

DORSAL NASAL REFINEMENT USING DICED CARTILAGE GRAFTS FIXED WITH BLOOD

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ABSTRACT

Background

The use of diced cartilage grafts in rhinoplasty is well described and it has been popularized recently for establishment and camouflaging any imperfections of the dorsal aesthetic lines and contour.

Objectives

To establish the efficacy of pure diced cartilage grafts fixed with blood in dorsal nasal refinement or augmentation.

Patients and Methods

Twenty six rhinoplasties patients (23 primary and 3 secondary) were included in this study. At the end of the procedure, diced cartilage grafts, fixed with blood, were inserted into the dorsum of the nose for dorsal augmentation and camouflage of any imperfections. These cases were subsequently assessed clinically and photographically 3 months, 6 months; and then every 6 months till 2 years postoperatively.

Results

At the regular follow up visits, only 3 patients had problem that required treatment. Two patients had palpable bony prominences at the keystone area, which were successfully treated by fine rasping under local anesthesia in clinic, and the other one had a small depression which was filled up.

Conclusions

The use of diced cartilage grafts admixed with clotted blood is an elegant and powerful technique in dorsal nasal refinement and augmentation without the additional morbidity, risks and complications incurred in the use of either Surgicel[®] or with fascia to wrap the cartilage grafts.

Keywords: *Diced cartilage grafts, Dorsal nasal refinement.*

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INTRODUCTION

In both primary and secondary rhinoplasty, establishment or refinement of nasal dorsal aesthetic lines is of great importance. Irregularities or deformities of the nasal dorsum, caused by various maneuvers such as hump reduction or adhesion of the dorsal skin to the nasal bones, account for a significant number of revision rhinoplasties^(1, 2). The problem is aggravated in thin skinned patients and secondary cases which the original anatomy was compromised⁽¹⁾.

Cartilage grafts are integral part of rhinoplasty surgery⁽³⁾. The use of cartilage for cosmetic and reconstructive surgery dates back to the late 1800s. Bert in 1865 was the first individual to transplant cartilage grafts in animals⁽⁴⁾. In 1889, Von Mangoldt first reported the autogenous costal cartilage in rhinoplasty⁽⁵⁾.

The use of diced cartilage grafts in reconstructive surgery was first described by Peer in 1943 though it was not for rhinoplasty⁽⁶⁾.

The term “diced cartilage graft” may encompass different types of cartilage, methods of preparation, and ways of insertion. This variability leads to confusion when comparing clinical indications, techniques, and results⁽⁷⁾. The fundamental technique of diced cartilage is not new, as it was extremely popular in Europe between the two world wars with numerous surgeons introducing cartilage dicers and chondrojet injectors⁽⁷⁾. The use of diced cartilage grafts in rhinoplasty surgery was recently revived by Erol with the publication of his technique for “Turkish delight” grafts (i.e., diced cartilage grafts wrapped in Surgicel®⁽⁸⁾).

The problem with solid cartilage grafts are late visibility, distortion, and displacement. To overcome these problems, the technique of diced cartilage grafts was developed. In 1989, Erol published his technique of the use of finely diced cartilage wrapped in Surgicel®, and subsequently published further descriptions of his technique⁽⁹⁻¹²⁾.

Daniel developed the technique of diced autogenous cartilages wrapped in fascia. He reported that the fascia wrapped cartilage grafts gives consistently better early and long-term results,^(7, 8, 13)

There are disadvantages of both of these previously developed techniques of cartilage graft delivery to the nasal dorsum. The use of Surgicel® wrapped grafts may be complicated by resorption and clinical failure^(7, 8, 14, 15) whereas the use of fascia wrapped grafts are

associated with increased operating time, additional morbidity of an additional incision and donor site as well as mild deviation, edge show, bulging of the radix and dorsal irregularities requiring revision^(3, 7, 16, 17).

The use of pure diced cartilage grafts results in issues related to the distribution of the grafts in the pocket and the difficulty in both the sculpting the material into the desired shape and maintaining that shape until healing occurs^(3, 8).

In this study, autologous diced cartilage grafts were fixed and attached together by the patient’s own fresh blood, in order to have all the advantages of the diced cartilage grafts and avoids the risks and disadvantages of the aforementioned techniques.

