Dacron Implants in Rhinoplasty

A Review of 136 Cases of Tip and Dorsum Implants

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The achievement of successful results in rhinoplasty may require the use of autografts, homografts, or alloplastic materials. Among the alloplasts, Dacron is an easily handled and manipulated synthetic material, readily applicable to nasal augmentation. The following represents the indications, surgical technique, outcome results, and analysis of our experience with Dacron mesh implants to the nasal tip, dorsum, and lateral walls in 136 patients.

The goal of an optimal aesthetic result in rhinoplasty may necessitate the use of grafts or implants. The different categories of materials used to achieve this consist of autografts, homografts, and alloplasts. The most common autografts used in rhinoplasty include septal cartilage and bone, conchal cartilage, and costal cartilage and bone. Although preferred by several researchers for their biocompatibility, bone and cartilage autografts may be associated with certain complications, particularly the predictability of the aesthetic result.

Several types of alloplastic materials have been, and continue to be, used for dorsal and tip augmentation in rhinoplasty.1-11 We believe implants have a valuable role in rhinoplasty, provided the right implant material is chosen and the correct technique is used for the proper indication. Some different types of alloplastic implants used in rhinoplasty are as follows: polytetrafluoroethylenes, the most common being Gore-Tex (W. L. Gore Associates, Inc, Flagstaff, Ariz); silicone rubber (such as Silastic); polyethylene, such as Medpore (Porex, Fairburn, Ga) and Plastipore (Richards Manufacturing Company, Memphis, Tenn) and polyesters and polyamides, such as Dacron (Ethicon Inc, Somerville, NJ), Mersilene (Ethicon Inc), Supramid7 (S. Jackson Inc, Alexandria, Va), and the Cooley Dacron knitted implant (Meadox; Boston Scientific, Quincy, Mass).

Dacron material implants have been extensively used in cardiovascular surgery, with the results of many long-term follow-up studies reported in the medical literature.12-17 Dacron fabric (Cooley) is a polyethylene terephthalate woven into a tight nonresorbable mesh. It is a multifilament fabric supplied as a white fabric sheet. Its design allows minimal tissue ingrowth that is enough to maintain the implant position. The multifilament arrangement makes the implant not slippery during surgery; therefore, it stays wherever it is placed and almost sticks to its bed or to the overlying skin. In addition, this implant may be handled, cut, and shaped easily while retaining a certain degree of body. It does not shred, as encountered with other Dacron-type materials, such as Mersilene mesh. In addition, its soft nature makes it difficult to detect by skin palpation or visual inspection, even years after being implanted.

One of us (N.F.) reported his experience with 98 cases of tip augmentation using Dacron mesh (Mersilene mesh) in 1991.2 Subsequent to this, our use of Dacron has moved from the looser mesh form (Mersilene) to the fabric form (Cooley) because of the latter’s further ease of intraoperative manipulation and minimal shredding. However, this advantage of the fabric form is minimal. As far as clinical results are concerned, both Dacron materials are identical.

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PATIENTS AND METHODS

PATIENTS

A retrospective analysis was performed, reviewing the results in 136 patients who underwent rhinoplasty with augmentation using Dacron implants. The indications for dorsal augmentation were a deep nasofrontal angle, a saddle deformity of the dorsum, or a depressed supratip area. Dorsal saddle deformity was the most common indication of dorsal correction.

Indications for tip augmentation were previously detailed. The 2 most common indications were a recessed tip and a wide tip.

The implant may also be used in the lateral wall to augment a depression, typically in cases of side-to-side nasal pyramid deviation.

All patients included in this study were asked several months postoperatively to rate their degree of satisfaction with the cosmetic result. The results were graded as very happy (n=68), happy (n=59), satisfied (n=5), and dissatisfied (n=5). The surgeon, at that same time, rated his own assessment of the aesthetic result. The different grades were very good (n=64), good (n=40), satisfactory (n=24), and unsatisfactory (n=8).

TECHNIQUE

Tip Augmentation

The technique used for tip implantation was previously described in detail by one of us (N.F.). Several critical points and some minor modifications will be emphasized. The fabric material (Cooley) is first folded onto itself to form a pad that is 2 to 8 layers thick and approximately 1 cm in width (from left to right) and 8 mm in height (from superior to inferior). The thickness of each layer is approximately 0.5 mm.

