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Advanced Aesthetic Rhinoplasty

Art, Science,
and New Clinical
Techniques

 Springer

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47.1 Introduction

There are many procedures described in the medical literature in order to correct volume defects in rhinoplasty, such as the osseous or cartilaginous autologous graft, the lyophilized bone, or synthetic materials, but all of them, at a higher or lesser level, can show some undesired effects, such as the reabsorption, intolerance, granulomas, visualization of the graft edges, or the migration of the implant [1–6]. With the idea of trying to avoid the undesired effects, we provide you with our protocol for the correction of the dorsum nasi defects by using other techniques, especially with the use of a dermic regeneration template (Integra™).

When the osseous dorsum nasi defects or the nasofrontal angle needs a moderate augmentation, the author uses demineralized bone matrix activated with platelet growth factors (PGF). When it is necessary to correct more important defects of the osseous dorsum nasi that need a higher volume of correction, or defects that affect

not only the osseous dorsum but also the cartilaginous one, the demineralized bone matrix with PGF is not the best way to follow for two reasons: the first one is that it is not possible to obtain a big increase in volume, and the second one is that an osseous bed is needed in order to be placed and start the process of osseous regeneration. For these reasons, in these cases, we prefer to use the dermic regeneration template of an only sheet (Integra™), which allows us to have a constant regeneration of autologous dermic tissue of the suitable thickness [7, 8], obtaining excellent results, above all in post-traumatic cases and secondary rhinoplasties.

The dermal regeneration template is a porous matrix of glycosaminoglycans and collagen, which provides us with a three-dimensional structure necessary for the cellular invasion and growth, which function is to stimulate the organism in the creation of autologous dermis. Although it is a synthetic material, it is completely absorbed in 4–6 months [9], and it is replaced totally by the own patient's tissue. It has an easy handling and versatility because it can be folded on its own and the size and shape of the implant can be designed as wished.

The proposed surgical treatment, as an alternative to the use of other grafts for the restoration of the defects of the dorsum nasi in the augmentation rhinoplasty, is the use of the dermic regeneration template, as the material for increasing volumes, improving the contours, and hiding the

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aesthetic defects. This material can be grafted under the cutaneous tegument without complications, and it keeps achieving its objective, the same as it is placed on the damaged tissue as a coating in case of burns or tissue lost [10–12].

If the author does not want to give volume, just some more thickness to the entire nasal contour (in cases of very thin skins to avoid that the osteocartilaginous structure could be seen excessively), either dermis regeneration template (Integra™) or a cellular dermis (Alloderm™) is used and placed it all over the dorsum nasi.

47.2 Technique

The use of the dermal regeneration template has already succeeded in other areas of the body in plastic surgery, such as the correction of cranial osseous defects [7].

The author used dermal regeneration template (Integra™) as an only technique or as an additional one to the rhinoplasty of 56 patients. An informed consent was obtained from all the patients to use Integra™, and all other options of different materials were explained to them as well.

Fifty-five patients had been operated on under general anesthesia and only one with local anesthesia: There were 32 open rhinoplasties and 24 closed ones. Two of them were post-traumatic cases, 18 secondary rhinoplasties, and 36 primary ones.

The complete dorsum nasi was increased in 41 cases, and a partial increase was carried out in 13 cases. In two cases, the area of the right upper lateral cartilage was also filled, and in one case, both upper lateral cartilages were filled. The author has used only one layer in all the cases, except in 10 patients that we have folded the sheet in order to obtain two layers; in 5 patients, the sheet was folded more times so as to get three layers; and in one patient, we folded the sheet in four layers.

All patients had a dermal regeneration template of one sheet used, having removed previously the superficial silicone layer, since this

works as an epidermis when it is used as an injury cover. The layer size used is of 5 × 5 cm, and its design is handled according to the area to be filled, cutting out the necessary amount, having the possibility of folding the material on its own as needed, in order to obtain the desired result in each case. It is better to carry the abovementioned design out before removing the superficial coat of silicone because the trimming is made easier. Once it is designed, it should be left to soak in saline solution for a few minutes before its placement. Then, the silicone coat is removed because its function is not necessary and it could work as a foreign body (Fig. 47.1).

It is important to place the layer carefully in order to have it well spread all over the area to be treated, avoiding the folds and, therefore, some possible irregularities of contour later. The template placement can be performed as a unique technique or associated to a complete rhinoplasty.

Depending on the maneuvers associated to the performed technique, a tamponade will be placed, as well as a plastic splint, if necessary. None of the patients needed a secondary revision after augmentation with dermic regeneration template.

The dermal regeneration template (Integra™) achieved very good results in patients with dorsum nasi defects, such as saddle nose deformities, overresected dorsum, or traumatic noses (Figs. 47.2, 47.5, and 47.6), and dorsum asymmetries (Figs. 47.3 and 47.4). It is mandatory to have a solid base where to place the dermic regeneration template. In cases where there is an absence of a solid base, we prefer to use autologous osseous or cartilaginous grafts.

