



Utilization of Tutopatch® bovine pericardium xenograft for nasal dorsum augmentation in primary and secondary rhinoplasties

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ABSTRACT

Objectives: The aim of this study was to present the utilization of Tutopatch® bovine pericardium xenograft for nasal dorsum augmentation and/or camouflage in primary and secondary rhinoplasties.

Patients and Methods: Between January 2017 and July 2019, the Tutopatch® bovine pericardium was used for nasal dorsum or glabellar augmentation in eight patients (3 males, 5 females; mean age 35 years; range, 25 to 43 years) and used for camouflage in six patients (1 male, 5 females; mean age: 30 years; range, 27 to 38 years) having rhinoplasty operations. Medical data of the patients were retrospectively analyzed. Pre- and postoperative results were compared. Degree of satisfaction was self-reported by the patients.

Results: The mean follow-up was 16 (range, 6 to 24) months. Only one major complication due to the overcorrection of the nasal dorsum with a small hump was observed in a secondary rhinoplasty case necessitating further revision. Other types of complications such as erythema, undercorrection, malposition, seroma, hematoma, or graft extrusion were not observed. All patients, except for the case necessitating further revision were satisfied with the outcomes.

Conclusion: Utilization of Tutopatch® bovine pericardium xenograft in wrapping the diced cartilage for nasal dorsum augmentation or as the camouflage material over the nasal dorsum and nasal tip skeleton in either primary or secondary rhinoplasty operations can be a wise option without any adverse allergic reaction or donor site morbidity.

Keywords: Augmentation, bovine, dorsum, nasal, pericardium, tutopatch.

Both primary and secondary rhinoplasties require the utilization of bony, cartilaginous or soft tissue grafts. Deep temporal fascia, rectus fascia, fascia lata, dermal graft, and scar tissues are all well-known soft tissue grafts commonly used for either nasal dorsum augmentation or camouflage, particularly in secondary rhinoplasties and sometimes in primary rhinoplasties. The use of AlloDerm® (Allergan)

has been recently reported in rhinoplasty for the same purpose.^[1]

The Tutopatch® (RTI Surgical) bovine pericardium consists of a non-cross-linked, acellular collagen matrix offering a safe, natural, biological, and sterilized soft tissue option and it has already been used in several cases of ophthalmological^[2,3] and otolaryngological^[4]

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procedures, as well as in breast reconstruction.^[5] However, to the best of our knowledge, there is no study utilizing the Tutopatch® bovine pericardium as a diced cartilage wrapping material in rhinoplasty series for nasal dorsum augmentation and/or camouflage.

In the present study, we aimed to investigate the efficacy of the Tutopatch® bovine pericardium xenograft for nasal dorsum augmentation and/or camouflage.

PATIENTS AND METHODS

Between January 2017 and July 2019, the Tutopatch® bovine pericardium xenograft was used for nasal dorsum or glabellar augmentation in eight patients (3 males and 5 females; mean age 35 years; range 25 to 43 years) and for camouflage in six patients (1 male, 5 females; mean age: 30 years; range, 27 to 38 years) having rhinoplasty operations. Two of the patients in whom the Tutopatch® bovine pericardium was used for nasal dorsum augmentation were female cases having primary rhinoplasties. In one male patient, the Tutopatch® bovine pericardium was used for glabellar augmentation in primary rhinoplasty. The remaining five patients in whom the Tutopatch® bovine pericardium was used for nasal dorsum augmentation were those having

secondary rhinoplasties and three of these cases were females and two were males. All patients in whom the Tutopatch® bovine pericardium was used for camouflage were those having secondary rhinoplasty with one male and five females. All data were obtained retrospectively



Figure 2. Wrapping of Tutopatch® bovine pericardium graft over an insulin syringe filled with diced cartilage. Free edges of Tutopatch® bovine pericardium piece (3x4 cm square) are sutured with 6/0 polydioxanone to form a sleeve.



Figure 1. Dampening of dry Tutopatch® bovine pericardium graft with a physiological saline containing gentamycin and rifamycin.



