CASE REPORT

A Case Report of Inferior Oblique Reattachment after Inferomedial Orbital Wall Reconstruction from Total Maxillectomy

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ABSTRACT

The detachment and reattachment of inferior oblique (IO) have been done by ophthalmologists in inferomedial orbital wall fracture repair to avoid inducing a new diplopia in patients post-operatively. However, doing them in orbital wall reconstruction in patient who underwent maxillectomy for a malignancy has not been described yet. We describe a case where a disinserted inferior oblique was reattached after titanium mesh implantation to prevent diplopia after the surgery.

This is the case of a 40-year-old male diagnosed with recurrent bilateral nasomaxillary ameloblastoma who underwent total maxillectomy of the right with removal of the inferomedial orbital wall, and detachment and reattachment of inferior oblique with no resulting inferior oblique palsy and diplopia from hypotropia or incyclotorsion.

This is the first report, to our knowledge, to describe reattachment of IO in its approximate insertion during reconstruction of the inferomedial orbital wall after total maxillectomy from a malignancy with no resulting diplopia.

Keywords: inferior oblique disinsertion and reattachment, origin, case report

INTRODUCTION

The inferior oblique (IO), one of the six extraocular muscles responsible for moving the eye, originates from the inferomedial orbital wall. Its origin and muscle path make visualization of and access to the inferomedial wall challenging when putting implants for inferomedial orbital wall fracture repair using the transcaruncular or the inferior transconjunctival approach.[1] As such, the IO is disinserted from its origin for better view by the surgeon.[2,3] There are times the IO gets disinserted iatrogenically.[4] This can cause IO palsy or restriction which in turn can lead to a new or persistent diplopia (if there is already one prior due extraocular muscle entrapment) due to hypotropia or incyclotropia as the IO's actions include sursumduction and excyclotorsion.[4]

This highlights the need for careful identification of IO during surgery on the inferomedial orbital wall for proper detachment and reattachment after the implant needed to repair the fracture has been placed and secured.[5]

There is no local or international literature on detachment and reattachment of the IO in its insertion after the removal of the inferomedial orbital walls for a malignancy and reconstruction using a titanium mesh. We present a patient who underwent maxillectomy from recurrent maxillary

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ameloblastoma and inferomedial orbital wall reconstruction with detachment and reattachment of IO.

CASE PRESENTATION

This is the case of a 40-year-old male diagnosed with recurrent bilateral nasomaxillary ameloblastoma who already underwent prior multiple excisions. One year prior to consult, he came in for a new 4 x 4 centimeter soft palatal mass gradually enlarging for eight months with associated pain especially on palpation (Figure 1A) which he underwent right and left partial maxillectomy. A repeat imaging showed the recurrence of the masses in bilateral maxilla (Figure 1B).

This necessitated repeat right total maxillectomy which resulted to the removal of the right orbital floor and tagging with polypropylene suture and detachment of the right inferior oblique from its origin (Figure 2A). A titanium mesh was placed as a replacement for the removed orbital floor and the tagged inferior oblique was anchored in the area approximated to be the muscle origin in the titanium mesh of the muscle (Figure 2B).

The day after the surgery, there was no diplopia. There was no hypotropia or incyclotorsion. (Figures 3A and 3B).

The patient underwent 33 fractions of post-operative radiotherapy. During his three months follow-up, he remained to be without diplopia. There was no incyclotorsion with

