Porous Polyethylene Implants In Secondary Revision Of Rhinoplasty: A Safer Procedure?

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Citation

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Abstract

Revision rhinoplasty is one of the most challenging operations in facial surgery. Not only is a surgical procedure being performed on a scarred facial structure, which limits overall success, but also the patient undergoing revision rhinoplasty often has unrealistic expectations of the final results. Revision rhinoplasty has stimulated a variety of reconstructive techniques by surgeons dedicated to restoration of both nasal form and nasal function. Supportive materials are widely used in this operation. These materials may be categorized as autogenous tissue, homograft materials, and alloplastic materials. In this study we present our experience with high density porous polyethylene (HDPP) in thirteen patients who had operated for aesthetical revision rhinoplasty with autogenous tissue before. HDPP implants were used in nasal dorsum in aesthetical revisions. We detected only one complication as implant malposition. We speculate that prior augmentation of the nasal dorsum forms a pre-expanded nasal skin and increases the vascularity of the region. Rasping of the nasal dorsum increases the bare contact surface adding to tissue ingrowth to the implant and stabilization of it. Scar tissue due to prior surgery and subperiosteal placement of the implant increases the barrier effect of the nasal skin. Although autogenic materials should be preferred in nasal dorsal augmentation, in secondary cases in which donor area limitations are encountered, HDPP implants can easily and effectively be used for nasal dorsum augmentation.

INTRODUCTION

Revisions in aesthetic rhinoplasty may be due to problems in surgical technique, insufficient evaluation of the patient, unrealistic expectations of the patient or problems in wound healing and scar formation ([1,2,4,11]). The rate for revision rhinoplasty in the literature are between %5-10 in different publications ([1,2,4]).

Revision rhinoplasty has stimulated a variety of reconstructive techniques by surgeons dedicated to restoration of both nasal form and nasal function. Supportive materials are widely used in these operations. These materials may be categorized as autogenous tissue, homograft materials, and alloplastic materials ([3]). Since in revision rhinoplasty it is advisable to replace missing or scarred structures with similar tissue, cartilage grafts are accepted as "golden standard"([15]). Although autogenous bone and cartilage offered the advantage of tissue compatibility, they had their drawbacks: donor site morbidity, restricted availability, difficulty of shaping the graft, unpredictability of remodeling, and resorption. High density porous polyethylene (HDPP) has been used successfully in rhinoplasty for many years([5,8,9,10,12,13,14,16]).

The nose is a difficult area for implantation because of the thinness of the tissue, the proximity of potentially contaminated mucosa, the prominence and mobility of the nose, and the fact that most cases requiring augmentation involve previous injury or surgery ([5]). In this study we present our experience with HDPP in thirteen patients who were operated for secondary aesthetical revision rhinoplasty.

MATERIALS AND METHODS

Thirteen secondary aesthetic revision rhinoplasty patients in whom high density porous polyethylene (HDPP) implants were used in secondary revision of rhinoplasty in Adnan Menderes University Department of Plastic, Reconstructive and Aesthetic Surgery were evaluated. All patients had at least one revision rhinoplasty in which dorsal cartilage grafts were used before. The patients had their first operations in different institutions and departments.

All patients were operated under general anesthesia with transcolumellar inverted V incision and open rhinoplasty. After extensive exposition of the nasal dorsum, remnants of the former operation, forming irregularities, in form of cartilage or bone were removed. Nasal dorsum was rasped

and custom made HDPP blocks were sculptured with No 15 scalpel. The formed HDPP implants were inserted into subperichondrial pocket and fixed to neighboring tissues with 6/0 prolene sutures.

All cases were followed for at least 6 months (6-48 months), complications, functional and aesthetic structure was evaluated.

RESULTS

Total thirteen patients were evaluated and five of them had dorsal irregularities (38,5 percent), four dorsal depression (30,8 percent) and four patients had dorsal irregularities and depression together (30,8 percent). No major complications in form of extrusion or infection were observed. In one patient (7,6 percent) malposition of the implant was observed and revised under local anesthesia. (Table 1).

Ages of patients varied between 21 to 32 and mean were 27.9 years. There were nine female (69.2 percent) and four male (30.8 percent) cases.

No functional complications were observed. The patients were evaluated by three different surgeons in terms of aesthetic appearance. The surgeons were asked to evaluate post operative photographs of the patients in antero-posterior, lateral and oblique views and grade the aesthetic appearance as bad, insufficient, acceptable, good or excellent. All patients' scores were above the acceptable (figure 1-5). Scores varied between 3.66 to 4.66 and mean was 4.0 (good).