47.3 Cases

Representative cases are presented and examples of surgical indications from regarding the use of the dermal regeneration template (Integra™) in rhinoplasty.

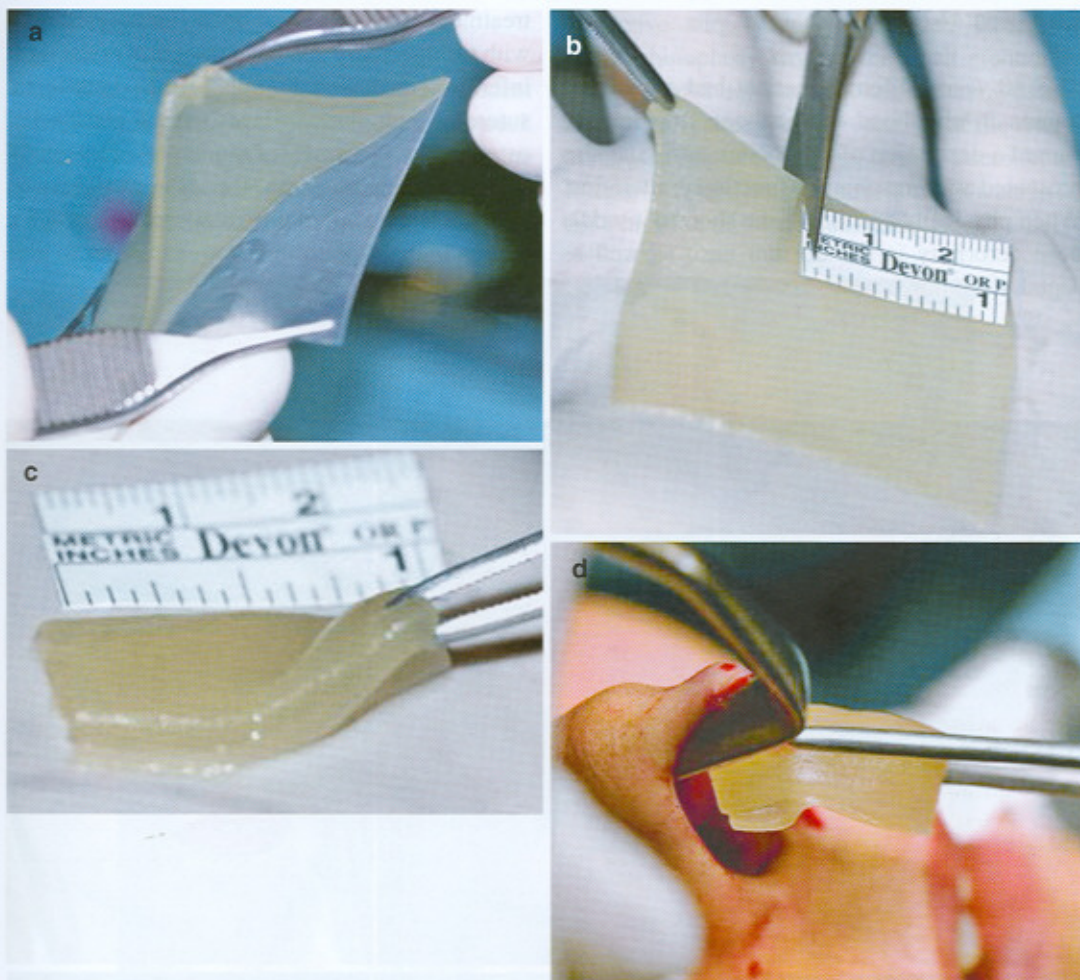


Fig. 47.1 (a–d) After removing the silicone layer, the necessary amount is designed and cut out, having the option of folding the material on its own as needed, and then placed in the area to be filled

Case 1 (Fig. 47.2)

This 40-year-old female patient had a contused trauma in childhood with a bone fracture that caused a depression of the dorsum nasi. She also presented with respiratory functional alteration. When physically examined, she showed a saddle nose deformity in the dorsum nasi, as well as septal deviation toward the left. The surgical

treatment consisted of an open rhinoseptoplasty, with turbinectomy and head resection of the right inferior concha, columella strut, interdomal suture of both alar cartilages, lateral and medial osteotomies, placement of four layers of Integra™ folded among them on the osteocartilaginous dorsum, and a graft of auricular cartilage of 0.5 × 0.5 cm in the supratip-break area in order to give more consistency to the area.



