

UDPS

UPDATE IN PLASTIC SURGERY

Vol. 6, 2, 2013

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ASSECE EUROPEAN ASSOCIATION OF AESTHETIC SURGERY





Editorial

Cari Amici,

strada è stata percorsa, tanti successi sono stati ottenuti e tante sfide ci saranno in futuro. Il 2013 è stato un anno difficile, per la situazione economica generale.

Ma tutti noi abbiamo fatto quadrato e abbiamo fornito ai nostri pazienti grande professionalità a costi contenuti.

Tutto questo senza rinunciare alla qualità e alla crescita personale.

Il 2013 è stato anche l'anno della rinascita del nostro sito.

Nuova veste grafica e ricco di nuovi contenuti.

Anche la nostra App, Plastic Surgery Planet è costantemente aggiornata ed è diventata un punto di riferimento anche all'estero.

Il Convegno/Incontro tenutosi a Ponte di Legno è stato un vero successo.

Momento di crescita personale con le relazioni dei nostri colleghi e anche momento di relax sulla neve.

Un'esperienza sicuramente che ripeteremo.

Il 2014 si presenterà con tantissime novità a partire dalla nostra rivista.

Ma non voglio svelare di più.

A tutti voi grazie e buon anno!

Dear Friends,

long road has been traveled, many successes have been achieved and there will be many challenges in the future. 2013 has been a difficult year for the general economic situation. But we all made square and we have provided our patients professionalism at affordable costs. All this without compromising on quality and personal growth.

2013 was also the year of the rebirth of our web site.

New graphic design and rich in new content.

Even our App, Plastic Surgery Planet is constantly updated and has become a reference point also to foreign countries. The meeting held in Ponte di Legno has been a real success.

Moment of personal growth with the reports with our colleagues and also relax in the snow.

An experience that definitely we will repeat.

2014 will present you with lots of news starting from our magazine.

But I will not reveal more.

To all of you thanks and happy new year!

Ruben Oddenino

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UPDATE IN PLASTIC SURGERY

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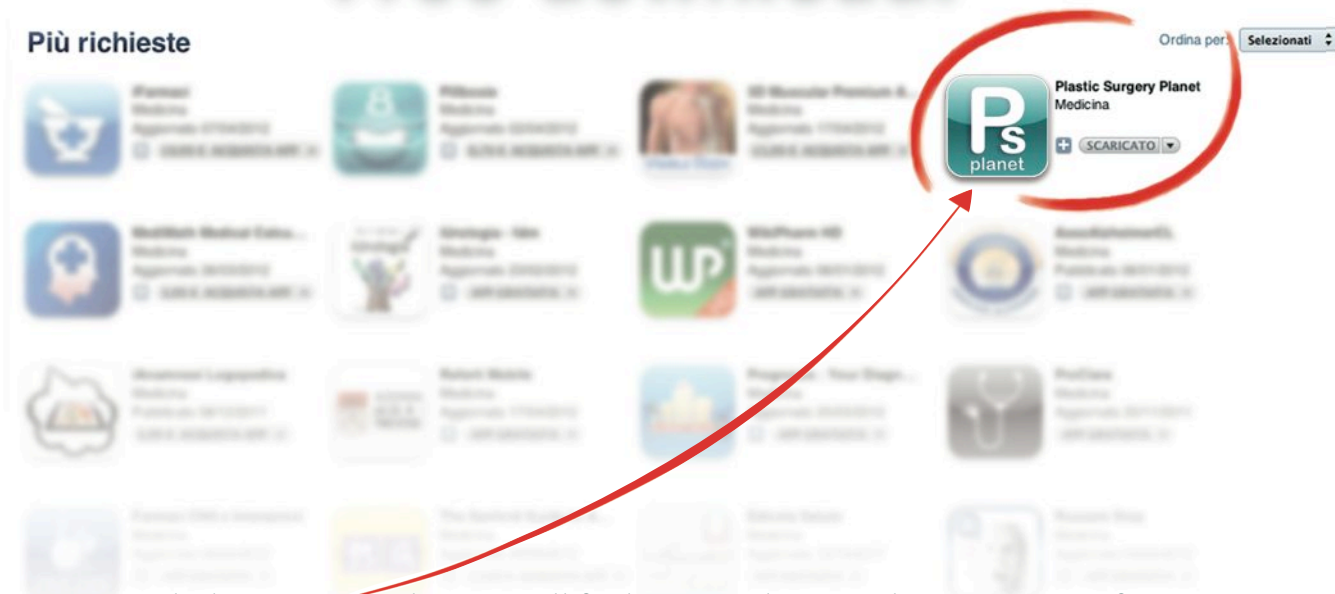


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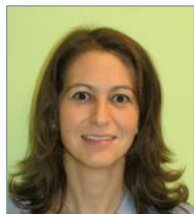
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Autologous fat graft after radiant therapy in breast reconstruction by flaps

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Valeria Bandi

Summary

Autologous fat graft after radiant therapy in breast reconstruction by flaps

Autologous fat grafting is nowadays a widely performed technique of reconstructive plastic surgery, in particular for treatment of burn scars, fibrous and atrophic tissues. Thanks to our experience in the use of autologous fat grafting, we thought to experiment the use of liposuction to reduce complications such as dehiscence or necrosis in high risk patients who had undergone mastectomy and radiant therapy for oncological purpose, in particular in the irradiated breast area of patients candidate to breast reconstruction by latissimus dorsi musculocutaneous flap, before the main surgical procedure. We believe, indeed, that the regenerative properties of fat graft, vascular improvement and architectural remodelling of soft tissues could play a role in preparing an irradiated site to major surgery. From March 2007 to January 2012, we treated with autologous fat grafting ten patients candidate to delayed breast reconstruction by means of latissimus dorsi flap surgery. We observed in all patients a significant improvement in skin texture, scar release and elasticity of irradiated mastectomy area at the follow up control after the autologous fat graft procedure and none of the patients presented any wound's complication after the surgical main surgical procedure. Therefore we believe that the use of autologous fat grafting is a valuable tool to prepare radiation-damaged tissues to major surgical procedures as latissimus dorsi's flap in breast reconstruction.

Key words: Adipocytes transplantation; Fat graft; Liposuction; Breast reconstruction.

INTRODUCTION

The reliability of vascularization of musculocutaneous flaps, such as the latissimus dorsi, determine the use of these to reconstruct breast in patients at high risk of complications¹. However, in patients who underwent radiation therapy after mastectomy and reconstruction in a delayed surgical time, some cases necrosis of the irradiated skin around the flap or dehiscence of suture after breast reconstruction is often observed.

Thanks to our experience in the use of autologous fat grafting, we thought to experiment the use of liposuction to reduce complications such as dehiscence or necrosis in those high risk patients who had undergone mastectomy and radiant therapy for oncological purpose. In particular, we decided to perform autologous fat grafting in the irradiated breast area of patients candidate to breast reconstruction by latissimus dorsi musculocutaneous flap, before the main surgical procedure.