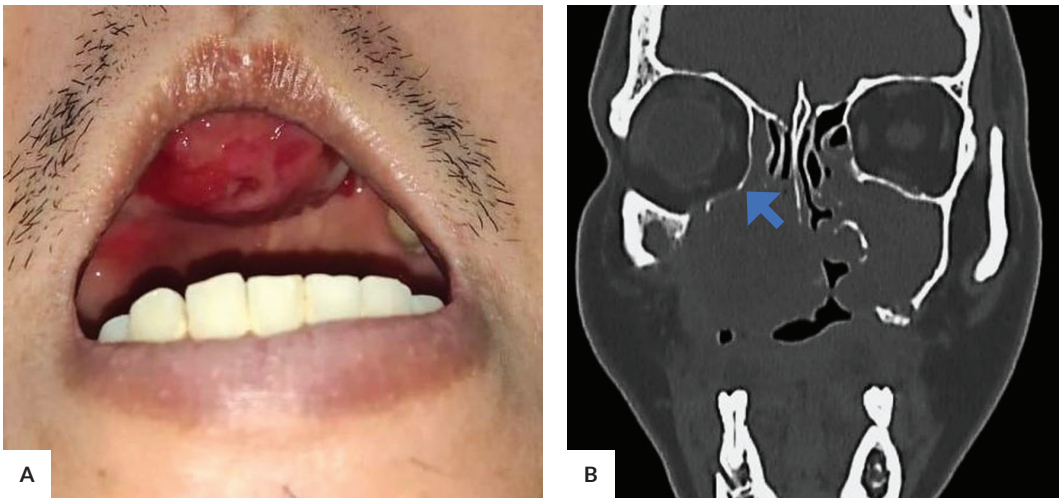

Figure 1. **(A)** 4 x 4 centimeter hard, reddish, and tender mass was seen in the hard palate. **(B)** Computed tomography of the face, coronal cut, shows the mass extending into and occupying the bilateral maxillary sinuses with involvement of the orbital floor *(blue arrow)* in the right.

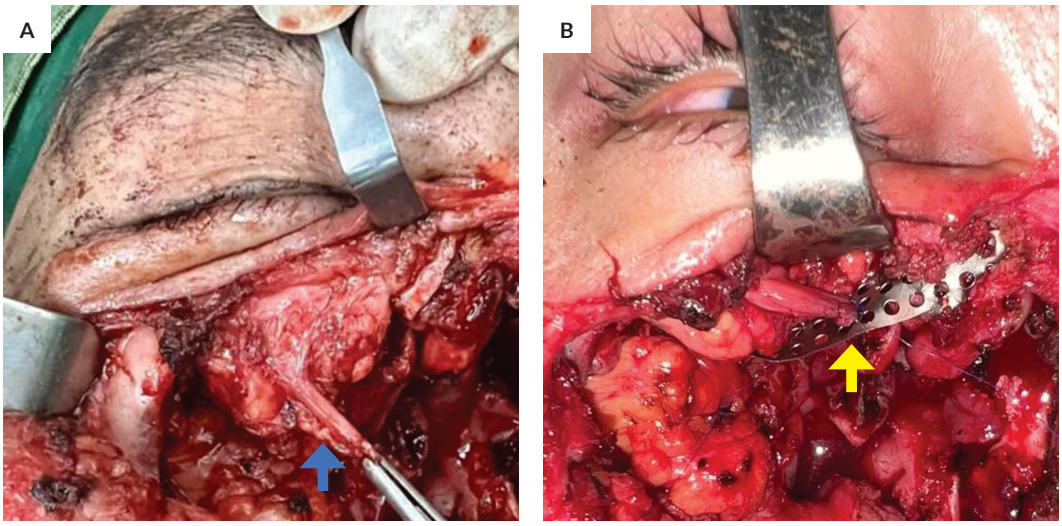

Figure 2. **(A)** After the removal of the right orbital floor, the inferior oblique *(blue arrow)* was identified and tagged. **(B)** After a titanium mesh was secured to reconstruct the inferomedial wall of the orbit, the inferior oblique was reattached *(yellow arrow)* in the approximate area of its origin.

the right inferior oblique still intact (Figures 4A and 4B). However, he complained of epiphora of right eye as a result of the nasolacrimal involvement during surgery. His visual acuity was 20/20 for both eyes with full extraocular muscle movement. He is being closely monitored for recurrence. He remained diplopia-free six months after the surgery.

DISCUSSION

This is the first report to our knowledge, that describes the detachment and reattachment of IO in its approximate insertion during the reconstruction of the inferomedial orbital wall after total maxillectomy from a malignancy with no resulting diplopia.