PATIENTS AND METHODS

This is a prospective study of 26 patients (2 male and 24 female) who underwent rhinoplasty in private practice in Sulaimani - Iraq, from October 2016 to October 2018. Twenty five patients had an open approach rhinoplasty under general anaesthesia and one case had a closed rhinoplasty under local anaesthesia. Near the end of the procedure, the diced cartilage grafts were fixed with fresh blood and placed just prior to closure.

Of the 26 cases performed, 23 were primary while three were secondary. Only autogenous cartilage grafts were used, which they were derived from the remnant pieces of the excised septum, lower lateral cartilages or concha, but costochondral grafts not used in this procedure because use of cartilage from the latter source was not necessary. The cartilage was diced into 0.5- to 1-mm cubes, using #11 blades, and in thin skinned patients, these were crushed with a cartilage crusher prior to implantation.

The diced cartilage was placed on Aufricht nasal retractor, and 1cc of fresh blood was dropped over the grafts till they were completely covered (Figure 1). Few minutes were allowed to elapse to enable the blood to clot. The graft was deemed ready for implantation once the cartilage blood admixture was firmly adherent to the Aufricht retractor so that no slippage occurred.

The Aufricht retractor, with the clot on the lower surface, was then used to lift the skin of the nasal dorsum and the graft was then carefully delivered into the dorsal pocket and the skin closed. See Figures 2 and 3.

Dorsal Nasal Refinement Using Diced Cartilage Grafts Fixed with Blood

As a final step, a gentle molding of the diced cartilage grafts was performed as needed from radix to the supratip area. Omnistrrips® 3M were then applied to the dorsum and a thermoplastic splints was applied and left in place for 9 to 10 days.

Postoperative surgical outcomes were assessed clinically for palpable contour irregularities and photographically by comparing pictures before and after surgery. Patients were followed up at 3 months, 6 months, 1 year, 18 months and 2 years, depending on the patient's compliance.

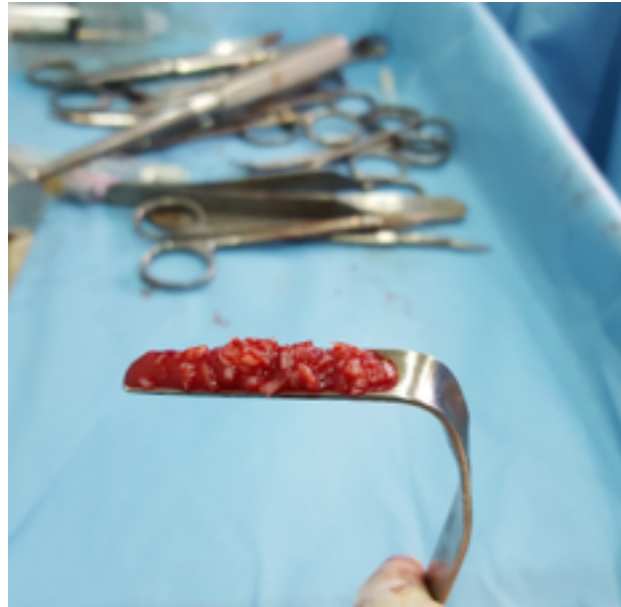


Figure 1. The diced cartilages collected on the dorsum of the Aufricht, and 1 cc fresh blood dropped over the grafts till they were covered in blood.



Figure 2. The cartilage grafts inserted in to the dorsal nasal cavity with the Aufricht.



Figure 3. The cartilage grafts then detached from the Aufrecht and placed on the dorsal nasal framework.

RESULTS

This was a prospective study involving 26 patients over a 2 year period with postoperative follow up ranging from 3 to 24 months with a median follow up of 15 months (Table 1).

Twenty two cases had satisfactory results at all the follow up visits, as there were no infection, irregularity, step off, graft visibility or palpable irregularity or evidence of resorption, (Figure 4 A, B, C, D), and (Figure 5 A, B, C, D).

Four patients at 3 months follow up had some problem in the nasal dorsum. One patient had a thin dorsal nasal

skin in whom slight irregularity and grittiness of the grafts was palpable, but photographically the nasal dorsum was smooth and no irregularity was visible, and no treatment has been required at subsequent follow ups (Figure 6 A, B, C, D). The second and third cases had both visible and palpable remnant of the dorsal bony hump, which required rasping under local anesthesia. In the fourth case, a small dimple was noted at the key stone area of the nasal dorsum, probably from resorption of the diced cartilage grafts and this was treated by hayaluronic acid fillers as the patient didn't want further surgical intervention.

