

Orbicularis muscle graft for treating deep glabellar rhytids

Enxerto de músculo orbicular para tratamento de rívide glabellar profunda

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ABSTRACT

Purpose: To evaluate the efficacy of grafting a preseptal strip of orbicularis muscle to treat deep static glabellar wrinkles.**Methods:** This was a prospective, interventional, case series study that included patients aged between 21 and 80, who underwent upper and lower blepharoplasty, and who presented varying degrees of deep static glabellar rhytids. After marking the glabellar rhytid, a subcision was made with 40 x 12mm needle along the entire length of the glabellar wrinkle. The orbicularis muscle graft was set into the recipient pocket already created in the glabella. The patients answered a self-assessment form about the results using the subject Global Aesthetic Improvement Scale after 6 months.**Results:** Seventeen glabellar rhytid fillings were performed. As for the subjective evaluation of the result of the specific glabella filling procedure, the patients were distributed as follows: 12 rhytids (70.6%; 12 out of 17) were self-assessed as much better; 4 rhytids (23.6%; 3 out of 17) were self-assessed as better, and 1 rhytid (5.8%; 1 of 17) was self-assessed as unchanged.**Conclusion:** This technique has excellent results, is easy to perform, has low morbidity and presents a high degree of satisfaction when patients evaluated themselves.

RESUMO

Objetivo: Avaliar a eficácia do enxerto de uma tira pré-septal do músculo orbicular no tratamento de rugas glabulares estáticas profundas.**Métodos:** Trata-se de estudo prospectivo, intervencionista, do tipo série de casos, que incluiu pacientes com idade entre 21 e 80 anos, submetidos à blefaroplastia superior ou superior e inferior e que apresentavam graus variados de rívides glabulares estáticas profundas. Após marcação da rívide glabellar, foi feita subcisão com agulha 40x12mm em toda a extensão da ruga glabellar, criando uma porta de entrada para o enxerto e formando um leito receptor na hipoderme. O enxerto do músculo orbicular foi inserido no leito glabellar. Os pacientes foram acompanhados considerando pós-operatório mínimo de 6 meses. Eles responderam a um formulário de autoavaliação sobre os resultados por meio da Escala *Global Aesthetic Improvement Scale*.**Resultados:** Foram realizados 17 enxertos de rívides glabulares (três pacientes submetidos ao procedimento bilateral). Quanto à avaliação subjetiva do resultado do procedimento, os pacientes foram distribuídos da seguinte forma: 12 rívides (70,6%; 12 de 17) autoavaliaram-se como muito melhores; 4 rívides (23,6%; 3 de 17) foram autoavaliadas como melhores e 1 rívide (5,8%; 1 de 17) foi autoavaliada como inalterada.**Conclusão:** A presente técnica apresenta excelentes resultados, é de fácil execução, apresenta baixa morbidade e alto grau de satisfação na autoavaliação.

INTRODUCTION

Facial aging is a multifactorial process involving involutional changes to the skin, subcutaneous tissue, facial muscles, ligaments, and bones. These changes are influenced by intrinsic (genetic) and extrinsic factors (sun exposure, smoking and diet etc.).^(1,2)

Facial rhytids represent a frequent aesthetic concern in clinical practice. The face is the foremost focus of human interaction and facial expression is essential in communicating emotions. The presence of rhytids when the face is at rest can give the wrong impression of negative emotions such as anger or sadness, or even mischaracterize people's personalities.⁽¹⁻³⁾

The glabellar rhytids are formed by the action of the corrugator supercilii and procerus muscles. They are highly prevalent and convey the impression of anger, rage, and dismay. If not properly treated they quickly evolve into static rhytids, becoming deeper and more difficult to treat.⁽⁴⁾

Therapeutic modalities for the treatment of these rhytids include the injection of botulinum toxin, hyaluronic acid or autologous fat filling, fractional radiofrequency, subcision, fractional CO₂ laser, microneedling, and polydioxanone threads (PDO) among others.^(1,4,5)

