



**TECHNOLOGICAL INNOVATION: REFREEZE TECHNOLOGY,
A COMBINATION OF ENDERMOLOGY AND
RADIOFREQUENCY IN THE TREATMENT OF GYNOID
LIPODYSTROPHY: A SYSTEMATIC REVIEW**

**INOVAÇÃO TECNOLÓGICA: TECNOLOGIA DE REFREEZE,
UMA COMBINAÇÃO DE ENDERMOLOGIA E
RADIOFREQUÊNCIA NO TRATAMENTO DA LIPODISTROFIA
GINÓIDE: UMA REVISÃO SISTEMÁTICA**

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UNA COMBINACIÓN DE ENDERMOLOGÍA Y
RADIOFRECUENCIA EN EL TRATAMIENTO DE LA
LIPODISTROFIA GINOIDE: UNA REVISIÓN SISTEMÁTICA**

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ABSTRACT

Introduction: Gynoid lipodystrophy, marked by the disproportionate accumulation of adipose tissue in the subcutaneous layer of the skin, significantly affects self-esteem and body perception, motivating the search for effective solutions. Endermology and radiofrequency technologies, especially when combined in the innovative Refreeze technology, promise advances in the treatment of this condition. Objective: This study aims to evaluate the effectiveness of integrating endermology and radiofrequency in reducing cellulite and improving skin texture. Methodology: A systematic review of

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studies published between 2005 and 2023 was carried out; the applicability and results of this therapeutic combination were evaluated. Conclusion: The findings indicate a significant improvement in skin texture and reduction in the appearance of cellulite, validating Refreeze technology as a less invasive and more effective approach.

Keywords: Cellulitis; radiofrequency therapy; vacuum; combination therapy.

RESUMO

Introdução: A lipodistrofia ginóide, caracterizada pelo acúmulo desproporcional de tecido adiposo na camada subcutânea da pele, afeta significativamente a autoestima e a percepção corporal, motivando a busca por soluções eficazes. As tecnologias de endermologia e radiofrequência, especialmente quando combinadas na inovadora tecnologia Refreeze, prometem avanços no tratamento dessa condição. **Objetivo:** Este estudo visa avaliar a eficácia da integração da endermologia e radiofrequência na redução da celulite e melhora da textura da pele. **Metodologia:** Foi realizada uma revisão sistemática de estudos publicados entre 2005 e 2023; a aplicabilidade e os resultados dessa combinação terapêutica foram avaliados. **Conclusão:** Os resultados indicam uma melhoria significativa na textura da pele e na redução da aparência da celulite, validando a tecnologia Refreeze como uma abordagem menos invasiva e mais eficaz.

Palavras-chave: Celulite; terapia por radiofrequência; vácuo; terapia de combinação.

RESUMEN

Introducción: La lipodistrofia ginoidal, marcada por la acumulación desproporcionada de tejido adiposo en la capa subcutánea de la piel, afecta significativamente la autoestima y la percepción corporal, motivando la búsqueda de soluciones efectivas. Las tecnologías de endermología y radiofrecuencia, especialmente cuando se combinan en la innovadora tecnología Refreeze, prometen avances en el tratamiento de esta condición. **Objetivo:** Este estudio tiene como objetivo evaluar la efectividad de la integración de la endermología y la radiofrecuencia en la reducción de la celulitis y la mejora de la textura de la piel. **Metodología:** Se llevó a cabo una revisión sistemática de estudios publicados entre 2005 y 2023; se evaluaron la aplicabilidad y los resultados de esta combinación terapéutica. **Conclusión:** Los hallazgos indican una mejora significativa en la textura de la piel y una reducción en la apariencia de la celulitis, validando la tecnología Refreeze como un enfoque menos invasivo y más efectivo.

Palabras clave: Celulitis; terapia de radiofrecuencia; vacío; terapia combinada.