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Table 1. The age, gender, date and type of operation and any action required at the follow up visits.

Case Numbers	Age/Gender	Date	Procedure	Action Required
Case 1	20 F	11/10/2016	Septorhinoplasty	No
case 2	39 F	1/7/2017	Septorhinoplasty	No
Case 3	35 F	6/7/2017	Rhinoplasty	No
case 4	29 F	13/7/2017	Septorhinoplasty	No
case 5	18 F	26/7/2017	Septorhinoplasty	No
case 6	21 M	2/8/2017	Septorhinoplasty	No
case 7	36 F	10/8/2017	Septorhinoplasty	No
case 8	37 F	25/8/2017	Rhinoplasty	Rasping required
Case 9	30 M	21/9/2017	Septorhinoplasty	No
case 10	22 F	21/9/2017	Septorhinoplasty	No
case 11	25 F	23/9/2017	Septorhinoplasty	Rasping required
case 12	23 F	28/9/2017	Septorhinoplasty	Filler used
case 13	25 F	28/9/2017	Rhinoplasty	No
case 14	19 F	28/9/2017	Secondary Septorhinoplasty	No
case 15	20 M	3/10/2017	Septorhinoplasty	No
case 16	30 F	4/10/2017	Rhinoplasty	No
case 17	34 F	5/10/2017	Septorhinoplasty	No
case 18	30 F	8/3/2018	Septorhinoplasty	No
case 19	19 F	1/7/2018	Rhinoplasty	No
case 20	18 F	28/7/2018	Septorhinoplasty	No
Case 21	30 F	3/9/2018	Septorhinoplasty	No
Case 22	28 M	3/9/2018	Secondary Septorhinoplasty	No
case 23	20 F	5/9/2018	Rhinoplasty	No
Case 24	35 F	2/10/2018	Secondary Rhinoplasty	No
Case 25	19 M	8/10/2018	Septorhinoplasty	No
Case 26	28 F	18/10/2018	Septorhinoplasty	No

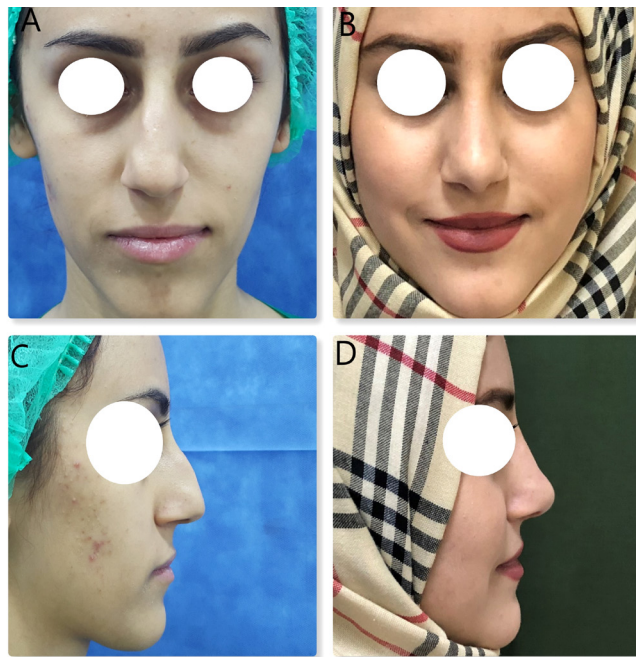


Figure 4. A: 20 year old female: Preoperative frontal view. B: Postoperative frontal view after 2 years. C: preoperative lateral view. D: Postoperative lateral view.



Figure 5. A: 21 year old male: The preoperative view from front . B: the postoperative view from front after 14 months. C: the preoperative view from profile. D: the postoperative view from profile.