Figure 1

Table 1

Patient	Age	Sex	Etiology	Formed rhinoplasty	Implant Location	Complication	Aesthetic evaluation
1	32	F	Irregularities and depression	2	Dorsal	No	4,66 (excellent)
2	28	M	Dorsal depression	1	Dorsal	No	3, 33 (acceptable)
3	21	F	Dorsal depression	1	Dorsal	Implant malposition	4,66 (excellent)
4	36	F	Dorsal depression	2	Dorsal	No	3,66 (good)
5	31	F	Dorsal irregularities	1	Dorsal	No	4 (good)
6	28	F	Irregularities and depression	1	Dorsal	No	3,66 (good)
7	29	M	Dorsal irregularities	2	Dorsal	No	4,66 (excellent)
8	23	M	Dorsal irregularities	2	Dorsal	No	3,66 (good)
9	24	F	Dorsal depression	1	Dorsal	No	4 (good)
10	31	F	Dorsal depression	2	Dorsal	No	3,66 (good)
11	27	F	Dorsal irregularities	2	Dorsal	No	3,66 (good)
12	26	M	Irregularities and depression	2	Dorsal	No	3,66 (good)
13	27	F	Irregularities and depression	2	Dorsal	No	4,66 (excellent)

*aesthetic evaluation 1-bad; 2-insufficient; 3-acceptable; 4-good; 5-excellent

Figure 2

Figure 1: Pre-operative and post-operative views of the patient # 1.

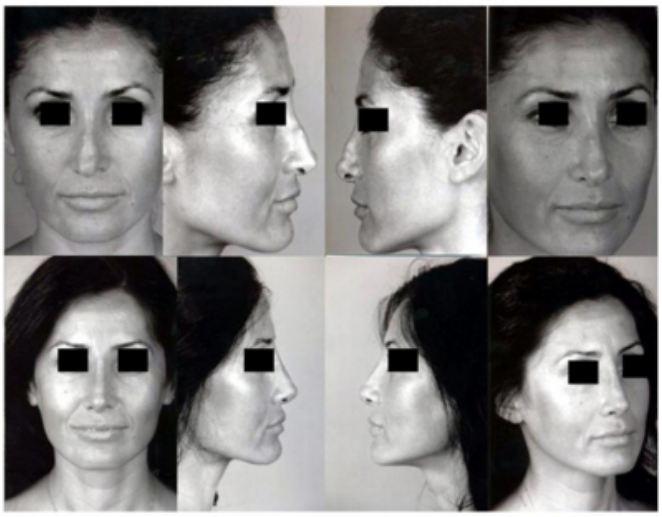

Figure 3

Figure 2: Pre-operative and post-operative views of the patient # 2.

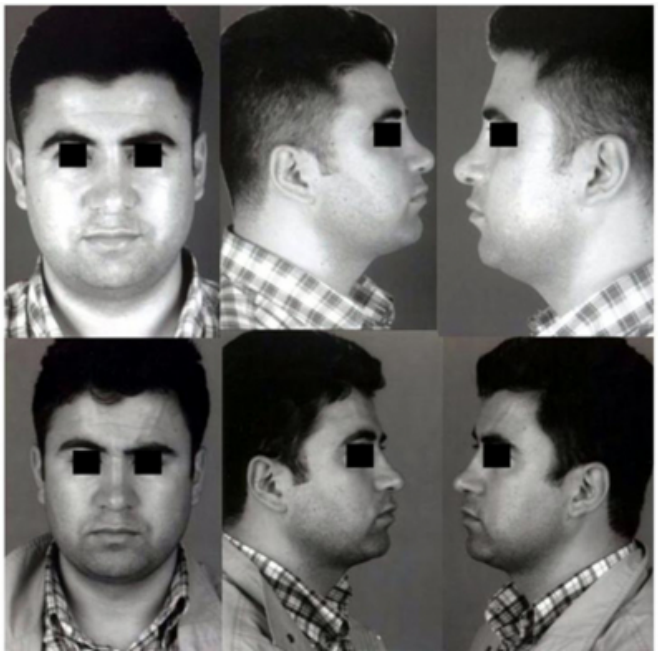

Figure 4

Figure 3: Pre-operative and post-operative views of the patient # 4.

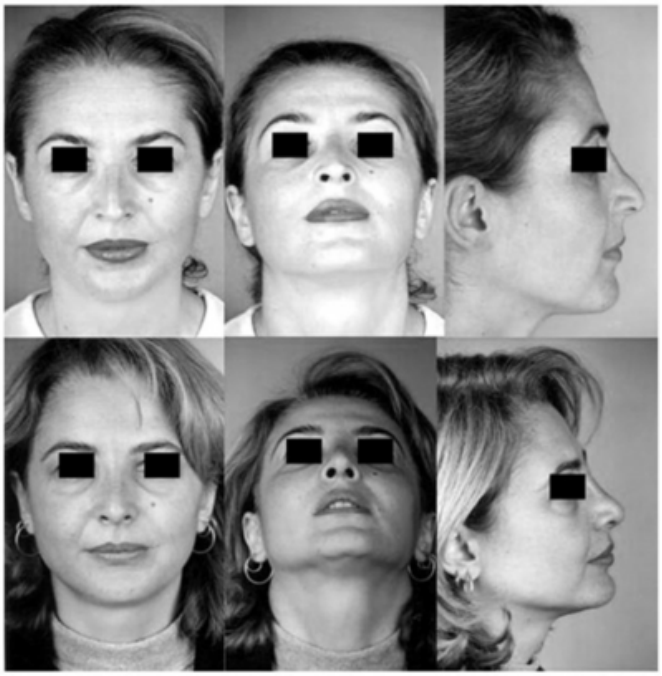

Figure 5

Figure 4: Pre-operative and post-operative views of the patient # 12.