Figure 3. Passing needle-bearing suture through space between nasal skin and nasal dorsum skeleton. The needle is pulled out from inside out at glabellar region and diced cartilage wrapped in Tutopatch® bovine pericardium is settled over nasal dorsum with further pull and guidance of the aforementioned 6/0 polydioxanone suture.

with a meticulous archive analysis. A written informed consent was obtained from each patient. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Operative technique

In all patients in whom the Tutopatch® bovine pericardium was used for nasal dorsum augmentation, a soft tissue sleeve was prepared with the Tutopatch® and diced cartilage was injected inside the sleeve. In all patients in whom the Tutopatch® was used for camouflage, it was either laid over the nasal dorsum or the nasal tip or laid over both of them resembling a blanket.

The precise dimensions of the Tutopatch® bovine pericardium used were tailored exclusively according to the need of each individual patient and the purpose of application. However, in our series, a 3×4 cm² and a 3×2 cm² sleeve of the Tutopatch® bovine pericardium was often used for nasal dorsum augmentation and glabellar augmentation, respectively. The patch size was typically 2×3.5 cm² for total nasal dorsum camouflage and 2×2.5 cm² for tip camouflage.



Figure 4. Knotting two 6/0 polydioxanone sutures on both corners of superior edge of Tutopatch® bovine pericardium graft for utilization of Tutopatch® as camouflage between nasal dorsal skin and nasal dorsal skeleton.

The Tutopatch® bovine pericardium sleeve was prepared similar to deep temporal or rectus fascia sleeve. Initially, a dry Tutopatch® graft of nearly 3×4 cm² was dampened with physiological saline containing gentamycin and rifamycin (Figure 1). It was, then, wrapped over an insulin syringe filled with the diced cartilage. Free edges of the Tutopatch® piece were sutured with 6/0 polydioxanone to form a sleeve (Figure 2). The diced cartilage was, then, injected into the prepared sleeve. The remaining part of the 6/0



Figure 5. Settlement of Tutopatch® bovine pericardium graft sheath over nasal dorsum with further pull and guidance of the aforementioned 6/0 polydioxanone sutures.



Figure 6. Raising skin and Tutopatch® bovine pericardium graft with the aid of an Aufricht retractor, if any further camouflage with diced cartilage is needed. Free diced cartilage mixed with blood is ready to be placed over another Aufricht retractor.

polydioxanone suture and its needle were kept without cutting and this needle, still bearing the suture, was passed through the space between the nasal skin and the nasal dorsum skeleton. The needle was, then, pulled out from inside out at the glabellar region and the diced cartilage wrapped in the Tutopatch® bovine pericardium was settled over the nasal dorsum with further pull and the guidance of the 6/0 polydioxanone suture (Figure 3).



Figure 7. Major complication with overcorrection of nasal dorsum with a small hump.

For utilization of the Tutopatch® bovine pericardium as a camouflage between the nasal dorsal skin and nasal dorsal skeleton, two 6/0 polydioxanone sutures were knotted on both corners of the superior edge of the Tutopatch® bovine pericardium graft (Figure 4). These sutures were passed through the space between the nasal skin and nasal dorsum skeleton. The needles were, then, pulled out from inside out at two glabellar sides and the Tutopatch® bovine pericardium graft sheath was settled over the nasal dorsum with further pull and the guidance of the 6/0 polydioxanone sutures (Figure 5). Of note, if any further camouflage with diced cartilage is needed, the skin and the Tutopatch® bovine pericardium graft can be raised with the aid of an Aufricht retractor (Figure 6) and diced cartilage coating can be performed. Then, the Aufricht retractor can be gently released without disturbing the settled Tutopatch® graft and the diced cartilage grafts.



Figure 8. Utilization of diced cartilage wrapped by Tutopatch® bovine pericardium xenograft for nasal dorsum augmentation in a secondary rhinoplasty case having upper nasal dorsum defect. This patient has also a simultaneous eyelid operation for scar release. (a) Preoperative anterior view, (b) Preoperative lateral view, (c) Postoperative anterior view, (d) Postoperative lateral view.

