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HEAD AND NECK

Prolene mesh mentoplasty

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Abstract Augmentation mentoplasty is a cosmetic surgical procedure to correct chin retrusion or microgenia which usually requires placement of an alloplastic material over the pogonion, and which results in increased chin projection and a more aesthetically balanced facial profile. Polypropylene mesh is easy to purchase, widely available in a general hospital and most commonly used by general surgeons. In this series of 192 patients, we wanted to demonstrate our simple mentoplasty technique using prolene mesh that can easily be combined with a rhinoplasty procedure, with possible causes of infection and the rationale for using prolene mesh in such procedures.

Keywords Mentoplasty · Prolene mesh

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Introduction

The chin is critically involved in the appearance of a human being because its characteristics affect the overall balance and appeal of the face, and the chin itself, as well as the nose, is involved in the perception of beauty from both front and profile views because of its central location on the face. Chin augmentation, or augmentation mentoplasty, is a cosmetic surgical procedure to correct chin retrusion or microgenia. This usually requires placement of an alloplastic material over the pogonion, which results in increased chin projection and a more aesthetically balanced facial profile. During the past 20 years, alloplastic implants have become popular because of their ready availability, lack of donor site morbidity, and improved host tolerances. Materials such as acrylic, Silastic (solid silicone, Michigan Medical Corporation, Santa Barbara, CA), Supramid (polyamide nylon mesh, Ethicon, Sommerville, NJ), Medpor (porous polyethylene, Porex Surgical Inc, College Park, GA), and Gore-Tex (polytetrafluoroethylene [ePTFE], W. L. Gore & Associates Inc, Flagstaff, AZ) have been used for this purpose [1].

The above-mentioned types of alloplastic materials have all their own disadvantages and in order to reduce extrusion rates of the implanted material, an ideal implant should not produce excess foreign body reaction; it should also be chemically inert, noncarcinogenic, nonallergenic, act as a scaffold for new collagen formation in case of a healthy healing, and be suitable for sterilization without modifying its qualities [2].

Polypropylene mesh is easy to purchase, widely available in a general hospital and most commonly used by general surgeons in the repair of abdominal hernias, and it gives good clinical outcomes over the years fulfilling the expectations from an alloplastic material. Approximately

7 years ago, we started using prolene mesh implants in chin augmentation in our private practice and ended up with satisfactory results. In this series of 192 patients, we wanted to demonstrate our surgical technique, with possible infection etiology and the rationale for using prolene mesh in such procedures.

Materials and methods

Sample

Over a 7-year period, 192 patients who underwent rhinoplasty procedures gave informed consent for an additional chin augmentation using prolene mesh during the same general anesthesia session in this retrospective multicenter study. The patients have been evaluated pre- and postoperatively (Fig. 1a, b) using Rhinobase software program [3] in the Frankfort position. During surgery, chin augmentation was performed after completion of the rhinoplasty procedure, but this stage requires detachment of sterile straps fixing the intubation tube and relocating it more laterally in order to have a good visualisation on the surgical area.

Surgical technique

The mentoplasty procedure starts with an infiltration local anesthesia (a mixture of 0.5% lidocaine and 1:200,000 epinephrine) and midline of the chin is marked on the pogonion as well as the midline of the lower lip as reference points. As local anesthesia sets in within minutes, appropriate sized implants are prepared from Prolene mesh (polypropylene; Ethicon GmbH, Germany). A 15 × 15 cm sheet of mesh is cut in a convenient size and folded on itself in a rectangular form as an implant material in accordance with the preoperative evaluation of the patient. The prolene mesh implant is then secured by a 3-0 prolene suture in a running horizontal mattress fashion (Fig. 2). The midline of the sutured implant is also marked as a reference point, lateral sides are trimmed and blunted. The implant is thereafter soaked into a solution of rifamycine and ready for implantation (Fig. 3). An approximately 3 cm mucosal incision is made on the labial side of the vestibule about 10 mm above its depth and parallel to the gingivolabial sulcus (Fig. 4). Through the mentalis muscle, the periosteum is incised and elevated. Wide subperiosteal dissection is performed and extended to each side from the midline (Fig. 5). The degloving procedure provides excellent exposure of the mandible's anterior portion and the mental foramen with its exiting nerve. The implant is then placed and positioned with great care using reference points for accurate implant positioning (Fig. 6). A couple of 4-0 polyglactin sutures are placed to close the previously elevated periosteum. By creating a tight pocket, these sutures hinder the implant from a possible malpositioning. Muscular and buccal tissues are repaired by layers with 4-0 polyglactin suturing and wound closure is accomplished. External support was provided by elastic bandage above the dressing for 1 week.