We present herein our experience in using Dacron alloplastic materials, mostly the fabric form, to augment and shape the tip, dorsum, and lateral walls in 136 patients undergoing rhinoplasty.

RESULTS

This series consisted of 92 women and 44 men, for a male-female ratio of 1:2.1. The mean ± SD age of the patients was 26.5 ± 7.5 years for men and 28.9 ± 9.4 years for women. All rhinoplasties were performed by the same surgeon (N.F.). In 88 (65%) of the 136 procedures, only the tip was augmented, while in 45 (33%) of the patients, the tip and the dorsum or lateral walls were augmented. In 3 instances (2%), Dacron was used on the dorsum only.

All patients were prescribed intraoperative antibiotics: intravenous cefazolin, 1 g, when an allergy to penicillin was ruled out or intravenous erythromycin in the cases of penicillin allergy. All patients were treated with oral antibiotics (such as erythromycin) for 1 week postoperatively for further prophylactic coverage.

The follow-up ranged from 7 months to 12 years (average, 37 months). The same operating surgeon (N.F.) performed the follow-up and assessment. Figures 4, 5, 6, 7, 8, 9, and 10 show examples of preoperative and postoperative results of Dacron implantations in various patients (lateral wall implants in Figure 4; dorsum and supratip implants in Figure 5; implants in a patient who underwent revision rhinoplasty in Figure 6; dorsal implant thickest at the nasofrontal angle superiorly in Figure 7; dorsal implant of equal thickness in Figure 8; tip implant only, representing the most common implant indication, in Figure 9; and long-term results in Figure 10).

The most significant complication was infection, which occurred in 9 (6.6%) of the patients. In all cases, the patient was immediately given oral antibiotics on diagnosis of the infection, and the implant was removed under local anesthesia as soon as possible. Removal of the implant was always performed without difficulty because there was little tissue infiltration or fibrous attachment in all of the patients with infection. In the case of a tip implant, a curved mosquito clamp is used to retrieve the implant through a small rim incision. In the case of a dorsal or lateral wall implant infection, the same technique is used through an intercartilaginous incision, but more dissection is required. It is important to accurately count the number of layers removed to ensure complete removal of the implant.

Ten implants were removed in these 9 patients. Eight were tip implants, and 2 were dorsal implants. In a single
A diagnosis of implant infection was based on purulent discharge at the site of the pocket incision, in addition to one or more of the following signs: swelling, tenderness, redness, or extrusion. The presence of discharge is definite proof of implant infection. In the absence of discharge, the patient is given antibiotics and checked almost daily to rule out the small possibility of a limited skin infection (eg, furuncle) not involving the implant.

Two patients underwent revision because of an unsatisfactory aesthetic result, where a tip implant had migrated slightly to the right and a dorsal implant was too thick. This was remedied under local anesthesia by trimming a portion of the implant, a somewhat tedious procedure. The noninfected implant is usually well attached to the skin and underlying structures. Dissecting the implant off the overlying skin is easier than freeing it from the underlying cartilage or bone. The surgeon may choose 1 of 3 approaches: (1) trim the excess (the hardest to do, because the implant is well integrated and the Cooley fabric is difficult to cut when invaded with granulation tissue); (2) remove the entire implant and replace it with a brand new one (the easiest approach); or (3) remove the implant, reshape it, and reinsert it (the only problem is fixing it in place, because it tends to be slippery).

Dacron fabric allografts are among the myriad of options available in rhinoplastic surgery. Although potential postoperative infection is a disadvantage, Dacron fabric implants are particularly desirable to use in many cases of augmentation rhinoplasty. In terms of the aesthetic result, they have several advantages, the most important of which is having an impressive natural appearance and feel that are hard to detect by either visual examination or manual palpation. They display no tendencies for curling or resorption over time and are unlikely to un-

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COMMENT

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dergo displacement. In our series, no cases of resorption or implant distortion were observed. In addition, there is no donor site morbidity. Dacron fabric can be molded to assume any shape or thickness required, providing a controllable and smooth contour. The amount of available material is unlimited. Decreased surgical time contributes to lower morbidity and lower cost. Finally, Dacron has been used extensively as a cardiovascular implant and has an excellent long-term record.12-17