1. Introduction

Adipose tissue is a dynamic organ, being the main lipid storage depot in our body, having an unlimited capacity for expansion (IBRAHIM, et al., 2009; KOENEN, et al., 2021). It plays crucial roles in our body, the main ones being thermogenesis and energy storage (HASSAN, et al., 2012). When this adiposity is deposited in specific regions, such as the subcutaneous layer of the skin, also known as subcutaneous adipose tissue, where it has adipose lobes, which are

separated by fibrous septa connected to the superficial fascia, which are defined and aligned perpendicularly to the skin. The organization of the fat lobules can vary, depending on the amount of fat and the thickness of the subcutaneous adipose tissue in each individual and as a consequence can lead to the development of Gynoid lipodystrophy, popularly known as cellulite (DA CUNHA, et al., 2015). And this is a recurring complaint among the population, as it affects not only their self-esteem, but also biopsychosocial factors, as there is a constant search to achieve the beauty standards set by social media, celebrities and fashion, shaping the perception of what is considered 'beautiful', leading to a search for an image that fits these standards. Thus, the search for unconventional alternatives, such as technologies that help to find this result, grows (BRITO, et al., 2015).

One of the most popular technologies for cellulite is the technique of mechanically massaging the tissue through the use of suction, in a non-invasive technique, enabling the mobilization of the skin fold. This technology is known and/or called endermology, or also as vacuotherapy or endermotherapy (BERGMANN, et al., 2021).

The technology from which endermology therapy originated was developed in the 1980s by Louis Paul Guitay of the LPG System company, called Endermology®, with the principle of gently stimulating the skin and subcutaneous tissue using suction energy with "roll-in and roll-out" movements (MALLOIZEL-DELAUNAY, et al., 2019). It stimulates adipocytes through receptors that lead to the release of fat cells, also stimulating fibroblasts to generate collagen and elastin (MALLOIZEL-DELAUNAY, et al., 2019). The mechanical massage takes place through two cylindrical rollers, with individual movements, which can elevate the tissue to the inside of the head during the treatment, forming a skin fold of tissue (KUTLUBAY, et al., 2013).

Another much studied and cited technology is radio frequency (RF), a technology from the 19th century that is radio frequency (RF), initially developed by the French physicist Jacques Arsène D'Ansoval (SOUZA, et al., 2018). This technology operates through electromagnetic waves of 30 KHz to 300 MHz that produce heat (MAIA, et al., 2021) when converting energy during interaction with

body tissue, triggering several positive health effects, such as increased metabolism and protein synthesis, the acceleration of biochemical reactions, and the promotion of toxin elimination. Additionally, RF improves lymphatic drainage and tissue oxygenation and nutrition. There are several RF modalities, including monopolar, which reaches the hypodermis; bipolar, which acts on the superficial layers of the skin; three-pole, which has an uneven energy distribution; and hexapolar, with six poles, providing a more homogeneous energy distribution (SOUZA, et al., 2018). RF generates heating of tissues with a high-water content, agitating their molecules while protecting the skin surface. Many RF devices include cooling systems to increase patient comfort, a technique known as thermotherapy that allows for deeper and more effective treatment, reaching temperatures of up to 40°C (SOUZA, et al., 2018).

Radiofrequency causes tissue heating, triggering several positive physiological effects, intensifying the body's biochemical activities. This heating effect also promotes sweating, helping to remove toxic substances from the body. At the same time, there is an optimization in the lymphatic drainage function and an improvement in tissue oxygenation and nutrition. Skin redness, or hyperemia, is a physiological sign of an increase in underlying body temperature (SOUZA, et al., 2018).

In a context of advanced technologies, it is important to conduct a detailed analysis of the subject and its results. This analysis aims to understand the results of each technology and whether the integration of two technologies provides better results than when they are separate. This study is based on Body Health's Refreeze technology, a tool that combines endermology, radiofrequency and thermotherapy, to examine whether the synergy between the technologies can enhance the desired effects.

