



Orbital Floor Reconstruction with Autologous Cartilaginous Graft. One Year Follow up Case Report

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Abstract

Repair of orbital floor damages following traumatic facial injuries represents a challenging practice in oral and maxillofacial practice. Management of associated ocular complications such as diplopia and Enophthalmos along with proper reconstruction for bony deficits are the main surgical goals. The current article represents a surgical reconstruction of the orbital floor using an autologous cartilaginous graft harvested from the nasoseptal cartilage of a thirty two years old male following a road traffic accident.

The objective of this case report was to evaluate clinically and radiodensometrically the repair of orbital floor fractures using autologous cartilaginous graft obtained from the nasoseptal cartilage.

Keywords

Orbital floor reconstruction; Autogenous; Cartilaginous graft

Introduction

Orbital floor fractures alone or in conjunction with other facial skeletal damage, are the most frequently encountered midfacial fractures, second only to nasal ones. Diplopia is the most repeatedly complication caused by orbital defects, others include limitation of ocular movement, infraorbital numbness, enophthalmos, and compromised vision [1]. Prompt therapy to restore the anatomic structure of the orbit and improve visual function and orbital appearance is therefore essential [2]. The orbital floor is most vulnerable to fracture because of the thinness of the roof of the maxillary sinuses, the existence of the infra-orbital canal and the curvature of the floor [3]. The goals of surgical intervention for orbital fractures include anatomic reduction of bony fragments, release of entrapped, crushed, or prolapsed tissues, and accurate restoration of orbital volume [4]. Numerous techniques and implant materials were investigated for the repair of orbital floor injuries, each of them came with their advantages and disadvantages [5]. Abundant host materials have been used to reconstruct the internal orbit, including autologous bone or cartilage, allogeneic bone and cartilage, and metal sheets or mesh [6]. Now a days we suffer from increase rate of accidents and violence, which leads to increase rate of maxillofacial fractures, we need to increase cooperation between different departments of the collage in order to gain more benefits to the patient.

Case Report

Thirty two years old male patient represented to the emergency room at Oral and Maxillofacial Surgery, Faculty of Dentistry, Suez Canal University. Following a road traffic accident. The patient disclosed a facial trauma after he was stroked by a moving vehicle. The patient was fully conscious with normal vital signs. Upon clinical examination periorbital edema, ecchymosis and subconjunctival hemorrhage of the right eye were detected. No paresthesia of the infra orbital region, ocular examination showed slight diplopia of the affected side with upward and lateral gaze. Computed tomography examination revealed multiple fracture lines with around 7 mm defect involving the orbital floor and one fracture line of the inferior orbital rim.

The patient was informed about the nature of the injury and the required surgical procedure and an informed consent was signed including his approval for the treatment protocol and the use of the radiographs and the photographs for international publication.

Surgical procedure

The access to the orbital floor was made using a subciliary skin incision approximately 2 mm inferior to the lashes along the entire length of the lid, subcutaneous and sub-orbicularis dissection was then performed followed by incision between pretarsal and preseptal portions of the orbicularis oculi muscle, then a periosteal incision and a subperiosteal dissection were done to expose the inferior orbital rim.

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Harvesting of the cartilaginous graft

The nasoseptal cartilage was exposed with a hemitransfision incision in the lower part of the nasal septum. It was essential to be sure that at least 1 cm of cartilage remained both dorsally and below to preserve the nasal bridge. The harvested cartilage was adapted, shaped and then implanted into the orbital floor, no implants were fixed to it and they were placed posterior to the orbital rim to gain resistance. A titanium miniplate was used for fixation of the inferior orbital rim.

It is our belief that all patients undergoing orbital approaches for traumatic injury should be observed in an inpatient facility overnight for management of postoperative pain or determination of any increase in the intraocular pressure.

Radiographic analysis

Postoperative computed tomography was performed for one year postoperative follow up period with three and six months intervals. Radiodensometric measurement of the graft was obtained with each radiographic scan to detect changes in graft density throughout the follow up period (Figure 1-3).

Clinical and radiographic examination were performed for a period of 12 months follow up period. No donor or recipient site morbidity were detected such as postoperative infection, nasal obstruction or graft extrusion or resorption.

No permanent postoperative diplopia was recorded apart from only transient period of temporary diplopia was detected for only four days postoperatively in extreme lateral movement. No postoperative enophthalmos was found and the patient was within the normal accepted range (1-2 mm) compared to the normal unaffected eye using Hertel exophthalmometer during postoperative ophthalmological examination in the follow up periods. Radiodensometric evaluation revealed that no changes were found in nasoseptal graft (NSG) thus the NSG remained static in place during the follow up period. From the data in Table 1 it could be noticed that no significant changes of the NSG density was detected along the study period (Figure 4,5).

