



# Usefulness of Titanized Polypropylene Mesh and an Anchor System for Correction of Lower Lid Retraction

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**Summary:** Because of the lower eyelid's free edge anatomy, it is difficult to preserve its contours after reconstruction. We recently attempted a new operative procedure to treat 2 cases of lower lid retraction by using a titanized polypropylene mesh and an anchor system. As the lower lid skin is elevated laterally in an oblique upward direction, the location of the mesh insertion is decided and the site is marked accordingly. The mesh to be inserted is approximately 20×10 mm. A skin incision is rendered from the medial to the lateral side of the lower eyelid edge, and the line of incision is raised beyond the lateral canthus along the skinfold. The mesh insertion site is then developed in the deep fat layer. After hemostasis, the mesh is densely sutured with the fat tissue. Next, the lateral orbital rim is exposed under the periosteum, and 2 anchors, each 2 mm in diameter, are driven into place. The thread connected to each anchor is passed through the mesh and subcutaneous tissue and placed in the lateral orbital rim. Excess skin is trimmed, and the wound is closed. Both patients had complained of dry eye and lacrimation before treatment. No postoperative complications were observed, and in both cases, the symptoms disappeared, and the patient's appearance was improved. During the follow-up period, which lasted from 15 to 29 months, elevation of the lower eyelid edge was kept at a favorable level, and neither case exhibited a relapse of retraction. (*Plast Reconstr Surg Glob Open* 2016;4:e626; doi: 10.1097/GOX.0000000000000620; Published online 22 February 2016.)

Lower lid deformity is caused by factors such as trauma, tumor excision, congenital anomaly, and facial palsy. Because of the lower eyelid's free edge anatomy, it is difficult to preserve its contours after reconstruction. We recently attempted a new operative procedure to treat 2 cases of lower lid retraction

because of facial palsy, using extralight titanized polypropylene mesh (TiMESH, PFM Medical Titanium GMBH, Nürnberg, Germany) and an anchor system (Mitek, Johnson & Johnson Company, New Brunswick, USA). In both instances, ocular symptoms were alleviated and the lower lid edge was aptly preserved.

## SURGICAL METHODS

As the lower eyelid skin is elevated laterally in an oblique upward direction, the location of the mesh insertion is decided and the site is marked accordingly (Fig. 1). The mesh to be inserted is approximately 20×10 mm. A skin incision is rendered from the medial to the lateral side of the lower lid edge, and the line of incision is raised beyond the lateral canthus along the skinfold. The mesh insertion site is then developed