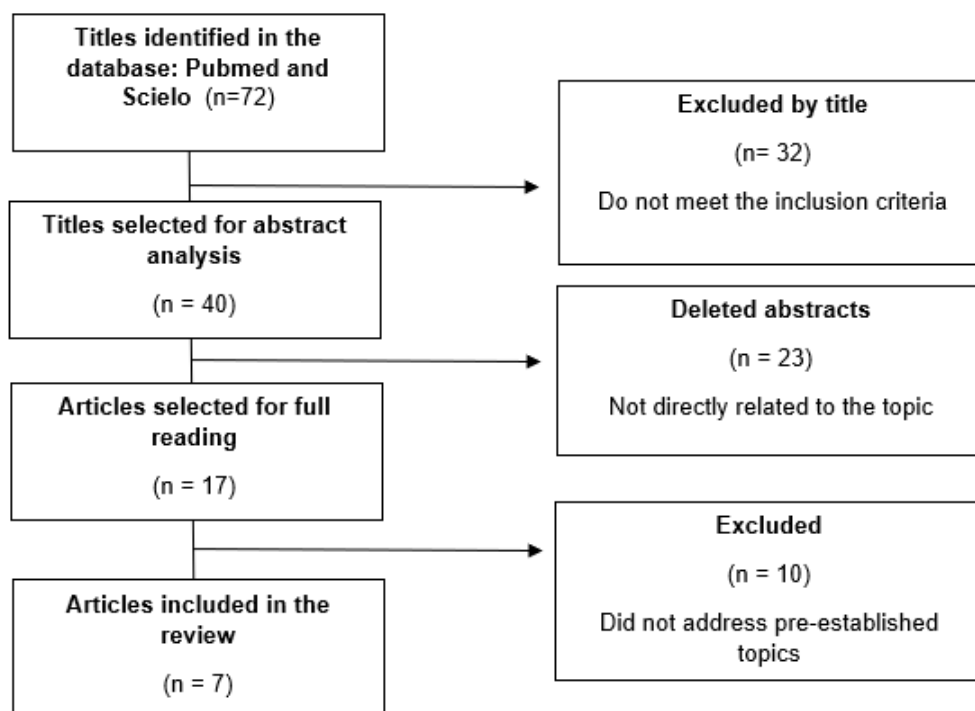
2. Methods

This article adopts a systematic literature review approach to analyze the impact of endermology and radiofrequency in combination on the reduction of localized adiposity. Studies evaluating the efficacy of the combination of both in improving cellulite and localized adiposity, published between 2005 and 2023 and

available in English and Portuguese, were included. Articles that only mentioned endermology and radiofrequency separately and were not open access were excluded. The search was carried out in electronic databases such as PubMed and Scielo, using the terms "cellulite", "radiofrequency therapy", "vacuum" and "combined therapy". The searches were complemented by analysis of the references of the selected articles to identify additional relevant studies.

In the initial phase of the research, we identified a total of 72 articles. Through analysis of the titles, 40 abstracts were selected for more detailed evaluation. Of these, 23 were discarded because they did not address any of the previously defined themes. In the next stage, we selected 17 articles for full reading, of which 7 met the established criteria and were incorporated into this review, as illustrated in Figure 1.

Figure 1 – Systematization of studies included in the review



Source: Author

3. Results

Table 1 provides a detailed overview of the articles used, their objectives, sample, treatment used and main results found. Table 2 presents comparisons on the results of endermology and radiofrequency separately and the

combination between them.

Table 1 - Treatment Effectiveness Table

01 - Treatment Effectiveness Table				
Authors	Objective	Sample	Treatment	Main results
Kulick (2006)	To evaluate the effectiveness of a device that combines RF, energy infrared and mechanical suction rollers to reduce skin surface irregularities in a limited treatment zone	16 patients	RF, infrared energy and mechanical suction rollers	Provided an improvement in the degree of cellulite in all patients lasting 6 months after the last treatment after regional therapy.
Arous et al., (2020)	To evaluate the therapeutic efficacy of the lipomassage endermology technique versus monopolar radiofrequency as a treatment modality to minimize cellulite formation.	45 patients (3 groups: G1 Endermology, G2 lipomassage and G3 Lymphatic Drainage)	Endermology lipomassage, Monopolar radiofrequency, Lymphatic drainage	Monopolar radiofrequency showed greater reduction in cellulite.
Alster et al., (2005)	To evaluate a new combined device involving radiofrequency, infrared light and mechanical tissue manipulation for the treatment of cellulite.	20 patients	Combination of RF, IR, Mechanical Massage	Cellulite can be significantly and safely reduced with the use of a non-invasive device that combines bipolar RF, infrared light and mechanical massage.
Kulick (2010)	To evaluate whether non-Invasive dual wavelength laser suction and massage Device is effective for Regional Cellulite Treatment	20 patients	Dual wavelength laser with suction and massage	Reduction in the volume of fat and improvement in the contour of the treated surface. Ninety-four percent of patients felt that their cellulite improved.
Hexsel et al., (2011)	To evaluate the safety and effectiveness of a bipolar radiofrequency, infrared, vacuum and mechanical massage device for treating cellulite and reducing body measurements	9 patients	Combination of bipolar RF, IR, vacuum and mechanical massage	Significant reduction in hip circumference, improvement in CSS.
Romero et al., (2008)	To evaluate a system that combines bipolar radiofrequency (RF) and intense infrared (IR) light along with mechanical massage and suction was recently reported to be effective in treating cellulite.	10 patients	RF, IR, mechanical massage, suction	Significant improvements in the appearance of cellulite on the treated side.

