SURGICAL & COSMETIC DERMATOLOGY

Systematic Global Body Assessment: a tool to support optimal patient selection for non-surgical treatment of skin laxity

Avaliação Corporal Sistemática e Global: uma ferramenta para seleção de pacientes para tratamento não cirúrgico de flacidez cutânea

Original Article

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ABSTRACT
Introduction: The search for minimally invasive aesthetic procedures to improve non-facial skin laxity has been increasing annually. The biostimulator poly-L-lactic acid stands out as one of the most versatile products for aesthetic procedures in this field.
Objective: To develop a systematic assessment framework tool to guide treatment decision-making for skin laxity in extra-facial areas, since there are no reports regarding how to select the most appropriate patients for non-invasive body shaping with biostimulators to date.
Methods: The authors developed the tool described herein based on their collective experience with treatment of extra-facial skin laxity with poly-L-lactic acid.
Results: This assessment method collates input from four fundamental factors: somatotype/morphotype, skin quality/severity of laxity, distribution and quantity of adipose tissue, and nutritional and hormonal profile.
Conclusions: Each aspect of the framework has been developed to optimize decision-making and tailor the clinical experience for each patient, enabling clinicians to select the most favorable candidates for biostimulator use, leading to more predictable and optimized outcomes.
Keywords: Rejuvenation; Classification; Skin Aging.

RESUMO
Introdução: A busca por procedimentos estéticos minimamente invasivos para melhora da flacidez cutânea corporal tem aumentado anualmente. O bioestimulador ácido poli-L-lático destaca-se como um dos produtos mais versáteis para melhora da flacidez.
Objetivo: Desenvolver uma ferramenta sistemática de avaliação estruturada para orientar a seleção de pacientes com flacidez cutânea em áreas extrafaciais, uma vez que ainda não existem critérios publicados para indicar tratamentos não invasivos de contorno corporal com bioestimuladores.
Métodos: Os autores desenvolveram a ferramenta descrita, baseada na experiência coletiva do tratamento de flacidez cutânea em áreas extrafaciais com ácido poli-L-lático.
Resultados: Este método de avaliação integra quatro fatores fundamentais: somatótipo/morfotipo, qualidade da pele/grau de flacidez, distribuição e quantidade de tecido adiposo, e perfis nutricional e hormonal.
Conclusões: Cada componente da avaliação foi elaborado para otimizar a tomada de decisão e personalizar a experiência clínica, permitindo aos médicos identificar os pacientes mais adequados ao uso de bioestimuladores e alcançar resultados mais previsíveis e eficazes.
Palavras-chave: Envelhecimento da Pele; Rejuvenescimento; Classificação.

INTRODUCTION

As skin ages, collagen and elastic fibers degrade, and the consequent loss of structural support and subcutaneous fat results in the development of wrinkles and ptosis, changing the contour and reducing the projection of extra-facial areas.[1–3] Skin laxity becomes increasingly prominent in the arms, knees, thighs, buttocks, and abdomen, and is one of the main reasons patients seek aesthetic treatments.[4] The search for effective and safe non-surgical aesthetic procedures to improve body appearance and contour has increased significantly in recent years, especially with respect to injectable treatments; an increase of 55% in non-surgical treatments for cellulite and 18% for skin laxity was reported in 2019.[5] Poly-ʟ-lactic acid is a biodegradable, biocompatible collagen biostimulator that increases dermal collagen content.[6–8] Its facial use has been widely described[9,10] and recent reports have also demonstrated its application in extra-facial areas,[11] such as the buttocks,[12,13] thighs,[14] arms,[13,15] chest/neck,[16,17] and back of the hands.[18] However, adequate treatment planning tailored to each individual patient's profile is essential. The objective of this paper is to propose a global and systematic body assessment framework and associated tool to assess which patients with sagging skin in extra-facial areas might be eligible for the use of poly-L-lactic acid. This framework is based on four factors: muscle constitution (somatotype/morphotype), skin laxity and quality, adipose tissue, and hormonal/nutritional profile.