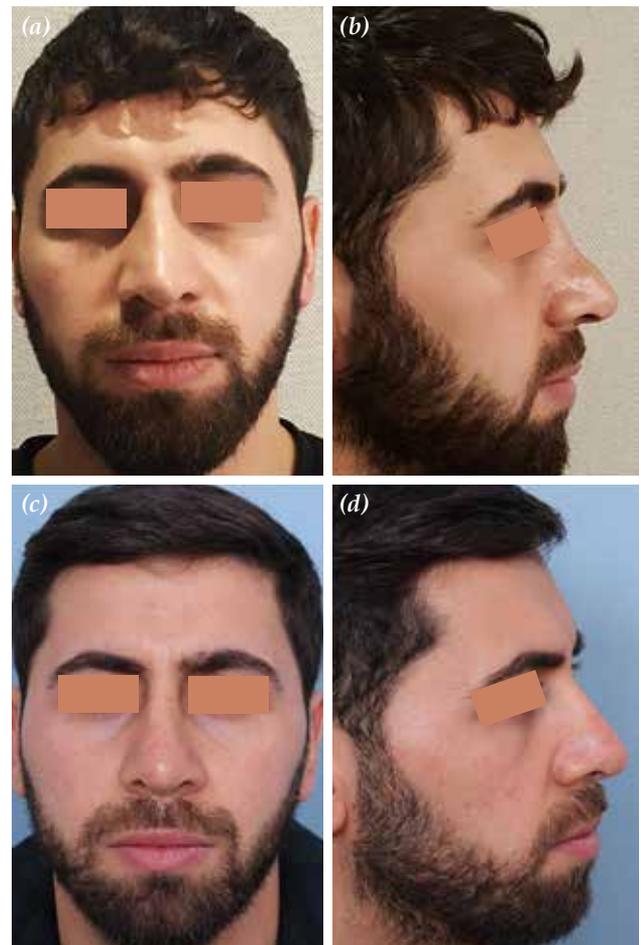


Figure 9. Utilization of diced cartilage wrapped by Tutopatch® bovine pericardium xenograft for nasal dorsum augmentation in a secondary rhinoplasty case having upper 1/2 nasal dorsum defect and pollybeak deformity. (a) Preoperative anterior view, (b) Preoperative lateral view, (c) Postoperative anterior view, (d) Postoperative lateral view.

Following the procedure, pre- and postoperative results were compared. Degree of satisfaction was self-reported by the patients.

RESULTS

The mean follow-up was 16 (range, 6 to 24) months. Only one major complication due to the overcorrection of the nasal dorsum with a minute nasal hump was observed in a secondary rhinoplasty case requiring further revision (Figure 7). Other types of complications such as erythema, undercorrection, malposition,

seroma, hematoma or graft extrusion were not observed. All patients except for the case requiring further revision were satisfied with the outcomes with a high degree of satisfaction. Pre- and postoperative results of selected cases are presented (Figures 8-11).

DISCUSSION

The idea of wrapping the diced cartilage and using it in dorsum augmentation was first suggested by Onur Erol, who first wrapped the diced cartilage with SURGICEL® (Johnson