Other implantable materials commonly used have similar advantages, but certain drawbacks make them less desirable. Silastic, for example, a silicone rubber, has a firm consistency, therefore tending to feel like a foreign body under the skin. Also, it lacks pores, impeding tissue ingrowth and possibly contributing to implant displacement. Its surface is slippery, which may lead to malpositioning and which makes it hard to handle intraoperatively. Gore-Tex, which has been used in nasal augmentation,6-8 also tends to be slippery, causing possible displacement in the initial postoperative period, before tissue ingrowth has taken place. In addition, Gore-Tex has a whitish color, which may become visible externally, particularly in thin-skinned individuals and particularly in the long term after postoperative edema has subsided.

Dacron is not without its drawbacks, the most significant of which is infection.1 Others include asymmetry and incorrect implant volume, both mostly related to the surgeon’s experience using the material. This experience is quickly acquired if the guidelines suggested earlier in this article, regarding the implant’s thickness range, shape, tapered edges, access incision, and insertion technique, are vigorously followed. The incision needs to be large enough (1.5 cm) to allow good exposure, dissection of a pocket, and easy implant introduction. It should be closed loosely to allow any serous discharge or bleeding to drain, rather than remain confined within the pocket and progress to abscess formation. The pocket needs to be approximately 50% larger than the size of the implant because it will eventually contract. If it is not sufficiently large, it will result in subsequent implant infection or extrusion.

Our complication rate of infection is comparable to previously reported rates of 4% to 9%.4,7 However, this drawback is tempered by the many advantages associated with the use of this material. The high cosmetic reliability and quality of the result are often understated in the literature. Although cartilage grafts are rarely infected, they have cosmetic problems, including resorption, displacement, curling, and sharp edges. The longer the postoperative follow-up, the more evident some of these problems will become, especially those related to curling and sharp edges and those in medium- to thin-skinned patients.
Figure 4. A and B, Preoperative views of a 29-year-old man with a narrow bony bridge and concave upper lateral walls more on the left side than on the right, a recessed upper dorsum, thick redundant skin at the supratip and tip areas, and a drooping nasal tip. C and D, Postoperative result 2 years 4 months following a rhinoplasty with lateral wall implants (just 1 layer on the right and 2 on the left) and dorsal and tip implants.

Figure 5. A and B, Preoperative views of a 29-year-old woman with a low dorsum and thick skin at the tip and supratip. C and D, Postoperative results 11 months following rhinoplasty with a dorsal implant thickest at the supratip area because of a resistant skin concavity at that area. A tip implant was also used.
Figure 6. A and B, Preoperative photographs of a 20-year-old man with a history of 3 previous septorhinoplasties. He presented with a turned-up asymmetrical tip, a recessed dorsum, and lateral wall depressions, more obvious on the left. C and D, Postoperative results 7 years 2 months following a revision rhinoplasty with dorsal, tip, and left lateral wall Dacron (Ethicon Inc, Somerville, NJ) implants.

Figure 7. A and B, Preoperative photograph of a 33-year-old man with a recessed ill-defined nasal tip, a low upper dorsum, and very thick nasal skin. C and D, Postoperative results 2 years 10 months following a rhinoplasty with a dorsal implant (thicker at the root of the nose) and a nasal tip implant.
Figure 8. A and B, Preoperative photographs of a 27-year-old man with a projecting tip and a low dorsum. C and D, Postoperative results 12 months following a rhinoplasty with a dorsal implant of uniform thickness and a tip implant.

Figure 9. A and B, Preoperative views of a 22-year-old woman who is a typical example of a nose surgery candidate with a dorsal hump and a somewhat wide nasal tip. C and D, Postoperative photographs 15 months after a regular rhinoplasty combined with the placement of a tip implant to achieve a well-defined yet natural-looking nasal tip. This case is a typical example of the use of the Dacron (Ethicon Inc, Somerville, NJ) nasal tip implant, which is more often used in the nasal tip than in the dorsum or lateral walls.
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REFERENCES


Figure 10. A and B, Preoperative views of a 28-year-old woman with a low dorsum and a prominent and very boxy nasal tip. C and D, Very long-term postoperative result 11 years 2 months after the use of Dacron (Ethicon Inc, Somerville, NJ) implants in the dorsum and tip areas.