Fig. 47.2 (a) Preoperative patient with a saddle nose and a marked supratip break due to a traumatism. (b) Twenty-seven months postoperative after open rhinoseptoplasty with the placement of four layers of Integra™

Case 2 (Fig. 47.3)

This 53-year-old female patient had antecedent rhinoplasty with depression in the dorsum nasi. At the examination, an excess of resection of the osseocartilaginous dorsum was noticed as well as a deviation of the dorsum nasi. The proposed

corrective surgery was performed through a closed rhinoplasty, rasping the small monticulus in the osseous dorsum nasi, left unilateral osteotomy to correct deviation, resection of the excess of lower lateral cartilage, and placement of Integra™ folded over its own in two sheets in all the extension of the dorsum nasi.



Fig. 47.3 (a) Preoperative patient with an excess resection in the dorsum due to a previous surgery. (b) Fifteen days post-operative following the use of Integra™ folded in two sheets in the dorsum nasi. (c) Twenty-four months postoperative

Case 3 (Fig. 47.4)

This 31-year-old female patient had previous rhinoplasty. She wished to have improvement of the dorsum nasi, with no respiratory difficulty. She showed a depression of the dorsum nasi and the

region corresponding to the right upper lateral cartilage. An open rhinoseptoplasty was performed, with the placement of a layer of Integra™ folded on its own, in two sheets, in the osteocartilaginous dorsum, and one sheet in the right upper lateral cartilage.



Fig. 47.4 (a) Preoperative patient with sequelae of a previous rhinoplasty in dorsum and right upper lateral cartilage. (b) Twenty-two months postoperative after use of

two sheets of Integra™ in the dorsum nasi and one in the depression of the area of the right upper lateral cartilage

Case 4 (Fig. 47.5)

This 44-year-old male patient had prior record of nasal trauma in his childhood and sequelae of rhinoplasty. At the examination, he showed respiratory difficulty, deformity of the dorsum nasi with a visible edge of the costal cartilage graft from the previous rhinoplasty, a very marked

supratip break, minimum depression in the right upper lateral cartilage, and a large synechia between the nasal septum and the lower concha in the right nasal nostril. A rhinoseptoplasty was performed, with a bridge resection, costal graft edge resection, osteotomies, and a folded sheet of Integra™ in a double layer in the whole dorsum nasi area.



Fig. 47.5 (a) Preoperative 33-year-old female patient with a record of sequelae of rhinoplasty. (b) Twenty-four months after an open rhinoplasty. First, the existing fibrosis was removed and then the tip reconstruction with a columella strut and a Peck graft. Also performed was

dorsal reconstruction with Permacol™ (porcine dermis), which reabsorbed in a few months, and lyophilized bone was placed, which also reabsorbed eventually. Finally, Integra™ was used for the same purpose

Case 5 (Fig. 47.6)

This 33-year-old female patient had sequelae of prior rhinoplasty. An open rhinoplasty was performed. First, the existing fibrosis was removed, and then, the tip reconstruction with a columella

strut and a Peck graft was carried out. We also did a dorsal reconstruction with Permacol™ (porcine dermis), which reabsorbed in a few months. Next, a lyophilized bone, which also reabsorbed eventually, was placed. Finally, Integra™ was used for the same purpose.



Fig. 47.6 (a) Preoperative patient with sequelae of a previous rhinoplasty. (b) Twenty-two months postoperative following tip reconstruction and three layers of Integra™ used to fill the dorsum deformity

47.4 Discussion

The use of the dermal regeneration template (Integra™) as a filler in primary or secondary rhinoplasties can be done successfully, whenever the material is handled properly. In the author's protocol for the correction of the dorsum nasi defects, demineralized bone matrix activated with platelet growth factors (PGF) is used only when the osseous dorsum nasi or the nasofrontal angle needs moderate augmentation.

When it is necessary to correct more important defects of the osseous dorsum nasi that need a higher volume of correction, or defects that affect not only the osseous dorsum but also the cartilaginous one, the demineralized bone matrix with PGF is not the best way to be followed. This is for two reasons: (1) It is not possible to obtain a big increase in volume, and (2) an osseous bed is needed for its placement and the consequent process of osseous regeneration. For these reasons and in these cases, we prefer to use the dermic regeneration template of an only sheet (Integra™), which allows us to have a constant regeneration of autologous dermic tissue of suitable thickness.

The thickness of the Integra™ sheet is 2 mm and does not increase after being placed in saline solution because it already comes wet. According to our experience, we have used it up to a maximum of four times folded, and there has been no case of resorption or overcorrected defect. Therefore, Integra™ can be used for correcting defects in between 8- and 2-mm height or thickness.

Nevertheless, in the cases in which an important amount of volume is required, the use of other materials should be considered, such as the autologous osseous graft, since the dermal regeneration template is useful to raise only up to 8-mm height, if it is always placed on a solid base. In case of more important defects or the lack of a solid base to place it, due to a complete absence of the cartilaginous or osseous dorsum, we do believe that it would be better to use the autologous osseous graft or the costal cartilage one in order to solve the problem.