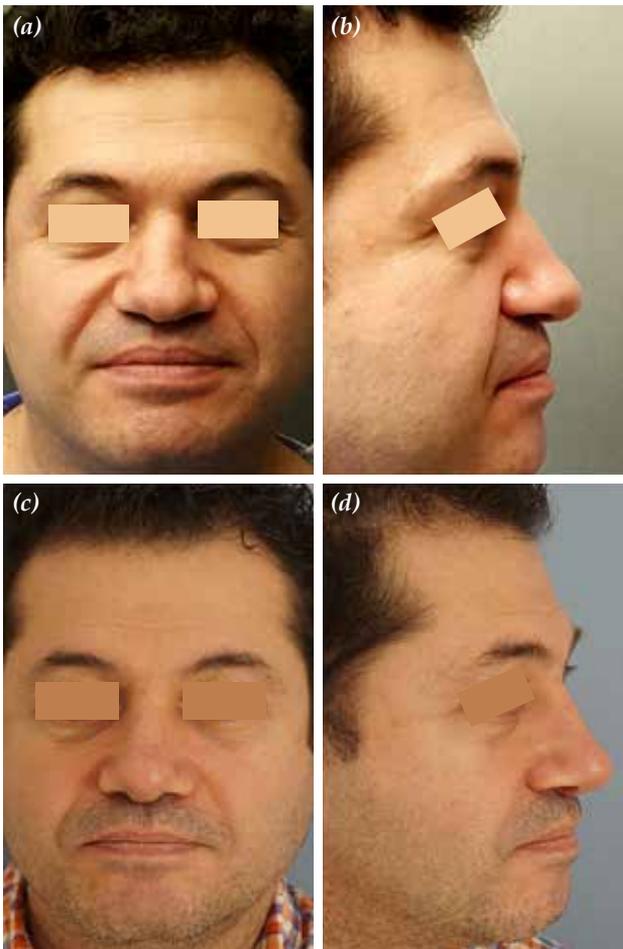


Figure 10. Utilization of diced cartilage wrapped by Tutopatch® bovine pericardium xenograft for nasal dorsum augmentation in a secondary rhinoplasty case having nasal dorsum defect due to a previous inappropriate septoplasty operation. (a) Preoperative anterior view, (b) Preoperative lateral view, (c) Postoperative anterior view, (d) Postoperative lateral view.

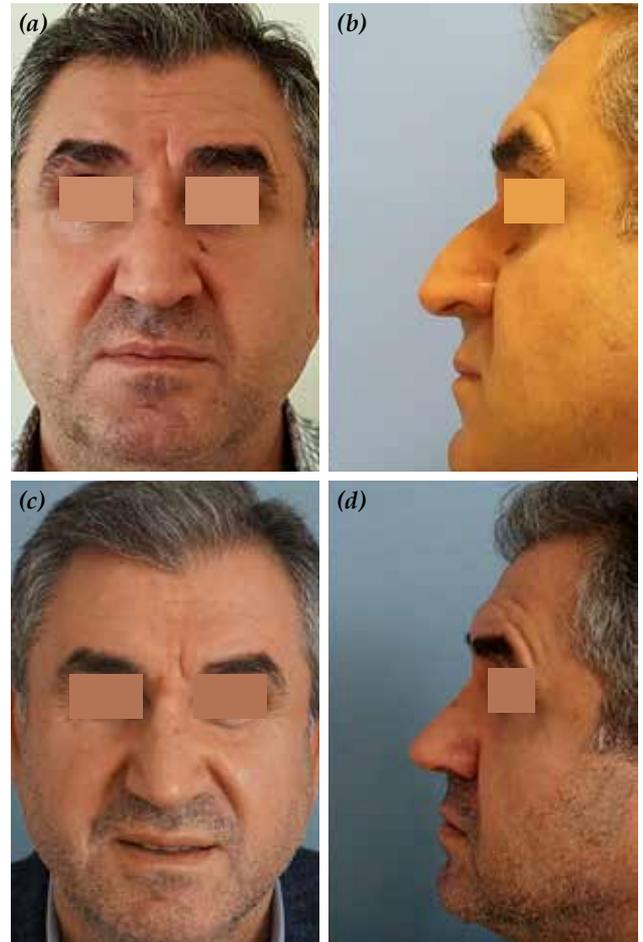


Figure 11. Utilization of diced cartilage wrapped by Tutopatch® bovine pericardium xenograft for glabellar augmentation in a primary rhinoplasty case with a deep glabellar depression. (a) Preoperative anterior view, (b) Preoperative lateral view, (c) Postoperative anterior view, (d) Postoperative lateral view.

and Johnson) and named this combination as the Turkish delight.^[6] The aforementioned author also used smaller dimensions of this combination in tip augmentation. Beyond doubt, this is one of the most important innovations in the field of rhinoplasty, particularly in secondary rhinoplasties with over-reduced nasal dorsum cases and this technique has become the pioneer of further innovations.