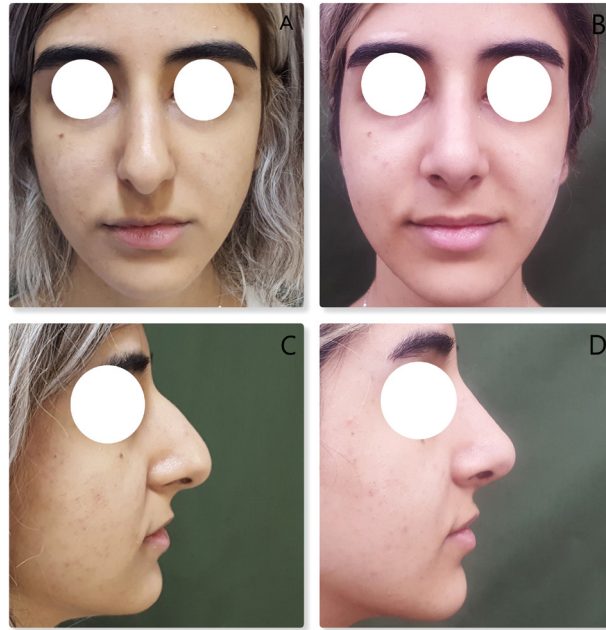


Figure 6. A: Preoperative frontal view. B: Postoperative frontal view, no visible irregularity. C: preoperative lateral view. D: Postoperative lateral view, smooth nasal dorsum.

DISCUSSION

The search for the best method for concealing irregularities of the nasal dorsum and consistently achieving a smooth contours remains a major concern of surgeons who perform rhinoplasty. Using diced cartilage grafts have revolutionized dorsal grafts in rhinoplasty, replacing layered septal grafts, stacked conchal grafts, and carved costal cartilage grafts ⁽⁷⁾.

Although free diced cartilage is promising as a useful tool in rhinoplasty, but involves the issues related to dispersion and scattering of small cartilage pieces in the larger pocket and the difficulty of sculpting the material and then maintaining the desired shape ^(3, 8, 18).

In this study we used autologous diced cartilage grafts, bonded and stabilized using only the patient's fresh blood, in which when the blood clots it holds the cartilage graft particles as a single moldable construct. A study by Lin et al stated that the pure diced cartilage grafts without the use of a sleeve (unwrapped) is not commonly reported due to concerns of graft dispersion, palpability, or visibility ⁽¹⁹⁾.

The advantage of this technique is that it is quick, and does not require the use of a foreign materials or a secondary donor site. Furthermore, the volume is predictable as the entire engrafted mass is cartilage plus few drops of blood and it can be molded as necessary.

With this technique, the cartilage grafts have better and direct contact with the pocket structures without an intervening barrier which reduces the chance of resorption. In a reported study, Arslan mentioned the irregular resorption rate of the engrafted mass is one of the major issues noted with diced cartilage grafts ⁽²⁰⁾.

The disadvantage of this technique is in very thin skinned patients, the cartilage grafts might require crushing prior to the admixture with the patient's blood which could possibly increase resorption, although a study by Cakmak et al, in their experience, mild crushing of the grafts has not been associated with increased resorption ⁽¹⁾.

The limitation of this technique is that it is more useful for refinement of the nasal dorsum rather than augmentation, although Lin et al have suggested that pure diced cartilage grafts can be used for this purpose in cleft rhinoplasty ⁽¹⁹⁾.

Oreroglu et al, used diced cartilage in combination with bone dust using the patient's blood as a carrier for delivery of the construct to the nasal dorsum ⁽¹⁷⁾, as has Codazzi et al ⁽²¹⁾. Use of autologous fibrin glue for diced cartilage graft fixation and bondage is another technique performed for dorsal nasal refinement in rhinoplasty ^(15, 22, 23).

In conclusion, the pure diced cartilage grafts fixed with blood is a valid option for refinement of the nasal dorsum in rhinoplasty. This technique has all the advantages of diced cartilage grafts and without the use of foreign materials or the necessity of a secondary donor site with its inherent morbidity and potential complications of cartilage graft wrapping.