METHODS

The authors developed the tool described herein through experience sharing. The components of the assessment tool were defined based on the authors' collective experience of treating skin laxity in extra-facial areas with poly-L-lactic acid.

RESULTS

Muscle constitution

The assessment of somatotypes, also known as morphotypes, classifies the individual's physical structure profile through three primary components: muscle, bone, and body fat. This classification is one of the five clinical items of the global and systematic assessment tool (Table 1). Somatotype influences not only to the concept of weight gain or fat location, but also to how we age, and is determined by racial, genetic and epigenetic factors.[19] In clinical practice, this assessment consists of a general inspection of the patient's body in front, lateral and posterior views, seeking to determine the predominant somatotype of the patient (Figure 1).[20-22] Based on over 15 years of clinical experience, the authors suggest tailoring poly-L-lactic acid treatment to the patient's predominant somatotype. Overall, the mesomorphic somatotype is usually associated with the best clinical outcomes after poly-L-lactic acid injection, followed by the endomorphic and ectomorphic somatotypes, as summarized in table 1.

Skin quality and severity of laxity

Type I and type III collagen are the most abundant types found in human skin, with type I responsible for skin elasticity and resistance.[23] From the age of 30, there is a reduction of around 1% per year in type I collagen, increasing the degree of skin laxity.[23–25] Therefore, we selected the degree of laxity and skin quality as the second key consideration when conducting a systematic body assessment. This factor has a direct impact on treatment success: it defines the limits of sagging and the degree of the expected clinical response, as well as helps physicians estimate the number of sessions and vials that will be required. To define eligibility for treatment with poly-L-lactic acid, the authors suggest using a visual analogue scale to grade the severity of body skin laxity (Figure 2). The best and most evident results from poly-L-lactic acid application are obtained in candidates with grade 1 and 2 skin laxity, who usually require only 1 or 2 sessions, while those with grade 3 or 4 will require more treatments (3 to 4 sessions) to achieve satisfactory results.

Adipose tissue

Adipose tissue contributes substantially to body contouring.[26] Although the recommended modality to define the distribution of body fat in gynoid or android patterns is bioimpedance or dual-energy X-ray absorptiometry, this may not be available in all clinics.[27] For in-office evaluation, the authors suggest the use of a body fat caliper, which measures skinfold thickness from the superficial subcutaneous cellular tissue. Measurements should be performed on the right side of the body by pinching the skin with the index finger and thumb, while trying to differentiate subcutaneous tissue from muscle tissue. Three measurements should be averaged: the higher the value, the

Table 1: Additional recommendations for the use of poly-L-lactic acid according to the patient's somatotype	
Somatotype	Use of poly-L-lactic acid and expected results
Ectomorph	During treatment, protein and vitamin supplements should be prescribed alongside appropriate exercises to maintain the musculature.
Mesomorph	Good clinical response is expected.
Endomorph	Laser and/or other technologies, such as micro- and macro- focused ultrasound, radiofrequency, and acoustic wave therapy, should be considered alongside poly-L-lactic acid treatment.
All types	General lifestyle changes should be discussed, such as improved diet and physical activity.

FIGURE 1: Definition of somatotypes according to distribution of bone, muscle, and fat structures

greater the amount of subcutaneous adipose tissue. We suggest a 4-grade classification system according to the amount of adipose tissue present in the treatment area (Table 2).

Hormonal and nutritional profile
Hormonal profile

Sex hormones are key determinants of body fat distribution. Estrogen is the main hormone implicated in metabolic regulation, providing protection against the accumulation of adipose tissue[28] as well as stimulating collagen production and maintaining skin elasticity.[24,25,29,30] Thus, it would be interesting to measure serum levels of sex hormones, transport proteins (sex-hormone binding protein), gonadotropins, and sex steroids; however, these tests are not common in dermatologic clinical practice. We suggest an indirect evaluation by visual determination of body shape (Figure 3).[31] Based on the authors' clini-

cal experience, the hourglass and triangle body shapes are most appropriate for treatment with PLLA, as they are likely to denote higher levels of estrogen.[28]

Nutritional profile

The body mass index (BMI) is a validated tool widely used to assess for obesity or undernourishment.[32] The authors' clinical experience suggests that the ideal BMI for PLLA treatment is in the range of 18.5–24.9 kg/m^2; individuals with a BMI <18.4 kg/m^2 may not have the expected result due to low levels of body fat and muscle.