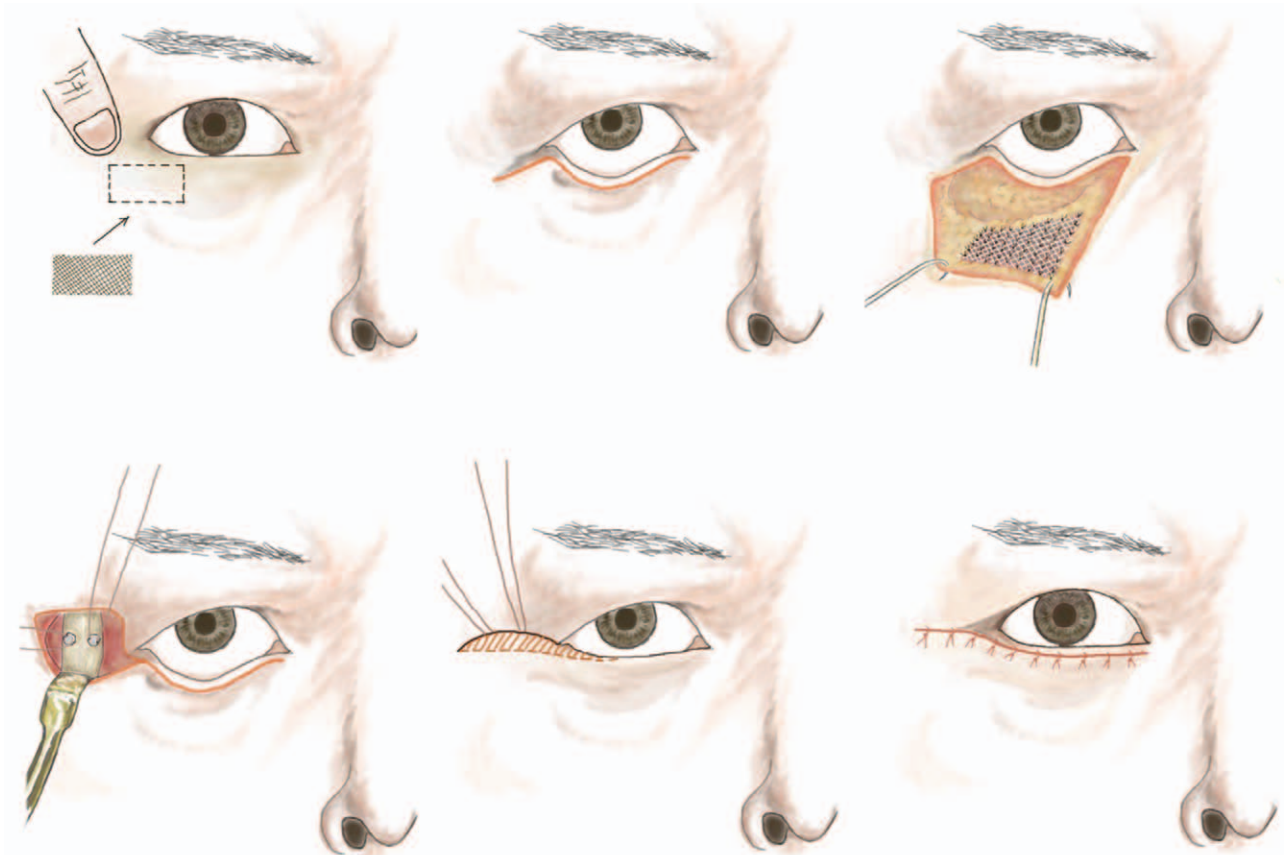
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**Fig. 1.** Diagram of the surgical methods.

in the deep fat layer. After hemostasis, the mesh is densely sutured with the fat tissue using the 5-0 nylon at vertical and horizontal intervals of 5 mm. Next, the lateral orbital rim is exposed under the periosteum, and 2 anchors, each 2 mm in diameter, are driven into place. The thread connected to each anchor is passed through the mesh and subcutaneous tissue and placed in the lateral orbital rim. This thread is also passed through the dermis so that the pull-up force may be maintained until the mesh adheres firmly to the subcutaneous tissue. After washing the surgical site, excess skin is trimmed and the wound is closed.

### RESULTS

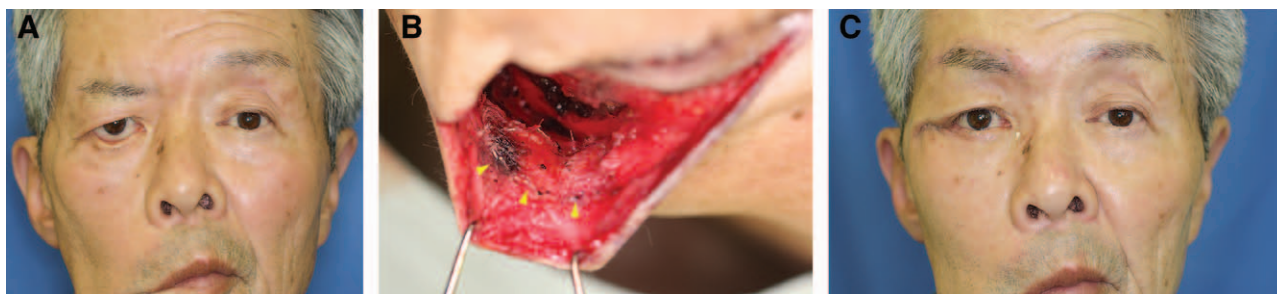
Two patients with paralytic lagophthalmos because of facial palsy (a 66-year-old woman and a 72-year-old man) received the previously described procedure. Both had complained of dry eye and lacrimation before treatment. No postoperative complications were observed, and in both cases, the symptoms disappeared and the patient's appearance was improved. During the follow-up period, which lasted from 15 to 29 months, elevation of the lower lid edge was kept at a favorable level, and neither case exhibited a relapse of retraction.