Results

Based upon pre- and postoperative calculations made using Rhinobase software program, the mean amount of vertical chin movement and improvement of the nasomental angle

Fig. 1 Preoperative (**a**) and postoperative (**b**) lateral views of the patient with facial soft tissue landmark. *G* glabella, *N* nasion, *R* rhinion, *ST* supratip, *T* tip, *C* columella, *AC* alar crease, *Sn* subnasale, *LS* labrale superius, *S* stomion, *LI* labrale inferius, *SI* sulcus inferioris, *Pg* pogonion, *Me* menton, *C* cervical point, *TR* tragion

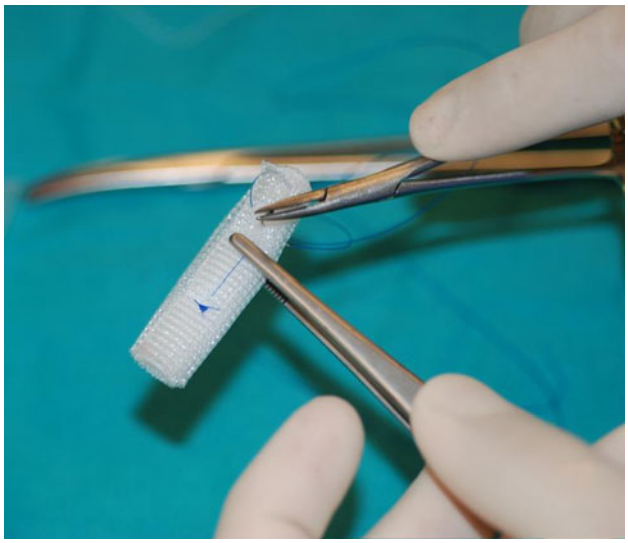

Fig. 2 Preparation of prolene mesh implant

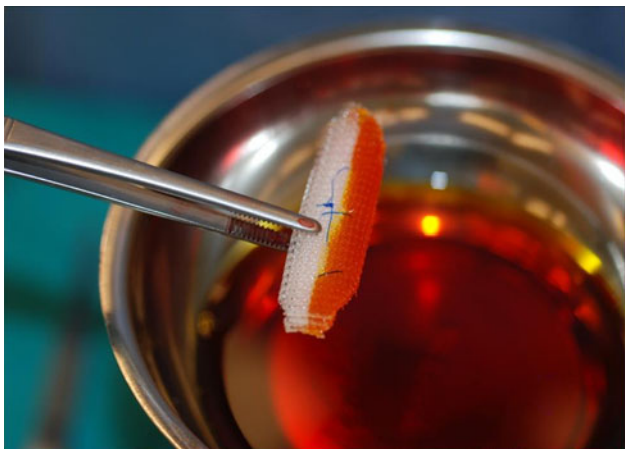

Fig. 3 The implant soaked into a solution of rifamycine after suturation

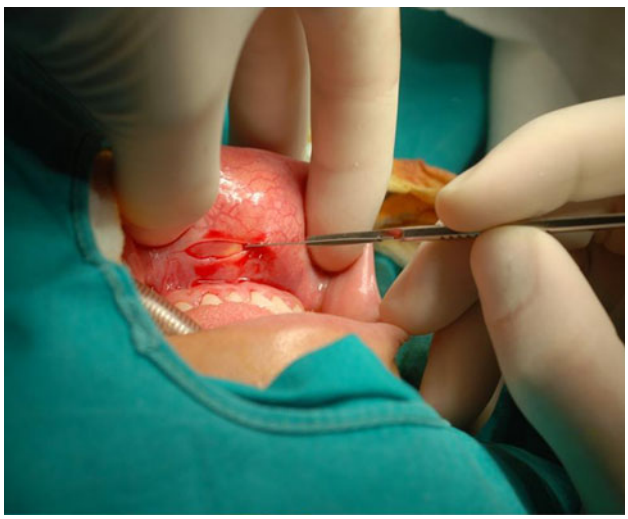

Fig. 4 Mucosal incision made on the labial side of the vestibule parallel to the gingivolabial sulcus