DISCUSSION

This article proposes a standard framework which has been developed into a tool to evaluate patients who seek treatment for extra-facial skin laxity by applying systematic assess-

FIGURE 2: Visual grading of skin sagging

ments based on four key factors (Figure 4). Although each of the classic somatotypes has distinctive characteristics, this classification may be considered on a spectrum.[21] Most patients have a predominance of two components, which can make it difficult to determine somatotype. Therefore, it is recommended to consider both visual evaluation and anthropometry/adipometry to define somatotype. It is important to emphasize that we are not suggesting that any one somatotype has a greater or lesser response to poly-L-lactic acid treatment, but rather that body constitution may influence the appearance of the skin and body contour, leading to a more or less apparent aesthetic result. Further studies are required to better understand these aspects

and their relationship with the results obtained with the use of biostimulators. The objective analysis of skin laxity has been studied previously.[33,34] Evaluating the patient's muscle condition is equally important, since muscle mass and tone can interfere with skin laxity in certain body areas; adequate muscle tone enhances aesthetic results, while weak muscles with significant hypotrophy can exacerbate skin laxity.[21] The results of treatment will be less visible in these patients, and their expectations should be aligned accordingly. One way to differentiate skin laxity from muscle flaccidity is to evaluate the area using the manual skinfold (pinch) test. In cases of skin laxity, in addition to slow return of the skin, ptosis and formation of spontaneous skinfolds (Grade

| TABLE 2: Presence of subcutaneous adipose tissue in the body region to be treated	
Grade	Condition of subcutaneous cellular tissue
Grade 1	Normal appearance; smooth subcutaneous tissue without localized fat.
Grade 2	Mild subcutaneous component in the area to be treated (skinfold: 0–3 cm).
Grade 3	Moderate subcutaneous component in the area to be treated (skinfold: 3–5 cm).
Grade 4	Subcutaneous component predominates over skin sagging (skinfold: >5 cm).

HOURGLASS TRIANGLE OVAL INVERTED TRIANGLE RECTANGLE
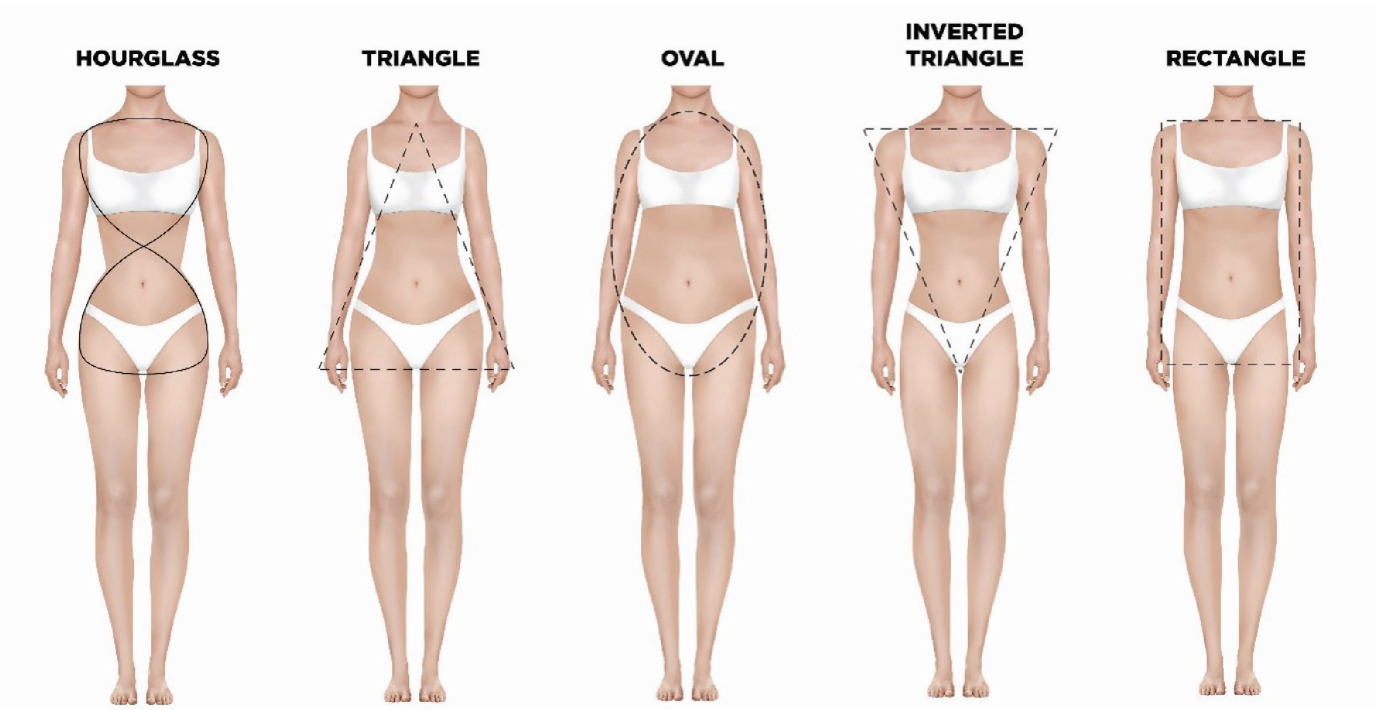
FIGURE 3: Body shape patterns