MATERIALS AND METHODS

From March 2007 to January 2012, we enrolled ten patients candidate to delayed breast reconstruction by means of latissimus dorsi flap surgery (Figure 1). They were classified as high risk patients as they were all smokers and one diabetic. The mean age was 49.2 years, in a range of 39 to 67 years of age. 3 to 10 months before enrollment, all patients had undergone mastectomy, chemotherapy and radiation therapy. They all presented a recipient area characterized by poor tissue quality, in terms of vascularization and texture.

We performed a solely fat grafting procedure on all five patients, under continuous intravenous fentanyl infusion associated with local

anesthesia performed by the surgeon. The graft was obtained by Coleman's technique. From a sample of approximately 100 mL a purified volume of 42 to 60 ml (average 52,6 ml) was injected in the breast area of each patient. We used an 18-gauge angiographic needle with a snap-on wing to deposit the graft at the dermal-hypodermal junction.

No complication occurred. Breast reconstruction by means of latissimus dorsi flap and implant placement was performed three months after fat grafting.

RESULTS

We observed in all treated patients a significant improvement in skin texture, scar release and elasticity of irradiated mastectomy area at the follow up control after the autologous fat graft procedure.

At 2 weeks, 3 and 6 months follow up control after reconstructive main surgery, none of the patients presented necrosis or dehiscence of surgical wounds (Figure 2).

As compared to the results of six similar breast reconstructions, performed in equally high risk patients but not exposed to fat grafting, we found out that fat grafting had been capable of greatly reducing complications' occurrence.

In fact, complications had occurred in three out of six patients who had not previously received the graft.

DISCUSSION

Various studies conducted over the past 10 years have demonstrated the capability of autologous fat grafting to regenerate

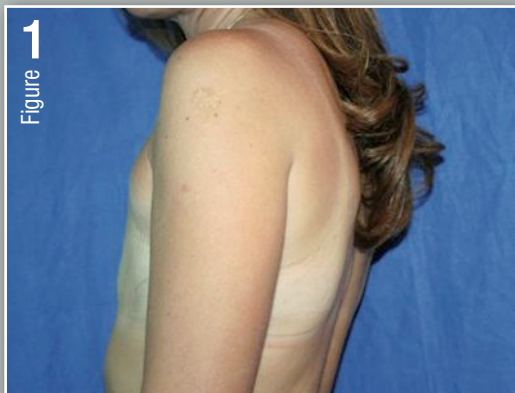


Figure 1

Figure 1.
Delayed breast reconstruction by means of *latissimus dorsi* flap surgery before autologous fat grafting and reconstructive procedure.



Figure 2

Figure 2.
Delayed breast reconstruction by means of *latissimus dorsi* flap surgery after autologous fat grafting and reconstructive procedure.

irradiated or injured tissues thanks to the presence of mesenchymal cells and angiogenic factors in the stromal vascular fraction of the graft^{2,3}.

Adipose tissue graft in fact improves skin quality and reduces scar retraction by promoting neo-vascularization and new collagen deposition in the recipient area⁴⁻⁷.

Rigotti et al. observed the efficiency of autologous fat grafting in the treatment of tissues damaged by radiant therapy, particularly in the breast area⁸.

For more than 10 years also our team experience a lot of success in the use of autologous fat grafting. Our last application of it was the aim to reduce local complication of the *latissimus dorsi's* flap when performed after mastectomy and radiation therapy; our preliminary experience shows that fat graft is an additional tool to prevent surrounding skin necrosis, when it is expected due to high-risk local factors. The regenerative properties of fat graft, vascular improvement and architectural remodelling of soft tissues could play a role in

preparing an irradiated site to major surgery.

CONCLUSIONS

Lipostructure is an easy, repeatable, low risk and non-invasive procedure with low morbidity; the use of autologous fat grafting is a valuable tool to prepare radiation-damaged tissues to major surgical procedures as *latissimus dorsi's* flap in breast reconstruction.

REFERENCES

1. Hammond DC. *Latissimus dorsi* flap breast reconstruction. *Clin Plast Surg* 2007; 34:75-82. Bibliographic Links
2. Cavaggioli F, Vinci V, Salva A, Klinger M. Human adipose-derived stem cells: isolation, characterization and applications in surgery. *ANZ J Surg* 2009; 79(11):856
3. Cavaggioli F, Klinger F, Villani F, Fossati C, Vinci V, Klinger M. Correction of Cicatricial Ectropion by Autologous Fat Graft. *Aesth Plast Surg* 2008; 32:555-557
4. Klinger M, Cavaggioli F, Klinger F, Pagliari AV, Villani F, Bandi V. Scar remodeling following burn injuries. In: Coleman SR, Mazzola RF, eds. *Fat injection: From Filling to Regeneration*. St Louis: Quality Medical 2009
5. Klinger M, Marazzi M, Vigo D, Torre M. Fat Injection for Cases of Severe Burn Outcomes: A New Perspective of Scar Remodeling and Reduction. *Aesth Plast Surg* 2008; 32:465-469
6. Klinger M, Cavaggioli F, Vinci V, Salva A, Villani F. Treatment of chronic post-traumatic ulcers using autologous fat graft. *Plast Reconstr Surg* 2010; 126(3):154e-5e
7. Klinger F, Cavaggioli F, Frocellini D, Vinci V, Maione L, Paiardi G, Klinger M. Breast fistula repair after autologous fat graft: a case report. *Case Reports in Medicine* 2011; 2011:547387. Epub 2011 Jun 7
8. Rigotti G, Marchi A, Galiè M, et al. Clinical treatment of radiotherapy tissue damage by lipoaspirate transplant: A healing process mediated by adipose-derived adult stem cells. *Plast Reconstr Surg* 2007; 119:1409-1422

Employment of needles in fat placement

Banzatti B, Colombo G, Arra E, Codolini L, Veronesi AM

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Barbara Banzatti

Summary

Employment of needles in fat placement

Autologous fat grafting is nowadays a widely performed technique of both aesthetic and reconstructive plastic surgery, thanks not only to its propriety of filler, but also to its regenerative effect on tissue trophism. Different approaches have been developed in recent years in methods of harvesting, processing and injection of fat, in order to achieve the best method of application. We believe that the injection technique has important implications on fat grafting survival and remodelling of tissues. Over the past 8 year, we experimented the use of a 18-gauge angiographic sharp needle (Cordis Corp., Bridgewater, N.Y.) for the Seldinger technique for the reinjection of transplanted fat cause we hypothesized that the use of sharp cannulas can create a better environment for fat graft survival thanks to the release of fibrous adherences and the enhancement of new collagen deposition. We observed very low morbidity as comparable to that experienced using the classical re-injection technique and we have obtained significant results in the treatment not only of burn scars but also of surgical scars, chronic ulcers, radio-dystrophic tissues and chronic neuropathic pain. We believe that sharp cannulas are a safe and effective alternative to classic blunt cannulas for adipose tissue placement, thanks to optimal results and no complications occurrence.

Key words: Needle; Fat graft; Lipostructure; Fat placement.

INTRODUCTION

Autologous fat grafting is nowadays a widely performed technique of both aesthetic and reconstructive plastic surgery. As described by Coleman, Rigotti, Klinger and more other surgeons it is more than a permanent filler because of its regenerative qualities studied and described in recent years. In particular it is a widely applied technique for both cosmetic and reconstructive purposes thanks not only to its propriety of filler, but also to its action on tissue trophism, leading to significant improvement in texture, color, softness and quality of skin and subcutaneous tissue and volumetric qualities in soft tissue augmentation¹.