Immediate	3 months	6 months	12 months
79.2	74.9	75.3	73.4

Table 1: Radio densometric measurement of NSG density at different time intervals

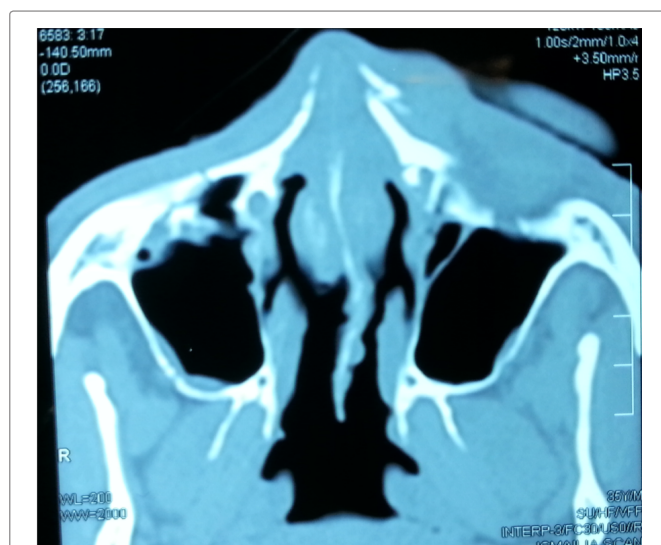


Figure 1: Preoperative axial CT view showing fracture of the orbital floor and the inferior orbital rim



Figure 2: Harvesting the Nasoseptal cartilage graft

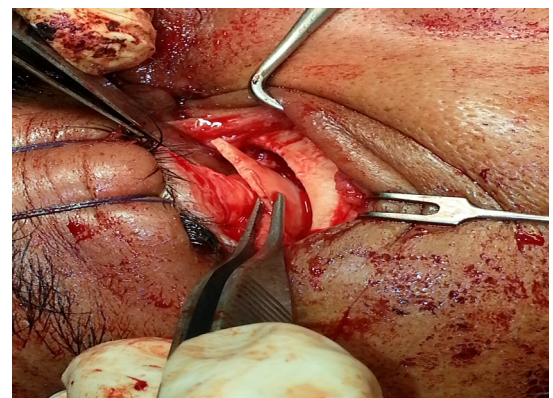


Figure 3: Application of the cartilaginous graft for reconstruction of the orbital floor

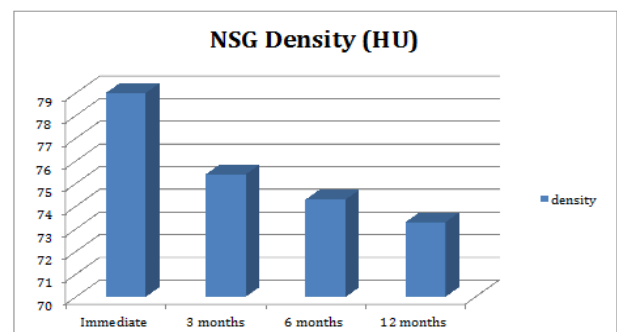


Figure 4: Changes of the NSG density at different time intervals of the follow up periods

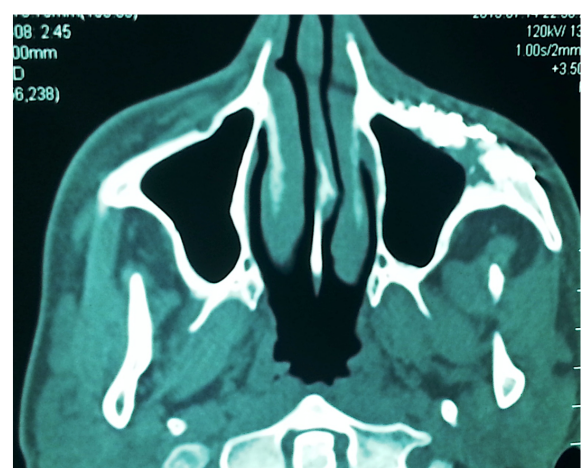


Figure 5: Twelve months postoperative C.T axial view

Discussion

The management of orbital floor injuries is complicated not only by their technical difficulties, but also by the required extensive medical competencies, ranging from the maxillofacial to otolaryngological to ophthalmic fields. In addition to timing of repair and surgery related issues, another key factor in the treatment of orbital fractures is the choice of the material used for tissue(s) reconstruction [6]. In a bulk of previous published articles [7-9] the use of titanium mesh for repair of orbital floor injuries was strongly advocated, the technique was described as effective easy and fast method for reconstruction of the orbital floor. The outcome of the current case report was in agreement with Taheri et al. [10] who examined the effectiveness of nasoseptal cartilaginous graft for repairing orbital floor defects, there was no donor site morbidity and no grafts became infected or extruded. This study confirmed that nasoseptal cartilage is readily accessible autologous tissue that should be considered when an autologous graft is needed for reconstruction of the orbital floor.

From the results and clinical experience of the current case report, the following may be concluded, the nasoseptal cartilaginous graft (NSG) was proved to be effective and reliable in adequately restoring the small to medium size orbital floor defects with maintaining the normal function and satisfactory esthetic outcome with minimal donor site morbidity. The NSG is easy to harvest and shape and can provide long term support to the surrounding tissues without undergoing resorption.

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