REFERENCES

1. Cakmak O, Buyuklu F. Crushed cartilage grafts for concealing irregularities in rhinoplasty. *Archives of facial plastic surgery*. 2007;9(5):352-7.
2. Kreutzer C, Hoehne J, Gubisch W, Rezaeian F, Haack S. Free Diced Cartilage: A New Application of Diced Cartilage Grafts in Primary and Secondary Rhinoplasty. *Plast Reconstr Surg*. 2017;140(3):461-70.
3. Harel M, Margulis A. Dorsal Augmentation with Diced Cartilage Enclosed With Temporal Fascia in Secondary Endonasal Rhinoplasty. *Aesthetic Surgery Journal*. 2013;33(6):809-16.
4. Elwany MS, Radi SH, Foda HT, Magdy E, Kalsa RR. Fate of implanted autologous cartilage grafts in rabbits: an experimental histological study. *Bull Alex Fac Med*. 2006;42(4).
5. Ma J-G, Wang K-M, Zhao X-H, Cai L, Li X. Diced Costal Cartilage for Augmentation Rhinoplasty. *Chinese Medical Journal*. 2015;128(19):2679-81.
6. Singh SK, Sood T, Sabarigirish K, Ramakrishnan N, Rajguru R, Manoj Kumar K. A New Era of Diced Cartilage Rhinoplasty: Our Experience. *Indian journal of otolaryngology and head and neck surgery : official publication of the Association of Otolaryngologists of India*. 2015;67(4):338-40.
7. Daniel RK. The role of diced cartilage grafts in rhinoplasty. *Aesthetic Surgery Journal*. 2006;26(2):209-13.
8. Daniel RK, Calvert JW. Diced Cartilage Grafts in Rhinoplasty Surgery. *Plastic and Reconstructive Surgery*. 2004;113(7):2156-71.
9. Erol OO. Long-Term Results and Refinement of the Turkish Delight Technique for Primary and Secondary Rhinoplasty: 25 Years of Experience. *Plast Reconstr Surg*. 2016;137(2):423-37.
10. Erol OO. Injection of Compressed Diced Cartilage in the Correction of Secondary and Primary Rhinoplasty: A New Technique with 12 Years' Experience. *Plast Reconstr Surg*. 2017;140(5):673e-85e.
11. Erol OO. Discussion: Free Diced Cartilage: A New Application of Diced Cartilage Grafts in Primary and Secondary Rhinoplasty. *Plast Reconstr Surg*. 2017;140(3):471-3.
12. Erol OO, Gundogan H. DICED CARTILAGE GRAFTS IN RHINOPLASTY SURGERY. *Plastic and Reconstructive Surgery*. 2005;116(4):1169-71.
13. Daniel RK. Diced Cartilage Grafts in Rhinoplasty Surgery: Current Techniques and Applications. *Plastic and Reconstructive Surgery*. 2008;122(6):1883-91.
14. Anchan SV, Naik A. Efficacy of diced cartilage graft in dorsal augmentation rhinoplasty and comparison with solid block cartilage. *International Journal of Otorhinolaryngology and Head and Neck Surgery*. 2018;4(3):670-2.
15. Bullocks JM, Echo A, Guerra G, Stal S, Yuksel E. A Novel Autologous Scaffold for Diced-cartilage Grafts in Dorsal Augmentation Rhinoplasty. *Aesthetic plastic surgery*. 2011;35(4):569-79.
16. Park P, Jin HR. Diced Cartilage in Fascia for Major Nasal Dorsal Augmentation in Asians: A Review of 15 Consecutive Cases. *Aesthetic plastic surgery*. 2016;40(6):832-9.
17. Öreroğlu AR, Cakır B, Akan M. Bone Dust and Diced Cartilage Combined with Blood Glue: A Practical Technique for Dorsum Enhancement 2013.
18. Hoehne J, Gubisch W, Kreutzer C, Haack S. Refining the Nasal Dorsum with Free Diced Cartilage. *Facial plastic surgery : FPS*. 2016;32(4):345-50.
19. Lin SI, Hsiao YC, Chang CS, Chen PK, Chen JP, Ueng SH. Histology and Long-term Stability of Diced Cartilage Graft for Revision Rhinoplasty in a Cleft Patient. *Plastic and reconstructive surgery Global open*. 2016;4(6):e763.
20. Arslan E, Majka C, Polat A. The Fate of Diced Cartilage Grafts of Traumatized Versus Nontraumatized Origin. *Aesthetic plastic surgery*. 2007;31(4):365-71.
21. Codazzi D, Ortelli L, Robotti E. Diced cartilage combined with warm blood glue for nasal dorsum enhancement. *Aesthetic plastic surgery*. 2014;38(4):822.
22. Tasman AJ. Advances in nasal dorsal augmentation with diced cartilage. *Current opinion in otolaryngology & head and neck surgery*. 2013;21(4):365-71.
23. Castro-Govea Y, del Valle SA, Kardasch VC, Eparza EP, Costilla OV. Diced and Crushed Cartilage Plus Autologous Fibrin Matrix Obtained by a Simple Process for Dorsal Augmentation of the Mestizo Nose. *Facial Plastic Surgery*. 2015;31(02):164-71.