Different approaches have been developed in recent years, in particular in methods of harvesting, processing and injection, in order to achieve the best method of application.

As we believe that the injection technique has important implications on fat grafting survival and remodelling of tissues, we experimented the use of a 18-gauge angiographic sharp needle (Cordis Corp., Bridgewater, N.Y.) for the Seldinger technique for the reinjection of transplanted fat (Figure 1).

MATERIALS AND METHODS

Over the past 8 years, we have performed more than 1000 surgical procedures to treat not only burn scars but also surgical scars, chronic neuropathic pain such as in Arnold neuralgia and PMPS^{2, 3}; we experimented the regenerative properties of fat grafting on radio-dystrophic tissues and hard-to-heal wound. We have obtained significant improvement in tissue quality and scar remodeling in all cases.

After harvesting and purification of the graft,

we perform fat releasing by moving the needle through two different methods in order to obtain the lysis of scar.

One first method consist of pushing the plunger of the syringe and leveraging the strength of exiting fat to overcome the fibrous tissue resistance, but it could determine intravascular injection of fat.

Therefore, we prefer to use a linear retrograde fashion technique that is performed by entering the needle for its entire length at the dermal-hypodermal junction and then, while extracting the needle, releasing fat.

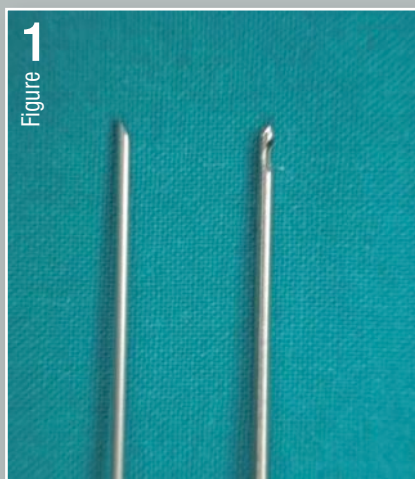
In that way, it is possible to perform a highly precise technique, avoiding to puncture vases (Figure 2).

A precise quantity of fat is deposited in each act, allowing a better survival of the graft at the dermal-hypodermal junction.

As much as in an aesthetic "needling procedure", we hypothesize that the use of sharp cannulas creates a better environment for fat graft survival because it releases fibrous adherences and also enhances new collagen deposition.

RESULTS

We observed very low morbidity as comparable to that experienced using the classical re-injection technique. The main after surgery complications, meaning oedema and bleeding of treated areas, have been nil, in this comparable to those of the classical technique. Patients report minimal discomfort after the procedure and we avoid new scars in the recipient area as sharp cannulas do not require skin incisions. In economic terms also, the use of 18-gauge angiographic sharp needles for the Seldinger technique is not

**Figure 1.**

18-gauge angiographic sharp needle (Cordis Corp., Bridgewater, N.Y.) compared with Coleman's cannula.

**Figure 2.**

Example of the linear retrograde fashion technique.

influential because they are disposable low-cost devices.

DISCUSSION

Since the pioneering experience of Coleman, improved techniques have transformed fat injections into reproducible grafts with long lasting results. Nowadays, many different approaches have been developed in the harvesting, processing and injection techniques but no standard procedure has been established⁴. Once the graft is harvested and processed fol-

lowing the codified procedure, blunt cannulas are classically used to re-inject fat. A scalpel skin incision is necessary to allow cannula access leading to creation of new scars and patients' discomfort. We also noticed that in the case of high tissue fibrosis such as in the case of burn scars treatment, blunt cannulas show limitations in overcoming tissue resistance due to the presence of fibrous tissue⁵⁻⁸. For these reasons we decided to experiment the use of a 18-gauge angiographic sharp needle (Cordis Corp., Bridgewater, N.Y.) for the Seldinger technique for the reinjection of transplanted fat. After an 8 year experience we had achieved an important confidence in the use of

this particular needles and we were able, thank to them, not only to treat with success scars and burn outcomes, but also to improve the aesthetic use of autologous fat grafting in terms of surgeon and patient satisfaction.

CONCLUSION

In conclusion, in our experience sharp cannulas are a safe and effective alternative to classic blunt cannulas for adipose tissue placement, thanks to optimal results and no complications occurrence both in aesthetic and in reconstructive surgery.

REFERENCES

1. Coleman SR. Structural fat grafting: more than a permanent filler. *Plast Reconstr Surg* 2006; 118(3 Suppl):108S-120S
2. Klinger M, Villani F, Caviggioli F, Bandi V, Banzatti B, Forcellini D, Nucca O, Klinger F, Catania B. Cellular technologies: fat harvesting, processing and injection in scars. *Agorà* 2010; 1
3. Caviggioli F, Forcellini D, Giaccone G, Catania B, Baserga C, Klinger M. Autologous fat graft: an additional or alternative treatment in the ulcer healing. *Update in Plastic Surgery* 2012
4. Caviggioli F, Klinger F, Forcellini D, Cornegliani G, Klinger M. Autologous fat graft and scar treatment. *Journal of Wound Technology*
5. Caviggioli F, Villani F, Forcellini D, Vinci V, Klinger F. Nipple resuscitation by lipostructure in burn sequelae and scar retraction. *Plast Reconstr Surg* 2010; 125(4):174e-176e
6. Caviggioli F, Klinger F, Forcellini D, Catania B, Salval A, Vinci V, Villani F, Klinger M. Scar treatment by lipostructure. *Update in Plastic Surgery* 2009; 2:2 pp. 51-53
7. Giaccone M, Banzatti B, Bandi V, Gaetani P, Klinger F, Klinger M. A new application of lipostructure: the occipital neuralgia. *Update in Plastic Surgery* 2012
8. Caviggioli F, Maione L, Forcellini D, Klinger F, Klinger M. Autologous fat graft in post mastectomy pain syndrome. *Plast Reconstr Surg* 2011; 128(2):349-52

Blepharoplasty complications: a literature review

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Riccardo Gazzola

Summary

Blepharoplasty complications: a literature review

Blepharoplasty is a popular procedure that accounts for 12.43% of all cosmetic surgical procedures. Although considered a safe procedure, complications could affect 3.8-12.7% of cases. The knowledge of the complications, including early signs, symptoms, diagnosis and treatment is essential. Literature is lacking about a comprehensive review of the major complications. We performed a literature review from 1974 to 2012 recording the most common as well as the most severe complications. Early signs, symptoms diagnostic procedures and treatment were also reported. The complications were then divided according to the affected anatomic region. Ocular complications include dry eye, ophthalmoplegia and blindness. Peri-bulbar complications consist in strabismus, cellulitis, Graves orbitopathy and lacrimal gland prolapse. Palpebral complications assemble eyelid hematoma, chemosis, ptosis, lagophthalmos and numbness. A good knowing, pre-operative evaluation and a watchful post-operative follow-up are essential to prevent the greatest number of complications, including the most severe.

Key words: Blepharoplasty; Complications; Ocular; Palpebral; Peri-ocular.

