

Insights on Complete Prosthetic Orbital Reconstruction for Maxillofacial Trauma Induced Severe Globe Injuries: An Overview

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Craniofacial fractures often have the potential for associated ocular injury, especially in cases with orbital or mid-face trauma. The incidence of ocular injuries associated with orbital fractures varies significantly in the literature, ranging from 2.7% to 90.6% [1]. The outcome of traumatic eye injuries can be something reversible like blurred vision, as in traumatic mydriasis, or irreversible complete blindness, as seen in severe retinal detachment or eyeball luxation or avulsion [2].

Although routine primary ophthalmological examinations are not mandatory in some countries immediately post craniofacial injuries, any indication of impairment in visual acuity or pupil reactivity should warrant an urgent ophthalmological opinion.

Open-globe injuries include a full-thickness break or rupture of the cornea and/or the sclera. Open-globe injuries are a major cause of unilateral visual loss. The incidence of blindness secondary to blunt facial trauma is 3% to 12% [3]. High velocity trauma severe enough to cause gross dysfunction and deformity of the orbit will also require extensive removal of orbital contents to prevent further tissue necrosis and infection [4,5].

Optimum orbital reconstruction after either complete loss of eyeball function or complete eyeball avulsion becomes necessary as the orbit and the periorbital region forms a major part of the aesthetic zone of the face. The goal of reconstruction is to preserve the orbital volume or perform volume augmentation, thereby facilitating the placement of a cosmetically appealing ocular prosthesis.

Suboptimal or a poor orbital reconstruction can cause a perceived enophthalmos, functional eyelid problems as well as affect the patients social activity and quality of life.

After loss of eyeball function, the primary aim for the surgeon as well as the patient is cosmetic rehabilitation of the globe along with the orbital and periorbital structures. Literature shows that

early orbital reconstruction coupled with insertion of an ocular implant helps in preventing a compromised aesthetic outcome. Miller and Tenzel reported five cases with significant globe rupture out of 30 cases with mid-face trauma, treated by scleral repair, none of them requiring enucleation [6-8]. Correcting enophthalmos is of significant importance, although sometimes, enophthalmos can be persistent due to limited orbital dissection and minimum reconstruction in the primary intervention, which can be explained by fear of the operator of iatrogenically worsening the globe rupture. Rubin., et al. reported on 20 patients with severe orbital fractures requiring internal orbital rigid skeletal fixation of which one subsequently required further bone grafting of the orbit to correct enophthalmos of the prosthesis [11]. The ideal time period for the reconstruction should be within the first month of trauma [9].

It has been reported that orbital volume correction first is of paramount importance, as this will push the prosthesis upwards and outwards, which often results in simultaneous correction of enophthalmos, upper lid ptosis and superior sulcus depression [10]. Ocular implant size can vary depending on the patient though most adult orbits can retain an 18-mm to 20-mm spherical implant [5]. Attempts to use large ocular prosthesis to fill the enlarged orbit have been quite unsuccessful as the weight of the large prostheses overcomes the resistance of the lower eyelid, resulting in repeated extrusion from the orbit [9]. Thus, reduction of the orbital volume to facilitate the use of a small, light ocular prosthesis is essential.

Only scleral repair with bony orbital reconstruction does not give optimum results, as the ruptured globe tends to atrophy causing enophthalmos [12].

In case the prognosis for visual acuity is poor, the decision for immediate reconstruction needs to be taken by the patient, the ophthalmologist and the oculoplastic surgeon. After the ophthalmological confirmation of a non-functional eye, correction of the

orbital volume by bony reconstruction first to correct orbital volume is the key, followed by the placement of an ocular implant to maintain the globe shape and an artificial eye shell to match the contralateral side, all of which should be completed within a month of trauma. More the delay in the procedure, more difficult are the chances of accurate reconstruction of the orbit and especially the globe.

Adjunctive procedures like fat grafting may be performed to enhance the cosmetic outcome of the orbit and periorbita. Secondary orbital volume augmentation can also be considered if volume correction seems inadequate.

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