GLOBAL BODY ASSESSMENT FRAMEWORK AND ASSOCIATED TOOL
For sagging skin in extra-facial areas for PLLA injection

Condition of subcutaneous cellular tissue	Grade 2 (skinfold: 0–3 cm)	Grade 3 (skinfold: 3–5 cm)	Grade 4 (skinfold: >5 cm)
Visual assessment of the degree of sagging	Grade 2 (mild)	Grade 3 (moderate)	Grade 4 (severe)
Body shape pattern (hormonal profile)	Hourglass/ Triangle	Oval	Inverted Triangle/ Rectangle
Nutritional profile	BMI 18.5–24.9 kg/m²	BMI 18.5–24.9 kg/m²	BMI >24.9 kg/m²
Biotype	Mesomorph	Endomorph	Ectomorph

More favourable results ⟵ ⟶ Less favourable results

FIGURE 4: Systematic Global Body Assessment Tool

3–4) will be observed. Muscle laxity/hypotrophy, in turn, is characterized by a lack of well-defined contours and mobility of the muscle on palpation upon muscle contraction. Regarding adipose tissue, in the authors' experience, grade 1–2 skinfolds (up to a maximum of 4 cm) yield the most favorable results after poly-L-lactic acid application. Nevertheless, studies have shown that gradual weight loss improves the histological structure of the hypodermis, improving skin quality and retractability.[26] Thus, patients with Grade 4 adipose tissue or a BMIs in the overweight/obese range should be encouraged to seek professional nutritional guidance and increase the intensity and frequency of physical activity to obtain better results following biostimulator application. Since patients presenting with grade 3/4 fat deposits are less likely to achieve visible results, treatments with other technologies can be considered, either in parallel or instead of poly-L-lactic acid. It is important to note that low food intake and very intense physical activity can also interfere with the outcome of treatment, and more sessions may be required to obtain satisfactory results. Furthermore, post–bariatric surgery patients may have delayed responses to treatment due to changes in adipose tissue structure and skin condition;[35] nutritional supplementation is often required in these cases.

CONCLUSION

Aesthetic procedures, especially the use of poly-L-lactic acid, have been increasingly sought by patients who want to improve skin laxity in non-facial areas of the body. Having a method that enables a systematic and individualized evaluation of patients can further improve their satisfaction with poly-L-lactic acid treatment, align expectations, and optimize outcomes. The authors believe that the use of the proposed tool, based on four key factors, can facilitate the selection of candidates for the application of poly-L-lactic acid in extra-facial areas. ●

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