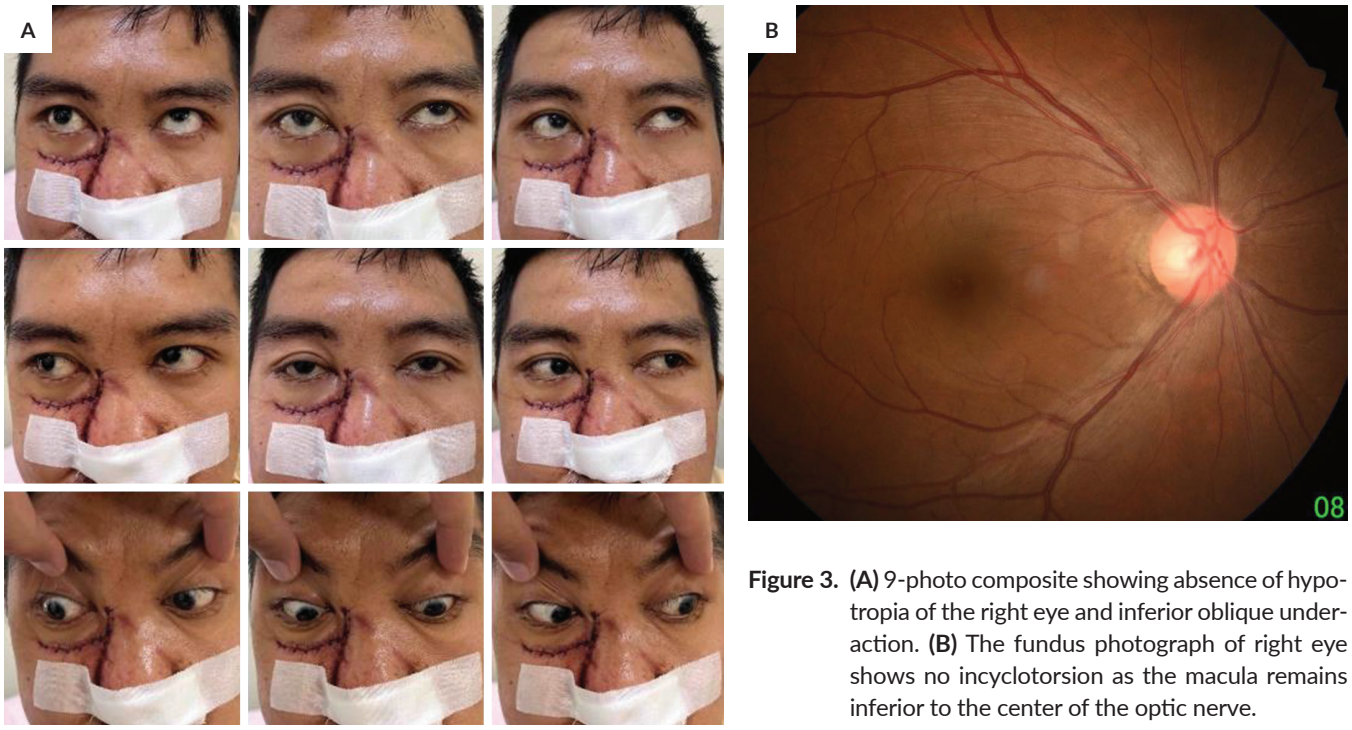

Figure 3. **(A)** 9-photo composite showing absence of hypotropia of the right eye and inferior oblique underaction. **(B)** The fundus photograph of right eye shows no incyclotorsion as the macula remains inferior to the center of the optic nerve.