Brightman et al., (2009)	To evaluate whether the combination of infrared light (IR), radiofrequency bipolar (RF), vacuum and mechanical massage (Velashape, Syneron Medical Ltd, Israel) is effective in improving the appearance of the skin and the circumference of the thighs	29 (19 arms, 10 abdomen)	Velashape (RF, IR, mechanical massage)	Significant reduction in circumference and improvement in skin appearance.
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02 – Treatment comparison table

Feature	Mechanism of action	Efficiency	Limitations	Comments
Endermology	Mobilization of adipose tissue, stimulates lymphatic drainage	Effective, but possibly less than monopolar RF	Dependent on operator technique and experience	Recommended for less severe cases of cellulite
Radio frequency	Deep tissue heating stimulating collagen remodeling	High effectiveness in reducing cellulite, especially monopolar RF	May require multiple sessions for optimal results	Preferable for significant cellulite reduction
Combination	Synergy between different technologies to maximize effectiveness	Superior results compared to isolated treatments, especially for cellulite and skin laxity	Effectiveness may vary depending on the specific combination and treatment protocols	Recommended for integrated and optimized approach

Source: Author

The results indicate a favorable trend towards the use of radiofrequency, especially in its monopolar form, and the combination of treatments to achieve optimal results in reducing cellulite and improving skin texture, through an integrated and optimized approach.

4. Discussion

Cellulite affects around 95% of women between the ages of 15 and 45 and is a recurring problem (DA CUNHA, et al., 2015). The comparative analysis of cellulite treatment technologies, specifically radiofrequency (RF) and endermology, shown in the articles reviewed, offers promising prospects for the treatment of gynoid lipodystrophy. The combined approach of these technologies, described in the literature, suggests that the effectiveness of the treatment can be significantly increased through this combination of endermology

and radiofrequency, which act on multiple aspects of cellulite.

As mentioned by Malloizel (2019), endermology will stimulate adipocytes through receptors that lead to the release of fat cells, also stimulating fibroblasts to generate collagen and elastin through mechanical massage, which takes place through two cylindrical rollers, and radiofrequency has its mechanism of action as cited by the author Arous (2020) of inducing dermal heating, causing collagen degeneration, and consequently, improving the remodeling of collagen fibers and skin contraction, improving its appearance.

It is fully known that the two technologies, each in their own aspect, promote improvement in the appearance of the skin and cellulite, thus reducing the degree according to the CSS scale (Cellulite Severity Scale). However, although the results presented are encouraging, it is important to recognize the limitations of these studies, highlighting that a well-designed and structured protocol is crucial to obtain such results. The implementation of randomized clinical trials with a larger number of participants and long-term follow-up could provide more robust data on the long-term efficacy and safety of these combined technologies. Furthermore, investigating individual responses to treatment in relation to different degrees of cellulite could provide more knowledge, further optimizing its clinical applicability.

However, the integration of RF and endermology, which occurs in Refreeze technology, represents an important innovation in the treatment of cellulite, in line with the objective of offering more effective and less invasive solutions for this condition. The promising results observed in the reviewed studies provide a solid foundation for its clinical application, while also outlining a path for future investigations. By addressing both current limitations and potential directions for subsequent research, the field is well positioned to advance the understanding and management of cellulite, benefiting patients seeking more effective and satisfying treatments.

5. Conclusion

The studies analyzed show that the combination of endermology and radiofrequency is effective for the treatment of gynoid lipodystrophy. By

integrating these treatments, Refreeze technology represents an innovation in this field, offering a less invasive and more effective solution for treatment. However, it is worth emphasizing the need for more research, including randomized clinical trials and long-term studies, to validate the effectiveness of this combined approach. In view of this, through the systematic reviews, we can conclude that Refreeze technology has the potential to improve the clinical management of cellulite, generating benefits for patients seeking effective and satisfactory treatments, and for clinics, by simplifying procedures using a single technology that covers multiple treatments.

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