As the glabella is an extremely vascularized area, and its vascularization presents anastomosis between the internal and external carotid system, the use of hyaluronic acid fillers and autologous fat must be used with extreme caution in order to avoid embolization of the central retinal artery and consequent blindness – a much feared and prevalent complication after fillings in this location.⁽⁶⁾

Deep static glabellar rhytids present a therapeutic challenge, as the use of botulinum toxin may not provide satisfactory results and the use of heterologous and autologous fillers can result in serious complications.^(6,7)

Within this perspective, the use of a strip of preseptal orbicularis muscle to fill this rhytid became promising as its volume could vary, did not present risks of vascular embolization, and graft reabsorption tended to be minimal. The aim of this study was to evaluate the efficacy of grafting a preseptal strip of orbicularis muscle to treat deep static glabellar wrinkles.

METHODS

This was a prospective, interventional, case series study. It was carried out at the Luz Hospital de Olhos and Hospital Oftalmológico de Anápolis from July 2022 to April 2023. Informed consent and institutional review board/ethics committee approval were obtained at

Hospital Oftalmológico de Anápolis, under the number CEP #009/22. The study has adhered to the tenets of the Declaration of Helsinki. Patients were called consecutively and spontaneously to the oculoplastic service of the hospital. The informed consent of the clinical photographs was obtained and is on file.

This study included patients aged between 21 and 80, who underwent upper, or upper and lower blepharoplasty, and who presented varying degrees of deep static glabellar rhytids diagnosed through anamnesis and clinical examination.

All patients who were candidates for the procedure were invited to participate in this study and signed the informed consent. The patient could withdraw from the study at any stage without any harm.

Once selected, the patient was photographed frontally and obliquely using standardized distance, angles, and lighting.

Surgical technique

With the patient under local anesthesia with intravenous sedation and after marking the glabellar rhytid, a subcision was made with an 18-gauge x 1 ½" needle along the entire length of the glabellar wrinkle, creating an entry port for the graft and forming a host pocket on the upper surface of the hypodermis. Two holes were then made – one at the top of the rhytid and one at the bottom.

During upper blepharoplasty surgery, an orbicularis strip of variable volume and length – depending on the depth and extension of the glabellar rhytid – was removed from the preseptal portion of the exposed orbicularis muscle. This muscle graft was set into the recipient pocket already created in the glabella.

The orbicularis muscle strip was tied with a 5.0 nylon thread at both ends to facilitate placing it in the receptor pocket. The 18-gauge needle was placed in the rhytid again, and the 5.0 nylon thread was introduced into the needle lumen through the cannon and retrieved at the other end. The needle was then slowly withdrawn and became a guide for the insertion of the orbicularis muscle graft. After the graft had been completely introduced and positioned, the threads were cut, and the micro-incisions were dressed.

The patient received a follow up appointment considering a minimum postoperative period of 6 months. Photographic documentation was repeated on the reassessment dates.

After a minimum period of 6 months since the procedure, the patient answered a self-assessment form about

the results. The Global Aesthetic Improvement Scale (GAIS) was used for this, taking into account the patient's subjective assessment of the outcome of their procedure and they classified it as much worse, worse, unaltered, better or much better. The photographic images were also analyzed by an experienced and independent oculoplastic surgeon, who used the GAIS to evaluate results classified as either worsened, unchanged, mild improvement, marked improvement and exceptional improvement. The safety of the procedure was assessed by clinical observation of the patients, as were reports of any complications or adverse symptoms after the procedure. The statistical calculations were performed using the Statistical Package for Social Science (SPSS), and the significance level was 95% ($p < 0.05$).

RESULTS

Fourteen patients were eligible for the study, totaling 17 glabellar rhytid fillings (3 patients underwent the bilateral procedure) by the same surgeon. All of the patients selected were female with a mean age of 61.8 (ranging from 51 to 72). All 14 patients underwent the procedure concurrently with upper and lower blepharoplasty.

As for the subjective evaluation of the result of the specific glabella filling procedure, the patients were distributed as follows: 12 rhytids (70.6%; 12 out of 17) were self-assessed as much better; 4 rhytids (23.6%; 4 out of 17) were self-assessed as better; 1 rhytid (5.8%; 1 of 17) was self-assessed as unchanged (Table 1).