### CASE REPORT

Case 1: The 72-year-old man had developed right facial palsy by extirpation of the parotid gland cancer. A preoperative evaluation revealed dry eye and lacrimation associated with paralytic lagophthalmos (Fig. 2A). He underwent brow lift surgery and lower blepharoplasty using our mesh/anchor method (Fig. 2B). At present, 29 months postoperatively, the subcutaneously inserted mesh is not palpable, and the patient has no complaints of discomfort. The affected area is free of inflammation, and the lower lid edge has been kept at a favorable height (Fig. 2C). Consequently, the patient is satisfied with both the resolution of his ocular symptoms and the esthetic improvement derived from the surgery.

### DISCUSSION

The lower eyelid keeps the eyelid edge at a normal position while supporting the eyeball. However, because of its free edge form, ptosis is likely to occur because of gravitational force and other factors, and reconstruction is difficult. Conventionally, the prevention of postoperative reformation was attempted by implanting autologous tissue (e.g., stored sclera, nasal cartilage, and auricular cartilage)



**Fig. 2.** The 72-year-old man had developed right facial palsy by extirpation of the parotid gland cancer. A preoperative evaluation revealed dry eye and lacrimation associated with paralytic lagophthalmos. Postoperatively, the patient is satisfied with both the resolution of his ocular symptoms and the esthetic improvement. A, Preoperative condition. B, The titanized polypropylene mesh was inserted in the deep fat layer. C, Postoperative condition after 29 months.

into the lower eyelid. But such a procedure carries a significant risk of reformation arising from age-related loosening of the lower lid skin.<sup>1</sup> Furthermore, patients sometimes complained of discomfort because of the implanted tissue below the skin.<sup>1</sup> Acellular dermal matrix graft was recently reported to use with the lower lid retraction.<sup>2</sup> But with this method it is not clear whether the lower eyelid's height can be maintained for long term.

In 2013, we reported a new operative procedure using a combination of polypropylene mesh and an anchor system as an improved technique of cheek pull-up for patients with Von Recklinghausen disease.<sup>3</sup> Because of the porosity and fibrosis-stimulating activity of polypropylene, the inserted mesh adheres to the subcutaneous tissue more readily. Furthermore, the thread connected to the anchor can fix the mesh together with the subcutaneous tissue as if en bloc, enabling the cheek to be pulled up for 5 years 10 months.<sup>3</sup>

The titanized polypropylene mesh is a polypropylene lattice coated with titanium and has been used for the repair of chest/abdominal wall defects and inguinal hernia. In a study using pigs, a titanized polypropylene mesh was shown to have a markedly lower shrinkage rate with fewer inflammatory reactions after implant compared with a conventional polypropylene mesh.<sup>4</sup> When used for inguinal hernioplasty, the titanized polypropylene mesh reportedly seemed to reduce the postoperative complications such as seroma and wound healing disorders and improve early convalescence.<sup>5-7</sup>

When implanted in the subcutaneous tissue of the lower eyelid, the titanized polypropylene mesh, with its reduced shrinkage rate, is useful in alleviating foreign body sensation and preventing a relapse of the lower lid retraction. To prevent dislocation and exposure of the mesh, the insertion site was set at the deep fat layer on the lateral side of the lower eyelid. In this way, the mesh implant was not palpable for both patients, and the patients involved

reported no discomfort. Furthermore, complications such as inflammation because of foreign body and fistula formation were effectively obviated. To date, no report has been published concerning the use of titanized polypropylene mesh on the face. Our recent experience indicates that the combination of the titanium mesh with an anchor system does not require a cartilage or sclera implant, making the surgery less complex while ensuring long-term efficacy.

## CONCLUSIONS

We have devised a new operative procedure for lower lid retraction because of facial palsy, using extralight titanized polypropylene mesh and an anchor system. Our recent experience indicates that this method ensured long-term efficacy. This novel approach appears to be very useful in correcting the lower lid retraction.

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## PATIENT CONSENT

*The patient provided written consent for the use of his image.*

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