INTRODUCTION

Blepharoplasty is a common procedure, performed both for aesthetic and functional purposes.

According to the *American Society of Plastic Surgeons*, 196,286 blepharoplasties were performed in 2011 in the United States, accounting for 12.43% of all cosmetic surgical procedures¹.

Minor complications occur in 3.8 to 12.7% of cases² while major complications are rarer but they could lead to impairment or loss of sight in the most severe cases^{3,4}.

Several complications have been reported in literature, although a comprehensive review of transient and permanent complications is still missing.

The knowledge of the risk factors and the correct preoperative evaluation, as well as the prompt recognition of early signs and symptoms is essential to the practitioner to prevent and avoid most of the complications.

MATERIALS AND METHODS

A retrospective and extensive literature review, from 1974 to February 2012, has been performed. Complications, early signs, symptoms diagnostic procedures and treatment were recorded. Complications were divided by anatomic region.

DISCUSSION

Pre-operative evaluation

Acquiring patient history and systemic conditions is essential, along with systemic medications and sensitivities. The use of anticoagulants and any bleeding diathesis should be investigated.

Then detailed ophthalmological history has to be documented, including visual acuity, corrective lenses, trauma, glaucoma, allergic reactions. Moreover any corneal refractory surgery performed in the earlier six months should be investigated.

The interview should focus on any ocular symptom, like dry eye, eyelid irritation or edema, and visual obscuration^{5,6}.

During the examination the surgeon observes any sign of keratitis, corneal dystrophies, lagophthalmos. Bell's phenomenon is investigated and the Schirmer's test is performed⁶.

Complications

Complications of blepharoplasty could be divided into groups according to the anatomic region damaged by the complication: ocular, peri-bulbar and palpebral.

Ocular complications include dry eye, ophthalmoplegia and blindness, peri-bulbar complications include strabismus, cellulitis, graves orbitopathy, lacrimal gland prolapse, while palpebral include eyelid hematoma, chemosis, ptosis, lagophthalmos and numbness (Table 1).

OCULAR COMPLICATIONS

Dry eye

Dry eye is a common complication after blepharoplasty. The scarcity of symptoms could often lead to underdiagnosis of this condition. A *Schirmer's test* or tears *Break Up Time* (BUT) should then be performed before any surgical procedure although in most cases could not be enough. *McKinney, et al.* studied the value of Schirmer's test and BUT in predicting the dry eye syndrome. They analyzed 146 patients

Table 1 - Complications

Complication	Authors	Onset of symptoms	Treatment	Healing time
Dry eye	7, 8	1 hour-2 weeks	Eye lubricants Artificial tears	2 weeks - 2 months
Corneal abrasion	9	Perioperative	Eye lubricants Antibiotic eye drops	Individually
Ophthalmoplegia	11	Perioperative		Transient
Retrobulbar hematoma	4, 19-23	Perioperative	Medical: - Acetazolamide 500 mg - Mannitol Surgery	
Necrotizing fasciitis	24-29		Medical: Antibiotic Surgery	
Strabismus	30-33	Perioperative	Surgery	–
Cellulitis	34, 35	7 days - 1 month	Medical Surgery	–
Graves orbitopathy	36	8 weeks	Steroid	–
Lacrimal gland prolapse	37	Intraoperative	Surgery	Immediately
Eyelid hematoma	9	Perioperative	Medical Surgery (rare)	
Chemosis	18	Perioperative	Topical steroid	–
Ptosis	9	Perioperative	Steroid	–
Lagophthalmos	9	Perioperative	Eye lubricants	–
Numbness	38	Intraoperative	–	–

after blepharoplasty, evaluating for each patient ocular history, orbital and periorbital anatomy. 73% gave negative results and displayed transient burning symptoms in only 1,9% of cases. On the other hand, 27% had abnormal test's results, among them, 5% of patients developed dry eye syndrome.

They concluded that an abnormal preoperative ocular history or abnormal orbital and periorbital anatomy, rather than Schirmer's test or BUT alone, are best predictor for dry eye complication⁷.

This syndrome is common but in the most cases does not persist for more than two weeks after surgery.

In the review by *Hamawy, et al.* (202 patients) only the 10,9% developed persisted eye dry symptoms for more than two weeks achieving a complete resolution of symptoms within 2 months in most of cases⁸.

The management of dry eye should start with the preoperative evaluation with the anamnesis of the systemic risk (e.g. auto-immune diseases), environmental, anatomical and pharmacological. Patient management should then continue through the operation and into the postoperative recovery period. In most cases, this problem is treated with artificial tears and eye lubricants. The treatment is easy and could be then prescribed in all cases, virtually with no side effects⁸.

The patients with eye dry syndrome could

otherwise develop easily corneal abrasion. This complication is reversible and the symptoms are pain, foreign body sensation, light sensitivity. Normally this complication appears immediately after surgery⁹.

Corneal abrasions are usually reversible with the proper treatment in a variable time that depends from kind of lesion and the features of the single patient.

Less commonly, central corneal edema may appear after eyelid procedure, as described by *Kwok, et al.*¹⁰

They report the case of a 60 year old woman that developed this complication after upper lid tarsotomy to correct a cicatricial entropion.

This defect was corrected by full thickness tarsal incision.

Ophthalmoplegia

Unreactive pupil with no accommodative stimulus characterizes ophthalmoplegia. Transient internal ophthalmoplegia during blepharoplasty have been reported in three cases. This complication is probably caused by inadvertent anesthesia of the short ciliary nerves or ciliary ganglion by anesthetic diffusion. This produces a temporary pupillary mydriasis and accommodative insufficiency¹¹.

Blindness

Transient or permanent loss of vision after blepharoplasty is a rare but dis-

abling complication. The exact incidence of visual loss is still unknown, although *DeMere* in 1974 hypothesized this complication in 0.04% of blepharoplasties³. Several causes of blindness have been described in literature and could be grouped as follows: optic nerve damage and retinal stroke.

The former by compression of the nerve^{12, 13} or direct effects of blood waste products¹⁴ by retrobulbar hematomas, the latter by rising of intraocular pressure^{15, 16} (sometimes by occurrence of acute angle-closure glaucoma in susceptible individuals) or central artery occlusion^{17, 18}.

The causes of damage to the optic nerve and retinal stroke are mainly retrobulbar hematoma and necrotizing fasciitis. Retrobulbar hematoma could be provoked by resection of peri-orbital fat pad, sometimes after inappropriate damage of the orbital septum^{4, 19}.

The early symptoms are perioperative and postoperative vomiting, coughing, or Valsalva³, decreasing visual acuity, pain, proptosis, and ophthalmoplegia²⁰. The treatment of this complication should be immediate and not exceed 90-120 minutes^{21, 22}.

The protocol is both medical and surgical. The medical treatment includes carbonic anhydrase inhibitors (intravenous or intramuscular acetazolamide 500 mg), corticosteroids (hydrocortisone 100 mg intravenous), hyperosmotic agents (rapid infusion of 20% mannitol)²³.

The surgical treatment is mandatory if vision does not improve rapidly and consists in lateral canthotomy, inferior cantholysis and hematoma evacuation²⁰.