If increased volume is desired and just some more thickness to the entire nasal contour (in

cases of very thin skins, to avoid that the osteo-cartilaginous structure could be seen in excess), either dermal regeneration template (Integra™) or a cellular dermis (Alloderm™) is used and placed all over the dorsum nasi.

Cellular dermis (Alloderm™) has different sizes. The most suitable Alloderm™ sheet for rhinoplasty is that of 2 × 4 mm. This sheet has a thickness between 0.17 and 0.99 mm. So, to obtain the same thickness of just one layer of Integra™, several layers of Alloderm™ will be needed, but with the inconvenience that its manipulation makes the correct and homogeneous placement difficult inside the nose.

Alloderm™ can provide a maximum dorsal augmentation of 3 mm and has a partial absorption from 10% to 30% of the volume [13, 14], especially over the dorsum in thin-skinned patients. It should be noted that even though Alloderm™ is dermis, it is still a foreign material because it is a cadaver dermal graft. That is why today it is only used in cases where the only need is to create a thicker cover/coat of the nose, with just one layer of Alloderm™.

The big advantage between Integra™ and the rest of options (Alloderm™, fascia lata allografts, etc.) is that Integra™ is the only material completely reabsorbed and replaced by autologous tissue because it regenerates the patient's own dermis.

Dermal autologous grafts also have a range of reabsorption [15, 16], not the diced cartilage wrapped in Surgicel [17] or in fascia [18] that has none reabsorption as confirmed histologically [19], but they have the disadvantage of the donor-site scar and the visibility and junctional step-offs [18].

The technique is simple, and the tridimensional matrix of the dermic regeneration template is completely reabsorbed and replaced by autologous dermis. It also avoids behaving as a foreign body and stops the possibility of granulomas [11]. The period of hospitalization using this technique has been lower than the one needed using autologous osseous grafts. The technique also shortens the operative time significantly by eliminating graft harvest.

The patients avoid the scars in the donor area in order to obtain the osseous or cartilaginous

graft, and they also have an easier and less painful postoperative period.

There is a natural feel to the implant, and it is impossible to have implant migration.

The results with the dermal regeneration template achieve stable results with a 27-month follow-up. The results are stable in terms of reabsorption because the material used is completely reabsorbed in a maximum of 6 months and it is replaced totally by the own patient's tissue. Only long-lasting edema could vary the final results; that is why even the results after a follow-up of more than 2 years are encouraging.

It has already been demonstrated that the thickness obtained with the same material in other indications keeps steady, as the medical literature shows [12, 20], such as in cranial osseous defects or in the treatment of injuries and burns. It is an advantage over other techniques (autologous or lyophilized bone) in which really exist a certain level of long-term reabsorption. Any secondary revision was needed after augmentation with dermal regeneration template. The cost of Integra™ is something to be considered before planning the surgery, and the number of layers needed will affect directly the final cost of the product used.

Conclusion

The dermis regeneration template (Integra™) is an alternative filler to be considered in rhinoplasty, mainly in those cases with important defects in the dorsum nasi due to traumatism or secondary rhinoplasties. We point out to the fact that Integra™ has an easy handling and versatility. It can be folded in several layers on its own. However, it is mandatory that the template is not too compressed in the implanted bed because it can collapse the porous matrix, avoiding the fibroblast migration necessary to create neodermis [7].

It is a simple technique that reduces the hospitalization period and avoids the postsurgical complications, such as the morbidity of the donor area, migration, visibility, reabsorption, and reaction to a foreign body. Patient satisfaction has been very high and steady in all patients.

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18.7 Introduction

Integra is a synthetic dermal template that is used in reconstructive surgery to replace missing skin. It is composed of a porous polyethylene glycol (PEG) scaffold that is covered with a thin layer of bovine collagen.

The PEG scaffold is designed to mimic the structure of the dermis, allowing for the migration of cells and the formation of a new dermal layer. The bovine collagen layer provides a barrier against infection and helps to maintain the shape of the graft.

Integra is used in a variety of reconstructive procedures, including the treatment of burns, trauma, and congenital defects. It is particularly useful in the treatment of large defects where the patient's own skin is not available for grafting.

The use of Integra in rhinoplasty is a relatively new technique. It is used to reconstruct the nasal skin and soft tissue, providing a more natural appearance and better long-term results.

In this chapter, we will discuss the use of Integra in rhinoplasty, including the indications, contraindications, and surgical technique. We will also discuss the advantages and disadvantages of this technique.

The goal of this chapter is to provide a comprehensive overview of the use of Integra in rhinoplasty, so that you can make the best decision for your patient. We will discuss the latest research and clinical experience with this technique.

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