Table 1. Subjective and oculoplastic evaluation of the rhytids

Oculoplastic evaluation	Rhytids
Exceptional improvement	3/17 (17.7)
Marked improvement	7/17 (41.2)
Mild improvement	6/17 (35.3)
Unchanged	1/17 (5.8)
Subjective evaluation	Rhytids
Much better	12/17 (70.6)
Better	4/17 (23.6)
Unchanged	1/17 (5.8)

Results expressed as n/n total (%).

As for the evaluation of results collected from photographic images performed by an independent and experienced oculoplastic surgeon, the distribution of results was as follows: 3 rhytids (17.7%; 3 out of 17) were classified as exceptional improvement (Figure 1); 7 rhytids (41.2%; 7 out of 17) were classified as marked improvement; 6 rhytids (35.3%; 6 out of 17) were classified as mild improvement; 1 rhytid (5.8%; 1 of 17) was classified as unchanged (Figure 2).



Figure 1. Clinical photographs before and after surgery (front view). (A) Preoperative clinical photo. (B) Postoperative clinical photo ("exceptional improvement").



Figure 2. Clinical photographs before and after surgery (front view). (A) Preoperative clinical photo. (B) Postoperative clinical photo ("unchanged").

Regarding adverse symptoms, there were only complaints of hyperemia, ecchymosis, and hematomas. All of these disappeared with care and observation. There were no cases of infection in the sample presented.

DISCUSSION

Orbicularis muscle grafting in the glabella for the treatment of static glabellar rhytids was associated with a high rate of patient satisfaction, as 94.2% of patients (16 of 17 rhytids) reported improvement or much improvement in their rhytids on the proposed scale. This fact is confirmed by the high concordance rate presented with the evaluation carried out by an experienced and independent oculoplastic surgeon: evaluation classified as mild improvement (35%), moderate improvement (41%) and exceptional improvement (17.7%), totaling 94.2%

improvement. As far as we know, this is the first article describing this technique.

Orbicularis muscle grafting surgery in the glabella was associated with a very low rate of trans- and post-operative complications. No patient complained of any localized pain – only hyperemia, ecchymosis, and light bruising. There were no cases of postoperative infection in the graft area in the series, which suggests that this procedure presented low morbidity.

Obtaining the graft is easy as it is done concomitantly with the upper blepharoplasty surgery, thus not requiring another surgical location. Carrying out the procedure does not present significant technical difficulties either. As we made small holes for the entry of the guide needle, there was also no need for surgical synthesis in the recipient area, which further reduces the morbidity of the procedure, and it can therefore be characterized as a minimally invasive procedure.

The glabellar region is an area where there are few effective therapeutic options, given that it is highly vascularized and has much anastomosis between the internal and external carotid system, which could lead to thrombi in the central retinal artery, causing blindness or a low acuity permanent look. Viable solutions include hyaluronic acid fillers, filling with autologous fat (both with increased risk of serious complications, such as blindness and local necrosis), fractional radiofrequency, subcision, fractional CO₂ laser, microneedling, and PDO threads, among others.^(1,4,5)

Botulinum toxin is widely used in this area, with very low morbidity and excellent results. However, it presents limited results in cases of deep static wrinkles. In this situation, the orbicularis muscle graft in the glabella would be an excellent indication, considering that it works as an

autologous filler, with very low or zero risk of vascular embolization and low morbidity, as witnessed in this study.

The limitations of this study include the small casuistry, the lack of a control group, the lack of long-term follow-up and the lack of standardization of the length and thickness of the graft – as it varied according to the length and depth of the ridge of the graft patient, depending on the subjective judgment of the surgeon. We do not know whether partial or total muscle absorption occurs in the long term. More studies are required to assess long-term graft viability and to standardize the technique.

CONCLUSIONS

We conclude that the present technique has excellent results, is easy to perform, has low morbidity and presents a high degree of satisfaction when patients evaluated themselves.

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