Necrotizing Fasciitis (NF) consists in a severe infection of subcutaneous tissues and fascia with 14.42% of mortality, which rarely affects the peri-orbital area²⁴.

Two categories of NF have been described: type 1 is a poly-microbial infection by mixed anaerobes, gram-negative bacilli and enterococci. This category affects predominantly immuno-compromised patients; type 2 NF consists of group A *Streptococcus pyogenes* with/without *Staphylococcal* co-infection²⁵. After blepharoplasty, NF begins with a superficial cellulitis with rapid progression along the fascial plane. The main symptoms are initially aspecific (pain, local edema and erythema). Fever and tachycardia accompany shortly the earlier symptoms²⁶. More advanced local symptoms are cutaneous necrosis and blistering²⁷, while the eye could display keratitis, uveitis or chorioretinitis²⁸.

The treatment of NF is aggressive and consists in parenteral antibiotics and surgical debridement. The course of this disease includes, if untreated, blindness, orbital lesions, meningitis, neurologic disorders and death²⁹.

PERI-OCULAR COMPLICATIONS

Strabismus

Strabismus could be observed usually in the first two or three post-operative days. This phenomenon may be transient, due to the muscle stress during the surgical procedure. The superior oblique muscle palsy or inferior rectus are more commonly involved. The involvement of different extrinsic muscles has been described. Mazow, *et al.* observed one case of horizontal strabismus in a 64 year old man after a four-lid blepharoplasty. In that case, the medial rectus muscle was involved. The complication was referred to an aggressive incision of the peri-orbital fat³⁰.

Syniuta, *et al.* observed in their case series of 12 patients, 7 cases affected by vertical deviation for an inferior rectus paresis after lower lid blepharoplasty. In the same study they observed that the most common affected muscle in upper lid blepharoplasty is the superior oblique³¹.

The patients with this muscle palsy can develop Brown's syndrome, consisting in the absence or limitation of gaze in elevation and adduction. This condition could be mono or bilateral. In one case this syndrome was reported secondarily to an upper lid blepharo-

plasty in a 56 year old man³². Ghabrial, *et al.* observed six patients affected by diplopia after transconjunctival eyelid blepharoplasty. They hypothesized in the pathogenesis of this complication, the concurrence of hemorrhage, edema and accidental muscle's incorporation during closure of orbital septum³³. A symptoms' duration longer than three days could indicate a permanent strabismus. In this case a minimum follow-up of three months is advised before taking into account any corrective surgical action. The patient could be usefully addressed to the ophthalmology and could be advised to dress corrective lenses.

Cellulitis

Orbital cellulitis is a rare and severe complication of blepharoplasty. The progression of this condition is rapid and should be considered a medical emergency³⁴. The onset of symptoms could occur even several days after surgery: proptosis, chemosis, conjunctivitis, diminished extra-ocular motility, eyelid erythema, pain and fever. The treatment of this condition could be challenging due to the development of resistant strains³⁵.

A cultural exams should be performed from the purulent secretions. CT scan should be acquired to study the orbital and eventually the intracranial extension of cellulitis. Blood cultures are useful and may reveal infections by hemolytic *Streptococcus* or *Streptococcus pyogenes*. The management of this patients is medical and surgical. When rapidly progressing, a surgical decompression of the orbit should be kept in consideration (see the paragraph "Blindness").

Graves orbitopathy

Graves orbitopathy is one of the most rare complications after blepharoplasty. The mechanism is unknown but we can suppose a stress mechanism on muscles inducing antibodies production. It's not clear whether this production is secondary to the inflammatory local reaction.

Rosenthal, *et al.* described a case of a 49 year old woman without thyroid or ophthalmologic disease. The reaction (rash and edema) in periorbital zone appeared 8 week after surgery and it was steroid responsive. This issue and the presence of the specific antibody led to the final diagnosis³⁶.

Lacrimal gland prolapse

Lacrimal gland prolapse is a common complication after upper lid blepharoplasty; the incidence amounts to 15% in the general population.

The prolapse could be divided in three levels: mild (0-2 mm), moderate (3-5 mm), or severe (6 mm or more).

The surgeon should diagnose and treat this condition intra-operatively in case of moderate or more severe prolapse.

When left untreated, the lacrimal gland prolapse could cause prolonged upper eyelid swelling and transient mild pain.

The surgical reposition of lacrimal glands is then advised and complication free³⁷.

PALPEBRAL COMPLICATIONS

Eyelid hematoma

Eyelid hematoma is a common complication after blepharoplasty and could develop from bleeding of the orbicularis muscle⁹. When the hematoma is not severe and retrobulbar hematoma has been ruled out, the treatment is conservative. Drainage and surgical revision are reserved for severe and rare cases.

Chemosis

Conjunctival edema can develop in the early or intermediate postoperative period as the result of incomplete eyelid closure, ocular allergy, or surgical edema with poor lymphatic drainage¹⁷.

Chemosis is worsened by systemic conditions, such as renal failure. Keratopathy may occur, as the edematous conjunctiva balloons around the cornea, preventing adequate tear film dispersion. Treatment is with preservative-free artificial tears and ointment. A mild topical steroid eye drop can be prescribed, although concurrent monitoring of the intraocular pressure and cornea is necessary. Systemic steroids are advised by others¹⁷. Rarely, a temporary suture tarsorrhaphy may be needed.

Ptosis and lagophthalmos

Ptosis and lagophthalmos are both the result of eyelid malposition during blepharoplasty.

Ptosis after blepharoplasty could be transient or persistent. The etiology of this complication is not clear although Lelli, *et al.* hypothesized that transient ptosis was the result of the mechanical action of edema or ecchymosis⁹. In case of persistent ptosis, a partial nerve injury should be considered or persistence of post-operative edema of levator. The second could be treated with steroid or diuretics.

On the other hand, lagophthalmos often occurs after blepharoplasty and in most cases it is transient. The issues that may lead to lagoph-

talmos are excessive skin removal, tethering of the eyelids by suture or steri-strips, trauma of the orbicularis muscle or peripheral seven cranial nerve lesion. There is an incomplete closure of the eye and the cornea is exposed, this can lead dry eye symptoms and corneal abrasions. Fortunately this is a transient complication that could be treated with eye lubricant if suspected⁹.

