving sustainable weight loss. The quoted results of this study confirm the thesis that vibrations have a beneficial effect on adipose tissue, causing weight loss and in order to achieve the result of vibration training, combining exercises on WBV with a diet plays an important role [11].

CONCLUSIONS

The survey carried out by the author showed a positive effect of the vibrotherapy treatment in terms of modeling silhouette and reduction of adipose tissue and cellulite. Unfortunately, in the available scientific publications, articles about the Pneumatic device Slim have not been found yet. Despite this, many scientists have published studies regarding vibrations generated in vibrating platforms. Research results in scientific articles differed in terms of the duration of the study, the number of women participating in the study, and the method of conducting the training vibration. In most cases, research carried out on the effectiveness of the whole-body vibration platform. The obtained conclusions are similar to the conclusions obtained in the study conducted by the author a survey on the effectiveness of action Pneumatic Slim treatment for body-shaping. Vibrotherapy found application in vibrating platforms, and vibrations are also used in cosmetic devices affecting muscle and fat tissue and skin.

SUMMARY

In the care of skin affected by cellulite, the main role is played by proper microcirculation within the skin and muscles, as a result of which toxic substances are removed from the body. The results of the study and the review of scientific reports lead to the conclusion that treatments based on vibrotherapy are an effective method for reducing cellulite and adipose tissue and in body-shaping.

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