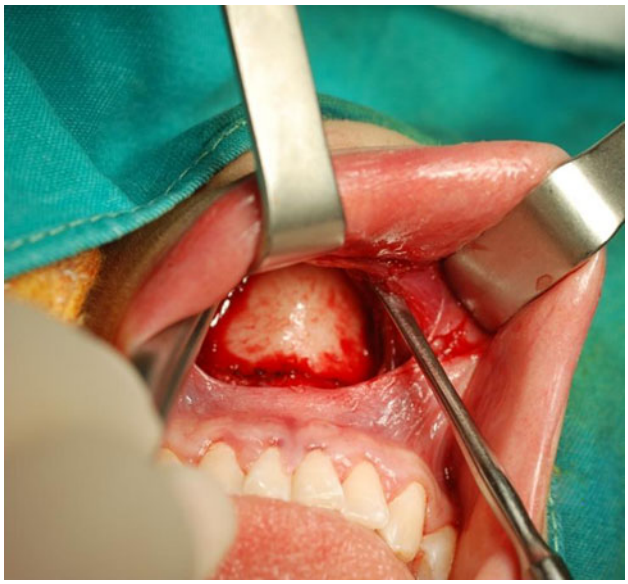

Fig. 5 Elevation of periosteum and creation of subperiosteal pocket

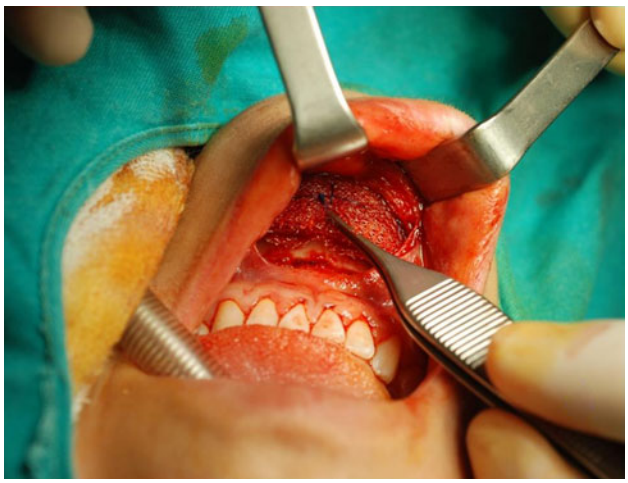

Fig. 6 Insertion of prolene mesh implant

was 12 mm (7–16 mm) and 9.4° (14–7.5°), respectively. The aesthetic results combined with a rhinoplasty procedure, were satisfactory, as determined by both patient and surgeon during the follow-up period of minimum 6 months to 7 years (Fig. 7a, b). The population of 192 patients experienced four complications (3 infections and 1 displacement) that required intervention. The overall complication rate was 2.1% (4/192). In one patient who was a scuba diver, an infection developed most probably due to the use of diving mouthpiece, since an interdental biting platform is gripped forcefully between the diver's teeth and is in close contact with the surgical area. The two other infections were experienced following dental abscesses and they responded perfectly to a course of antibiotic treatment. No alloplastic or allergic reaction was observed as should be from such a widely used implant material.

Fig. 7 Preoperative (**a**) and postoperative (**b**) lateral views of another patient in Frankfort position

Discussion

Facial beauty is related to symmetrical structures of facial proportions. Patients with a retruded chin who desire rhinoplasty are mostly unaware of their facial imbalance and deformities. Approximately 20–25% of patients requesting rhinoplasty can also benefit from augmentation mentoplasty [4]. Today, most surgical procedures performed on the chin are alloplastic implants; in many instances the results are good, and complications are few when patients are selected appropriately. The osseous genioplasty is not solely within the domain of the maxillofacial or craniofacial surgeon; it is well within the reach of any surgeon whose practice involves facial aesthetics. The surgeon who masters this relatively simple procedure can solve a broad range of chin deformities that an implant cannot solve: a chin that is too long, too short, or asymmetric. Additionally the solution to failed alloplastic genioplasty is not another alloplastic genioplasty but an osseous genioplasty [5]. During the past 20 years, several kinds of alloplastic implants have become more popular because of their ready availability, lack of donor site morbidity, and good tissue tolerance. Genioplasty using Medpor as a combined technique was evaluated for the first time by Park et al. [6] and it was found that the amount of the movement at the time of surgery when checked after surgery did not change in patients who underwent genioplasty using Medpor compared with patients who underwent genioplasty using osteotomy. The use of mersilene mesh in augmentation of facial defects were first suggested by McCollough [7] and then they presented a large series of mersilene mesh mentoplasty procedure in the 1990s [8]. Gross et al. [1] reported no bone resorption or capsule formation, relatively lower infection rates and an excellent long-term predictability and cost-effectiveness in a further study using mersilene mesh. However, this is the first study known to use prolene mesh as an implant material in mentoplasty procedures.

Of all the synthetic meshes available, prolene mesh which is still the mesh most commonly used in the repair of hernias, is macroporous, non-absorbable, non-carcinogenic and suitable for sterilization without modifying its qualities and it gives good clinical outcomes [2]. The mesh material's pore size and multi-filamentous or mono-filamentous natures are important for scar formation. There is a decrease in the level of inflammation and fibrosis when macroporous mesh is used. Erosion phenomena with synthetic meshes may be related to poor incorporation of the sling into host tissue, as a result of insufficient collagen synthesis produced by fibroblasts. While mersilene mesh has a pore size <10 μm, prolene has pore size of 1–2 mm in comparison [9]. Meshes with a pore size >100 μm that allow fibrous tissue through mesh promote adhesion formation and less scar formation, which is beneficial for an alloplastic implant located free floating in a subperiosteal pocket.

Augmentation mentoplasty may result in a small percentage of soft tissue relapse 6 months after surgery, however the mean amount of vertical chin movement and improvement of the nasomental angle achieved with prolene mesh mentoplasty technique are in accordance with the current literature and yielded long-term satisfactory results when combined with a rhinoplastic procedure. The infection rate in our series was consistent with the findings of other publications using mersilene mesh [1, 8], which may be due to the ability of the antibiotic solution to penetrate the porous mesh as well as the ability of white blood cells to move through the large pores within the mesh.

However, oral, dental and buccal hygiene should not be underestimated and a dental consultation accompanied with a panoramic radiograph to exclude dental apical pathology should be sought preoperatively for caries as a potential source of infection.

Conclusion

The prolene mesh mentoplasty technique conducted by an otolaryngologist is a simple, rapid and safe procedure that can easily be combined with a rhinoplastic intervention under the same anesthesia session.

Conflict of interest None.

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