Conflict of interest statement

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REFERENCES

1. American Society of Plastic Surgeons. Plastic Surgery Procedural Statistics. 2011; Available from: http://www.plasticsurgery.org/Documents/news-resources/statistics/2011statistics/2011_Stats_Full_Report.pdf.
2. Codner MA, Wolff JN, Anzarut A. Primary transcutaneous lower blepharoplasty with routine lateral canthal support: a comprehensive 10-year review. *Plast Reconstr Surg* 2008; 121(1):241-50.
3. DeMere M, Wood T, Austin W. Eye complications with blepharoplasty or other eyelid surgery. A national survey. *Plast Reconstr Surg* 1974; 53(6):634-7.
4. Medina FM, Filho Pde TP, Freitas HB, Rodrigues FK, Caldato R. Blindness after cosmetic blepharoplasty: case report. *Arq Bras Oftalmol* 2005; 68(5):697-9.
5. Naik MN, Honavar SG, Das S, Desai S, Dhepe N. Blepharoplasty: an overview. *J Cutan Aesthet Surg* 2009; 2(1):6-11.
6. Gladstone G, Myint S, Black E, Brazzo B, Nesi F. Upper Blepharoplasty, in *Oculoplastic Surgery Atlas* 2003; Springer-Verlag. New York.
7. McKinney P, Zukowski ML. The value of tear film breakup and Schirmer's tests in preoperative blepharoplasty evaluation. *Plast Reconstr Surg* 1989; 84(4):572-6; discussion 577.
8. Hamawy AH, Farkas JP, Fagien S, Rohrich RJ. Preventing and managing dry eyes after periorbital surgery: a retrospective review. *Plast Reconstr Surg* 2009; 123(1):353-9.
9. Lelli GJ Jr, Lisman RD. Blepharoplasty complications. *Plast Reconstr Surg* 2010; 125(3):1007-17.
10. Kwok SK, Tse DT. Central corneal dellen: a complication of upper eyelid tarsotomy. *Ophthalm Plast Reconstr Surg* 2000; 16(3):237-40.
11. Perlman JP, Conn H. Transient internal ophthalmoplegia during blepharoplasty. A report of three cases. *Ophthalm Plast Reconstr Surg* 1991; 7(2):141-3.
12. Goldberg RA, Marmor MF, Shorr N, Christenbury JG. Blindness following blepharoplasty: two case reports, and a discussion of management. *Ophthalmic Surg* 1990; 21(2):85-9.
13. Callahan MA. Prevention of blindness after blepharoplasty. *Ophthalmology* 1983; 90(9):1047-51.
14. Gocer AI, Ildan F, Hacıyakupoglu S, Tuna M, Bagdatoglu H, Polat S, et al. The effect of immediate decompression on the optic nerve in retrobulbar hematoma. *Neurosurg Rev* 1996; 19(3):169-73.
15. Mahaffey PJ, Wallace AF. Blindness following cosmetic blepharoplasty-a review. *Br J Plast Surg* 1986; 39(2):213-21.
16. Heinze JB, Hueston JT. Blindness after blepharoplasty: mechanism and early reversal. *Plast Reconstr Surg* 1978; 61(3):347-54.
17. Kelly PW, May DR. Central retinal artery occlusion following cosmetic blepharoplasty. *Br J Ophthalmol* 1980; 64(12):918-22.
18. Haverals K, Augustinus A, Hondeghem K. Bilateral acute angle-closure glaucoma after blepharoplasty. *Bull Soc Belge Ophthalmol* 2010; (316):59-61.
19. Wolfort FG, Vaughan TE, Wolfort SF, Navarre DR. Retrobulbar hematoma and blepharoplasty. *Plast Reconstr Surg* 1999; 104(7):2154-62.
20. Winterton JV, Patel K, Mizen KD. Review of management options for a retrobulbar hemorrhage. *J Oral Maxillofac Surg* 2007; 65(2):296-9.
21. Hislop WS, Dutton GN, Douglas PS. Treatment of retrobulbar haemorrhage in accident and emergency departments. *Br J Oral Maxillofac Surg* 1996; 34(4):289-92.
22. Hayreh SS, Kolder HE, Weingeist TA. Central retinal artery occlusion and retinal tolerance time. *Ophthalmology* 1980; 87(1):75-8.
23. Ord RA. Post-operative retrobulbar haemorrhage and blindness complicating trauma surgery. *Br J Oral Surg* 1981; 19(3):202-7.
24. Lazzeri D, Lazzeri S, Figus M, Tascini C, Bocchi G, Colizzi L, et al. Periorbital necrotizing fasciitis. *Br J Ophthalmol* 2010; 94(12):1577-85.
25. Bisno AL, Stevens DL. Streptococcal infections of skin and soft tissues. *N Engl J Med* 1996; 334(4):240-5.
26. Kronish JW, McLeish WM. Eyelid necrosis and periorbital necrotizing fasciitis. Report of a case and review of the literature. *Ophthalmology* 1991; 98(1):92-8.
27. Carter PS, Banwell PE. Necrotizing fasciitis: a new management algorithm based on clinical classification. *Int Wound J* 2004; 1(3):189-98.
28. Shindo ML, Nalbone VP, Dougherty WR. Necrotizing fasciitis of the face. *Laryngoscope*, 1997; 107(8):1071-9.
29. Doorenbos-Bot AC, Hooymans JM, Blanksma LJ. Periorbital necrotizing fasciitis due to *Cryptococcus neoformans* in a healthy young man. *Doc Ophthalmol* 1990; 75(3-4):315-20.
30. Mazow ML, Avilla CW, Morales HJ. Restrictive horizontal strabismus following blepharoplasty. *Am J Ophthalmol* 2006; 141(4):773-4.
31. Syniuta LA, Goldberg RA, Thacker NM, Rosenbaum AL. Acquired strabismus following cosmetic blepharoplasty. *Plast Reconstr Surg* 2003; 111(6):2053-9.
32. Wilde C, Batterbury M, Durnian J. Acquired Brown's syndrome following cosmetic blepharoplasty. *Eye (Lond)*, 2012; 26(5):757-8.
33. Ghabrial R, Lisman RD, Kane MA, Milite J, Richards R. Diplopia following transconjunctival blepharoplasty. *Plast Reconstr Surg* 1998; 102(4):1219-25.
34. Chiu ES, Capell BC, Press R, Aston SJ, Jelks EB, Jelks GW. Successful management of orbital cellulitis and temporary visual loss after blepharoplasty. *Plast Reconstr Surg* 2006; 118(3):67e-72e.
35. Juthani V, Zoumalan CI, Lisman RD, Rizk SS. Successful management of methicillin-resistant *Staphylococcus aureus* orbital cellulitis after blepharoplasty. *Plast Reconstr Surg* 2010; 126(6):305e-307e.
36. Rosenthal EL, Baker SR. Development of Graves orbitopathy after blepharoplasty. A rare complication. *Arch Facial Plast Surg* 1999; 1(2):127-9.
37. Massry GG. Prevalence of lacrimal gland prolapse in the functional blepharoplasty population. *Ophthalm Plast Reconstr Surg* 2011; 27(6):410-3.
38. Klatsky S, Manson PN. Numbness after blepharoplasty: the relation of the upper orbital fat to sensory nerves. *Plast Reconstr Surg* 1981; 67(1):20-2.

CONCLUSION

Knowing any possible complication affecting blepharoplasty is essential to the practitioner.

A good pre-operative evaluation and a watchful post-operative follow-up are essential to prevent the most severe complications.

Rhinophyma treated with one-stage surgery and dermal substitute: technique and histological evaluation

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Francesco Leone

Summary

Rhinophyma treated with one-stage surgery and dermal substitute: technique and histological evaluation

Hyalomatrix® is a sterile dermal substitute. We applied it in two cases of rhinophyma following surgical excision with scalpel. No complications occurred. The healing time was comparable with other procedures and cosmetic outcomes were satisfying. Post-operative histological examination showed normal, well vascularized skin.