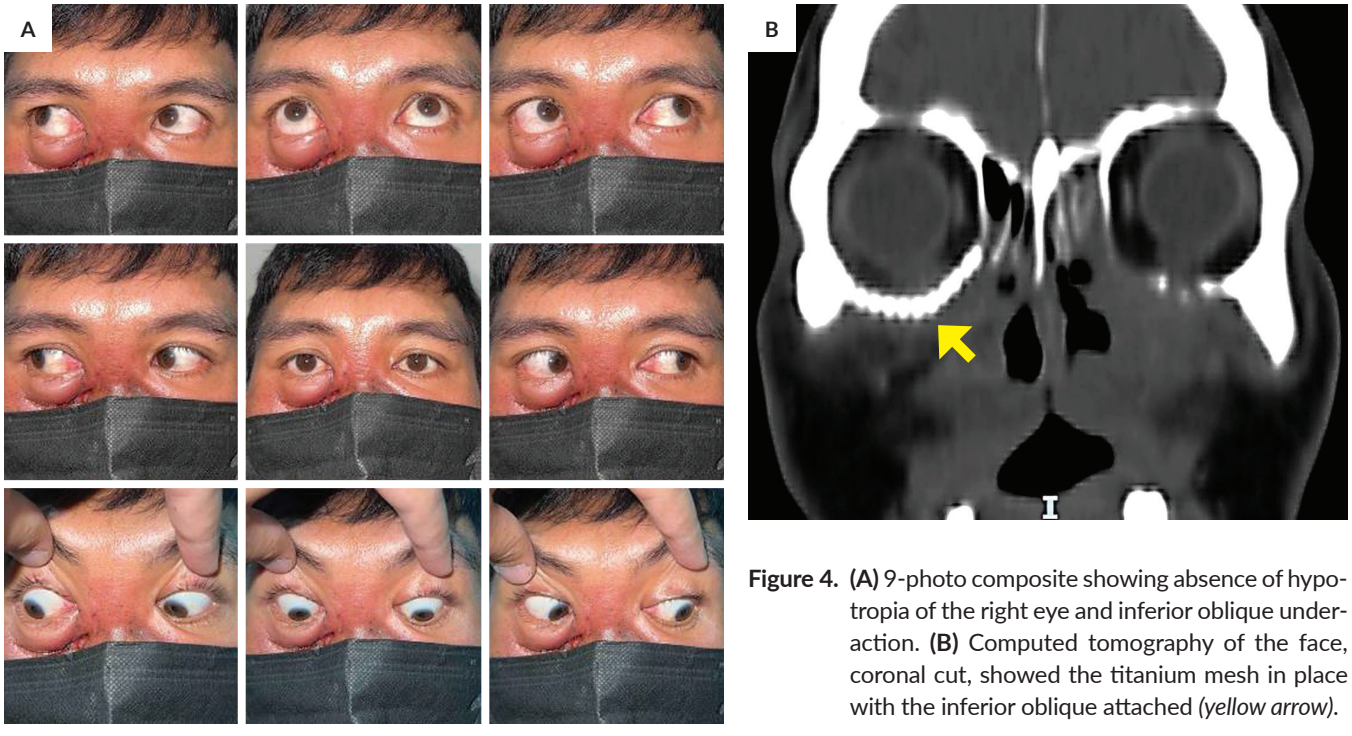

Figure 4. **(A)** 9-photo composite showing absence of hypotropia of the right eye and inferior oblique underaction. **(B)** Computed tomography of the face, coronal cut, showed the titanium mesh in place with the inferior oblique attached *(yellow arrow)*.

When repairing inferomedial orbital wall fractures using a porous polyethylene and polylactic acid copolymer implants, Ahn et al. described their technique of preplacing 6-0 polyglactin suture at the periosteum in the approximated IO origin and reattaching the IO using the suture after the implant has been secured.[5] Only 10% of their patients had persistent diplopia even after six months. Rodriguez et al. and Alameddine et al. recommended leaving a muscle stump to mark the original insertion and to easily reattach the IO.[2,6] Rodriguez et al. only had 20% of their patients with persistent diplopia after 6-13 months while Alameddine et al. only had 2% after 2 months.[2,6] Multiple authors suggested disinserting the IO up to the periosteum and leaving the IO unattached as it can spontaneously reattach to the bone after.[7-9] For our case, the whole inferomedial orbital wall was replaced by titanium mesh and the IO may not re-attach spontaneously in the implant. Similarly, it was easy to reattach the IO in our case since the maxillectomy made the inferomedial orbital wall so accessible compared to the transcaruncular or the transconjunctival approach used for orbital wall fracture repair. The holes in the mesh also made it easier to anchor the tagged IO. However, unlike orbital wall fracture repair where the origin of IO remains, the whole inferomedial orbital wall was replaced by the titanium mesh and as such, familiarity of the anatomy of IO helped us reapproximate the reattachment of the muscle. It was significant to reattach the IO properly for our patient to minimize the chance of diplopia, who even with malignancy requiring maxillectomy, had significantly better quality of life after due to the absence of diplopia. Multiple authors reported persistence of diplopia in cases where the IO is left to spontaneously reattach.[4,8,10,11]

We expected diplopia immediately after surgery since it was commonly reported that patients develop transient diplopia post-operatively as a result of inflammation.[2] But there were also patients in other case series who never developed any. We also expected diplopia after the radiotherapy as there had been documented cases of diplopia after irradiation of head and neck tumors.[12] However, the extraocular muscles were involved in the reported cases.

Six months after the surgery and three months after the radiotherapy, the extraocular muscle movements, specifically the IO, are all intact in our patient. As such, reattachment of the IO after disinsertion from total maxillectomy is recommended to avoid inducing diplopia.

CONCLUSION

This case highlights the need for proper identification, detachment, protection intraoperatively, and reattachment of IO when the inferomedial orbital wall, specifically with the involvement of the IO origin, has to be reconstructed to avoid inducing new diplopia due to IO palsy or restriction.[2]

Ethical Considerations

Consent was given by the patient to use the photographs for this article.

Statement of Authorship

Both authors contributed in the conceptualization of work, acquisition and analysis of data, drafting and revising of manuscript, and approved the final version submitted.

Author Disclosure

Both authors declared no conflicts of interest.

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