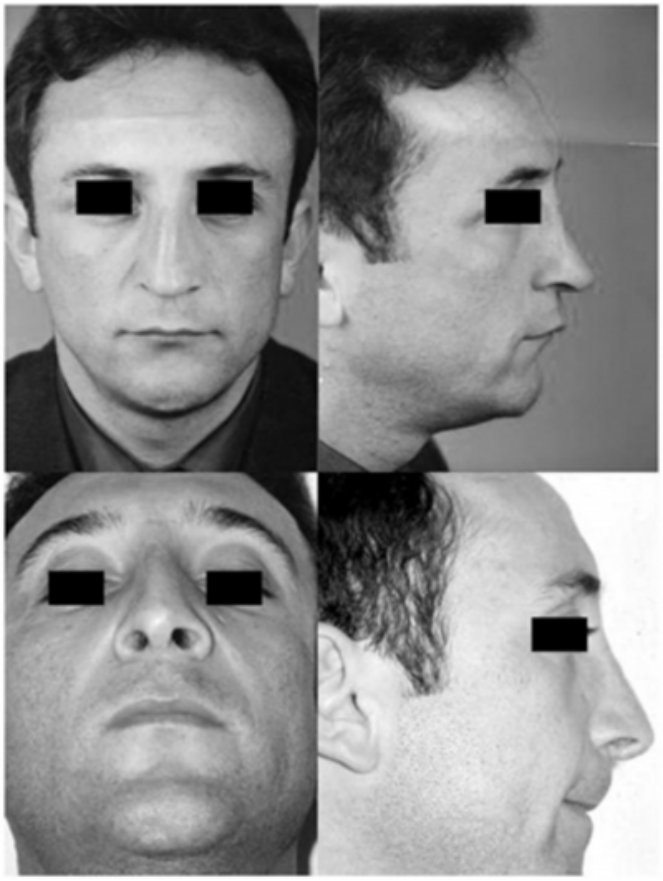

Figure 6

Figure 5: Pre-operative and post-operative views of the patient # 9.

DISCUSSION

Rhinoplasty is one of the most performed aesthetic interventions. Need for revision may be as high as %10 in some series ([1,2,4]). Common indications for revision rhinoplasty may be categorized according to the location, like upper-middle or lower vault([4,15]). Complications in the upper vault are usually due to the nasal osseous structure. Irregularities, localization and depth of the radix nazi or saddle nose deformity are most observed complications. Autogenous grafts in form of cartilage, bone, cellulose wrapped dished cartilage, perichondrium or alloplastic implantation materials are frequently used to prevent or correct these complications ([3]). Although autogenous bone and cartilage are offering the advantage of tissue compatibility, they have their drawbacks: donor site morbidity, restricted availability, difficulty of shaping the graft, unpredictability of remodeling, and resorption. Especially septal cartilage is known as gold standard as graft material but its limited availability is an n important draw back ([15]). There are also problems in alloplastic implants especially in the nasal region. The thin nasal skin which is not a good barrier may give rise to exposition of the implant, closeness to the nasal mucosa and sebaceous glands may give rise to implant infection, the nose is susceptible to traumas and the recipient are in revision rhinoplasty is a cicatrized tissue which makes interventions less comfortable.

High density porous polyethylene is an inert, nonantigenic, nonabsorbable and easily applied material with pore sizes between 160-368 µm which allow tissue ingrowth. HDPP implants are commonly used in craniofacial applications ([8]). Complication rates regarding HDPP implants are reported as high as %20 and most commonly observed complications are implant infection and extrusion ([6,7]). HDPP is also used for nasal dorsal augmentation in and complication rates between %2,8-10 are reported ([6]). Some authors discouraged usage of HDPP in nasal regions and proposed placement of implants under a second fascial envelope not directly skin ([8]).

We applied HDPP implants to nasal dorsum in secondary revision rhinoplasty in seven patients. Prior usage of cartilage or bone graft for dorsum augmentation or fading of irregularities were applied in all of the patients with limited success. Secondary revision rhinoplasty was done in all of the patients and HDPP implants were sub-periosteally placed. In are small group of patients only a minor complication was observed in form of malposition of the implant.

We speculate that prior augmentation of the nasal dorsum forms a pre-expanded nasal skin and increases the vascularity of the region. Rasping of the nasal dorsum increases the bare contact surface adding to tissue ingrowth to the implant and stabilization of it. Scar tissue due to prior surgery and subperiosteal placement of the implant increases the barrier effect of the nasal skin. Although autogenic materials should be preferred in nasal dorsal augmentation, in secondary cases in which donor area limitations are encountered, HDPP implants can easily and effectively be used for nasal dorsum augmentation.

In conclusion we believe that usage of the HDDP implants in secondary revision of the rhinoplasty is safer than the primary operations.

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