INTRODUCTION

Rhinophyma is a nasal skin disorder characterized by teleangectasia, hyper-vascularity, ¹ sebaceous gland hyperplasia, occluded sebaceous ducts and dermal fibrosis ². Aetiology and risk factors are still not clear ³, but it is generally accepted that this disorder can be considered as the final stage of an untreated rosacea.

Rhinophyma mostly affects Caucasian men from fifth to seventh decades of life.

The lower two-thirds are mainly involved, eventually yielding difficult breathing through narrowed nostrils ⁴.

Surgical treatments for advanced rhinophyma include surgical excision ⁵, electrosurgery ⁶, laser surgery ⁷⁻⁹ or cryosurgery ¹⁰.

Rhinophyma may be associated to malignancy ¹¹.

Hyalomatrix® is a sterile dermal substitute, including an inner layer of HYAFF® and an external elastomeric film ¹².

HYAFF® is a semi-synthetic family of biopolymers obtained by the controlled esterification of the hyaluronan with benzyl alcohol.

Hyalomatrix® is currently used for the treatment of acute wounds ¹².

Preoperative risk assessment, routine examinations and clinical photographs were performed. Informed consent was obtained from each patient. Cefazolin was preoperatively administered. Under general anaesthesia, local infiltration of about 5 mL of 3% mepivacaine with 1/100000 epinephrine was administered for haemostasis and postoperative pain relief. The affected tissue was excised with a #15 scalpel, up to the muscular and perichondral layer.

A Hyalomatrix® sheet was cut on the shape of the excised area, applied on the wound bed and fixed with 4/0 polyglactin sutures.

Both patients were discharged on the following day and followed up at 7, 14, 21, 28 days, 2 and 6 months after surgery. Hyalomatrix® was removed 2 weeks after surgery.

Biopsies were taken at 12 (first patient) and 6 months (second patient).

The clinical outcome of the procedure was evaluated by the timing of re-epithelialization and the patient's satisfaction.

RESULTS

No post-operative complications occurred. The operating time was 45 to 55 minutes and complete healing was achieved in 3 to 6 weeks. The first patient was followed up 12 months after surgery and no recurrence was found. The skin quality was good and both patients were fully satisfied with the outcome (Figure 2).

Histological features

In both cases, at intra-operative examination, the histological hallmarks of rhinophyma were found: hyperplasia of the sebaceous glands, vasodilatation in the

PATIENTS AND METHODS

From January 2010 to August 2011 we treated two patients with rhinophyma. The first patient (Figure 1), male, 51-year old, had no comorbidities, no known allergies, no history of smoke or alcohol abuse and did not undergo previous surgery.

The second patient, male, 79-year old, was diabetic, smoker, cardiopathic and had chronic obstructive pulmonary disease; he had no history of alcohol abuse and did not undergo previous surgery.

Key words: Surgery; Rhinophyma; Artificial skin.

superficial dermis, marked solar elastosis. In both cases, the histological examination one year after surgery showed the complete absence of sebaceous glands and also of solar elastosis (Figure 3).

The superficial and deep derma healed with slight fibrosis, identified by excess of collagen deposition.

The vascular pattern of the tissue, composed of vessels mostly perpendicular to the epidermis, was different from physiologic derma, suggesting a neoangiogenetic process¹⁴ from

the deep derma toward the superficial vascular plexus (Figure 3).

Before and after surgery, the epidermis appeared not involved by rosacea.

CONCLUSION

Instead of other surgical procedures, scalpel excision allows histological examination and detection of eventual malignancies¹. Healing by secondary intention

requires a long outpatient management with increased risk of infection¹, while the outer silicone layer of Hyalomatrix®, could act as a barrier towards contamination¹².

Full thickness skin grafts¹³ or local flaps may additionally imply donor site morbidity.

Our cases preliminarily show that scalpel excision of rhinophyma, combined with the use of a dermal substitute, offers a simple, rapid and effective management.

The healing time is comparable with the timing of other treatments⁶⁻⁹.



Figure 1.
Preoperative view.



Figure 2.
Postoperative view
8 months after surgery.

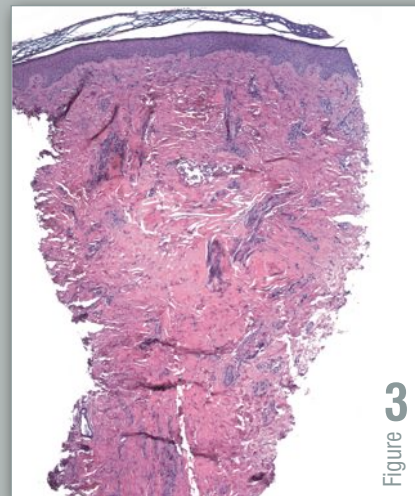


Figure 3.
H&E original magnification X10.
Histological evaluation 1 year after the operation which demonstrates the total absence of sebaceous glands.

REFERENCES

1. Rohrich R, Griffin J, Adams W. Rhinophyma: review and update. *Plast Reconstr Surg* 2002; 110(3):860-69.
2. Marks R, Harcourt-Webster JN. Histopathology of rosacea. *Arch Dermatol* 1969; 100:683-91.
3. Aloï F, Tomasini C, Soro E, Pippione M. The clinicopathologic spectrum of rhinophyma. *J Am Acad Dermatol* 2000; 42(3):468-72.
4. Lomeo PE, McDonald JE, Finneman J. Obstructing rhinophyma: a case report. *Otolaryngol Head Neck Surg* 2005; 133(5):799-800.
5. Greaney L, Singh NP, Roberts DN. Surgical management of rhinophyma. *Clin Otolaryngol* 2010; 35(2):158-9.
6. Rex J, Ribera M, Bielsa I, Paradelo C, Ferrándiz C. Surgical management of rhinophyma: report of eight patients treated with electrosection. *Dermatol Surg* 2002; 28(4):347-9.
7. Simo R, Sharma VL. The use of the CO₂ laser in rhinophyma surgery: personal technique, experience, complication, and long-term results. *Facial Plast Surg* 1998; 14(4):287-95.
8. Lim SW, Lim SW, Bekhor P. Rhinophyma: Carbon dioxide laser with computerized scanner is still an outstanding treatment. *Australas J Dermatol* 2009; 50(4):289-93.
9. Laube S, Lanigan SW. Laser treatment of rosacea. *J Cosmet Dermatol* 2002; 1(4):188-95.
10. Kempiaik SJ, Lee PW, Pelle MT. Rhinophyma treated with cryosurgery. *Dermatol Surg* 2009; 35(3):543-5.
11. Lutz ME, Otley CC. Rhinophyma and coexisting occult skin cancers. *Dermatol Surg* 2001; 27(2):201-2.
12. Myers SR, Partha VN, Soranzo C, Price RD, Navsaria HA. Hyalomatrix: a temporary epidermal barrier, hyaluronan delivery, and neodermis induction system for keratinocyte stem cell therapy. *Tissue Eng* 2007; 13(11):2733-41.
13. Jaramillo MJ, Stewart KJ, Kolhe PS. Phenytoin induced rhinophyma treated by excision and full thickness skin grafting. *Br J Plast Surg* 2000; 53(6):521-3.
14. West DC, Hampson IN, Arnold F, et al. Angiogenesis induced by degradation products of hyaluronic acid. *Science* 1991; 228:1324-6.