In the Daniel's work,^[7] the Turkish delight technique yielded clinical failure in all cases, which the author attributed to a foreign body reaction to SURGICEL®. He, then, described

wrapping of diced cartilage with deep temporal fascia for nasal dorsum augmentation. Calvert et al.^[8] experimentally demonstrated that SURGICEL® induced an immune reaction and caused diced cartilage resorption, while fascial graft constituted a barrier against immune reactions and prevented diced cartilage resorption. It has been recently postulated that the diced cartilage with fascia graft preserves its cartilage component in a healthy state, compared to cartilage graft alone owing to protective factors provided by the temporal fascia. Its strong adherence to the cartilage, lack of angiogenic

factors, and high content of collagen IV-derived fragments with anti-angiogenic effects make the temporal fascia a good protective tissue to prevent implanted cartilage degeneration.^[8]

Nonetheless, one of the most important drawbacks of the utilization of deep temporal fascia is donor site morbidity at the temporal region of the scalp. This issue is particularly important for bald patients and patients having scarce hair. As a solution to this, Cerkes and Basaran^[9] popularized the use of rectus fascia as a wrapping soft tissue. The use of rectus fascia was particularly reasonable, if a submammary incision was performed for costal cartilage harvesting. The utilization of rectus fascia also had the advantage of using the same donor site for costal cartilage graft.

Another favorable autologous fascial option for use in rhinoplasty operations with or without cartilage support is the fascia lata.^[10,11] It is thicker than all other autologous fasciae and this feature can be highly advantageous in camouflaging severe nasal dorsum deformities.

Utilization of AlloDerm® has been recently popularized by Gordon et al.^[1] which is also a reliable alternative without any donor site morbidity. The AlloDerm®'s biocompatible framework has been shown to provide a collagen matrix supportive of neoangiogenesis which may contribute to an increased proportion of cartilage graft viability.^[1] However, preferring the AlloDerm® as a wrapping material also has a drawback related to its high cost. On the other hand, the Tutopatch® is considerably cheaper than AlloDerm®.

To the best of our knowledge, this is the first study which used the Tutopatch® bovine pericardium as a diced cartilage wrapping material in rhinoplasty series for nasal dorsum augmentation and/or camouflage. In the present study, no donor site morbidity was seen due to the harvest of any autogenous soft tissue for wrapping.

After moisturizing the graft with physiological saline containing gentamycin and rifamycin for two minutes, it becomes a soft and pliable material, ready for tailoring according to the need of an individual patient. Thanks to its

collagenous nature, it can be also readily sutured without any difficulty. No adverse effect related to the use of Tutopatch® bovine pericardium such as allergy, bio-incompatibility or resorption was described either in the literature or in our series.

The use of diced cartilage wrapped with the Tutopatch® bovine pericardium in primary rhinoplasty operations is extremely rare. The main indication in primary rhinoplasty is the augmentation of excessive glabellar depression. However, the lack of donor site morbidity in the utilization of Tutopatch® bovine pericardium may have priority for patients demanding primary rhinoplasty. The use of the Tutopatch® bovine pericardium was particularly important in secondary rhinoplasties in our series, since it could readily correct saddle nose depressions and could nicely smoothen the nasal dorsum irregularities very effectively. The main supporter of the augmentation in this technique is to aggregate the diced cartilage and it is possible to conclude that this type of dorsal augmentation is not solid, does not contain the risk of warping, can be molded during operation and in the early postoperative period, is not absorbed, and becomes solid over time. All these properties are highly valuable for nasal dorsum reconstruction.

In conclusion, utilization of the Tutopatch® bovine pericardium xenograft in wrapping the diced cartilage for nasal dorsum augmentation and/or as the camouflage material over the nasal dorsum and nasal tip skeleton in both primary and secondary rhinoplasty operations can be a wise option without any adverse allergic reactions or donor site morbidity.

Declaration of conflicting interests

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