Treatment of Achilles tendon region ulcers using autologous fat grafts

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Summary

Treatment of Achilles tendon region ulcers using autologous fat grafts

Ulcers of the Achilles tendon region are common but difficult problems due to inadequate blood supply. Both spontaneous healing and surgical reconstruction in this area can be compromised by inadequate perfusion of skin, even in normal subjects. We present a case of a chronic ulcer treated with autologous fat grafting, a promising and known surgical technique of reconstructive and regenerative surgery. Traditional and advanced wound dressings have been used in this patient without clinical improvement for a period of three months. Two weeks after fat grafting, indeed, evident signs of clinical improvement with a clear reduction on the ulcerated area appeared. One month after fat grafting, the ulcer was completely healed. We think that the treatment of ulcers of the Achilles tendon region by fat grafting is leading to encouraging results and could become suitable in many types of ulcers. The possibility of treating major dehiscence by performing this treatment offers several advantages; it is a minimally invasive technique, which uses a tissue which is straightforward to collect and obtains excellent results. The new perspective gathered with the case study presented suggests it is possible to solve complicated wounds with just one session of autologous fat grafting, allowing treating those cases in which split-thickness skin-graft or other medical treatments do not find the proper solution, granting results which are stable over time.

Key words: Adipocytes transplantation; Fat graft; Liposuction; Ulcers.

INTRODUCTION

Ulcers of the Achilles tendon region are common but difficult problems due to inadequate blood supply. Both spontaneous healing and surgical reconstruction in this area can be compromised by inadequate perfusion of skin, even in normal subjects. Healing an ulcer on the Achilles tendon region is a difficult goal.

The skin is mechanically stressed by the gliding of the underlying tendon, and this causes tension on the ulcer's margins, sometimes damage is associated with underlying tendon injuries that required orthopedic consulting and reconstruction. The surgical techniques more used are skin grafts and local flaps. In addition to requiring the immobilization of the patient for a long time, these techniques often do not give satisfactory results.

MATERIALS AND METHODS

We report the case of a 63-year-old patient with chronic ulcer of the Achilles region in outcomes of surgery tarsorrhaphia for subcutaneous rupture of Achilles' tendon (Figure 1). Traditional and advanced wound dressings have been used previously without clinical improvement for a period of three months. No comorbidities were reported except of hypertension controlled by therapy. According to our clinical evidence (e.i., significant improvement in texture, color, softness, quality of skin and subcutaneous tissue, functional motility, and pain) and histologic findings (e.i., patterns of new collagen deposition, local hypervascularity, dermal hyperplasia and regeneration of annexial structures)¹⁻⁵, we carried out the remediation of the ulcer by grafting autologous adipose tissue. After clinical assessment and routine preoper-

ative examination, the patient underwent only one intervention under local anesthesia.

After tumescent infiltration of 70 ml of saline solution, 20 mg di mepivacain, 7.5 mg di levobupivacain and 0.5 ml of epinephrine 1:1000, liposuction of the subumbilical area by means of a 10-ml syringe was performed. An adipose tissue sample of approximately 8 ml was obtained and processed following Coleman's technique (i.e., centrifuged at 3000 rpm for 3 minutes).

A volume of 5 ml was injected using an 18-gauge angiographic needle with a snap-on wing at the dermal-subdermal junction of the margins and at the central region of ulcer. The patient was followed up at 2 weeks, 1 month, 3 months, 6 months and one year.

RESULTS

At the first visit, two weeks after fat grafting, evident signs of clinical improvement with a clear reduction on the ulcerated area appeared.

At the second visit, one month after fat grafting, the ulcer was completely healed (Figure 2).

At 6 months and 1 year follow-up examination, the tissue integrity was preserved. In addition the patient reported an improvement in the quality of life, returning to perform tasks that previously were limited by pain and the increased risk of infection.

DISCUSSION

In most cases, advanced wound dressings are able to restore an adequate skin healing; however in a significant percentage



Figure 1.

Chronic ulcer of the Achille region in outcomes of surgery tarsorrafia for subcutaneous rupture of Achilles' tendon.



Figure 2.

Chronic ulcer of the Achille region one month after fat grafting.

of patients resolution of injury does not occur causing the establishment of a tendon exposure and a hard-to-heal wound. Cutaneous injuries of the Achilles tendon area have a strong tendency to become chronic, probably, because the local area is characterized by poor vascularization and a very thin cutis layer and is constantly subjected to tensile forces. A large variety of surgical techniques have been used over the years, such as local flaps, free flaps and skin grafts.

Our team has obtained important results using adipose tissue grafting in cases of post-traumatic chronic ulcers, delivering complete wound healing of treated areas through the interaction between lipoaspirate centrifuged and injured tissues. Observed data regarding wound healing and pain resolution are compatible with our previous studies regarding fat graft applications.

The rapid improvement in wound healing and the complete reepithelialization of ulcer suggest that deep biological interactions between transplanted fat in dermal-subdermal structures occur very early.

We also found that this result is stable over time. Our research¹⁻⁵ and other evidence in the literature suggest an active role of adult mesenchymal stem cells from the stromal fraction of harvested fat.

We didn't yet understand which are the molecular components bring to it.

Nevertheless, we think that the treatment of ulcers of the Achilles tendon region by fat grafting is yielding encouraging results and could become suitable in many types of ulcers. The possibility of treating major dehiscences, by performing this treatment offers several advantages; it is a minimally invasive technique, which uses a tissue which is

straightforward to collect and obtains excellent results.

CONCLUSION

The new perspective gathered with the case studie presented suggests it is possible to solve complicated wounds with just one session of autologous fat grafting, allowing treating those cases in which split-thickness skin-graft or other medical treatments do not find the proper solution, granting results which are stable over time.

The treatment of post-traumatic injuries of the Achilles tendon area with autologous fat graft provides a promising mini invasive surgical alternative to wound healing; our future aim is to extend autologous fat graft to many other type of skin injuries which are hard-to-heal.

REFERENCES

1. Klinger M, Caviggioli F, Klinger F, Pagliari AV, Villani F, Bandi V. Scar remodeling following burn injuries. In Coleman SR, Mazzola RF, eds. *Fat injection: From Filling to Regeneration*. St. Louis: Quality Medical Publishing 2009
2. Klinger M, Caviggioli F, Klinger F, Forcellini D, Villani F. Scars: A review of emerging and currently

available therapies. *Plast Reconstr Surg* 2009;124:330

3. Klinger M, Marazzi M, Vigo D, Torre M. Fat injection in severe burn outcomes: A new perspective of remodeling and reduction. *Aesthetic Plast Surg*. 2008; 32:465-469
4. Klinger M, Caviggioli F, Vinci V, Salval A, Villani F.

Treatment of chronic posttraumatic ulcers using autologous fat graft. Plastic and Reconstructive Surgery 2010; 126:154e-155e.

5. Caviggioli F, Forcellini D, Giaccone M, Cornegliani G, Baserga C, Klinger M. Autologous fat graft: an additional or alternative treatment in the ulcer healing. *UpDate in Plastic Surgery* 2012; Vol. 5, 1.