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Case Report

Correction of malocclusion and functional impairment following failed maxillofacial gunshot reconstruction: a case report

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ABSTRACT

Gunshot injuries to the face represent one of the most complex forms of maxillofacial trauma, frequently resulting in extensive bone comminution, soft-tissue damage, and functional impairment. This report describes a 31-year-old male who sustained a high-velocity facial gunshot injury that was initially managed elsewhere with unsatisfactory outcomes. The patient presented with severe malocclusion, restricted mouth opening, and facial asymmetry. Secondary corrective surgery was undertaken to restore skeletal alignment, occlusion, and function. Postoperative recovery was favorable, with restoration of neurosensory function, stable occlusion, and satisfactory esthetic and functional outcomes following implant-supported rehabilitation.

Keywords: Gunshot injury, Maxillofacial trauma, Malocclusion, Secondary reconstruction, Rigid internal fixation

INTRODUCTION

High-velocity maxillofacial gunshot injuries are characterized by extensive bone fragmentation, soft-tissue avulsion, and wound contamination. These injuries may produce significant functional and esthetic deformities if not managed appropriately. Several studies have emphasized the importance of staged reconstruction and accurate anatomic reduction in restoring facial form and function.[1-3]

Inaccurate reduction or suboptimal fixation may result in malocclusion, neurosensory deficits, and limited mandibular mobility. Clinically reported studies indicate that secondary corrective surgery is frequently required when initial reconstruction fails to re-establish proper skeletal relationships.[4-6]

CASE REPORT

A 31-year-old male was referred to to be treated in oral and maxillofacial surgery in Masyaf National Hospital (Hama-Syria), four weeks after undergoing emergency facial reconstruction for a high-velocity gunshot injury that had been managed at another hospital. The patient complained of severe malocclusion, inability to chew properly, facial asymmetry, restricted mouth opening, and persistent numbness affecting the right upper lip, nasal ala, and infraorbital region. He also reported progressive difficulty in speech articulation and swallowing, significantly impairing his daily activities and quality of life.

Extraoral examination revealed healed entry and exit scars over the right zygomatic and maxillary regions with noticeable facial asymmetry. Palpation demonstrated irregular bony contours and mild tenderness over the right midface. Intraoral examination showed marked malocclusion characterized by an anterior open bite measuring approximately 6 mm, with occlusal contact limited to the left posterior teeth. Maximum interincisal opening was restricted to approximately 15 mm and deviated to the right-side during opening. Dense fibrotic scar bands involving the floor of the mouth and ventral

tongue were noted, resulting in restricted tongue mobility and compromised oral function.

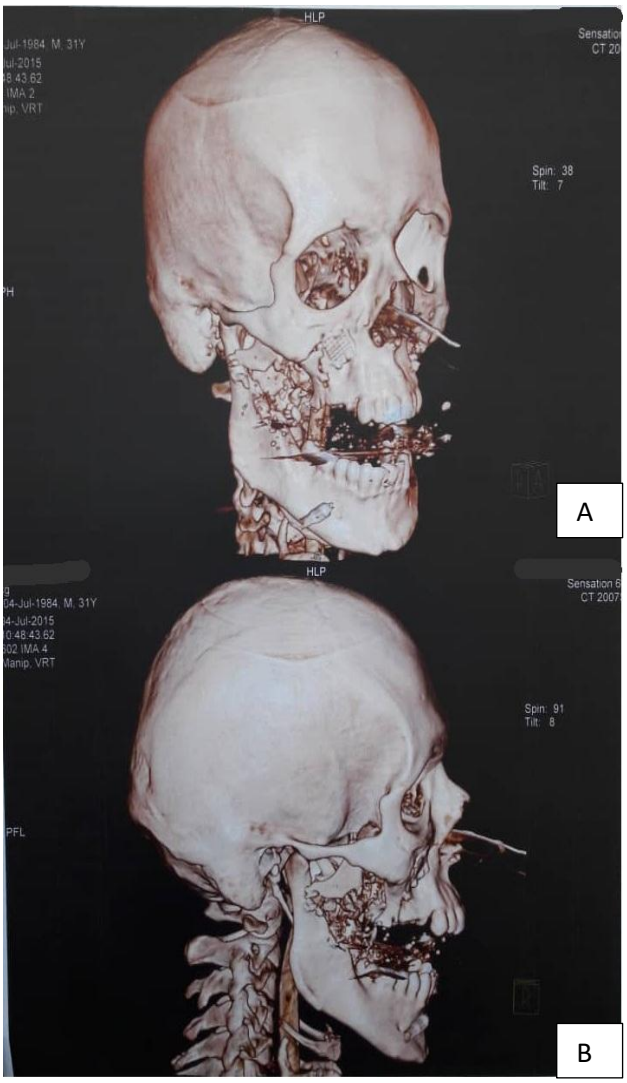

Figure 1 (A and B): Three-dimensional CT reconstruction showing asymmetrical maxillary reduction and misplaced fixation hardware following the initial surgery.

Radiographic evaluation using cone beam computed tomography (CBCT) and three-dimensional reconstruction revealed improper maxillary reduction, malpositioned fixation plates, and residual skeletal asymmetry. The right maxilla was vertically displaced, contributing to the open bite deformity and facial disharmony. Evidence of iatrogenic compression of the infraorbital nerve pathway was also noted.

Based on clinical and radiographic findings, the patient was diagnosed with secondary deformity following failed primary gunshot reconstruction, presenting with malocclusion, restricted mandibular mobility, and neurosensory deficit. A secondary corrective surgical plan was formulated aiming to restore proper skeletal alignment, occlusal relationships, and facial symmetry.

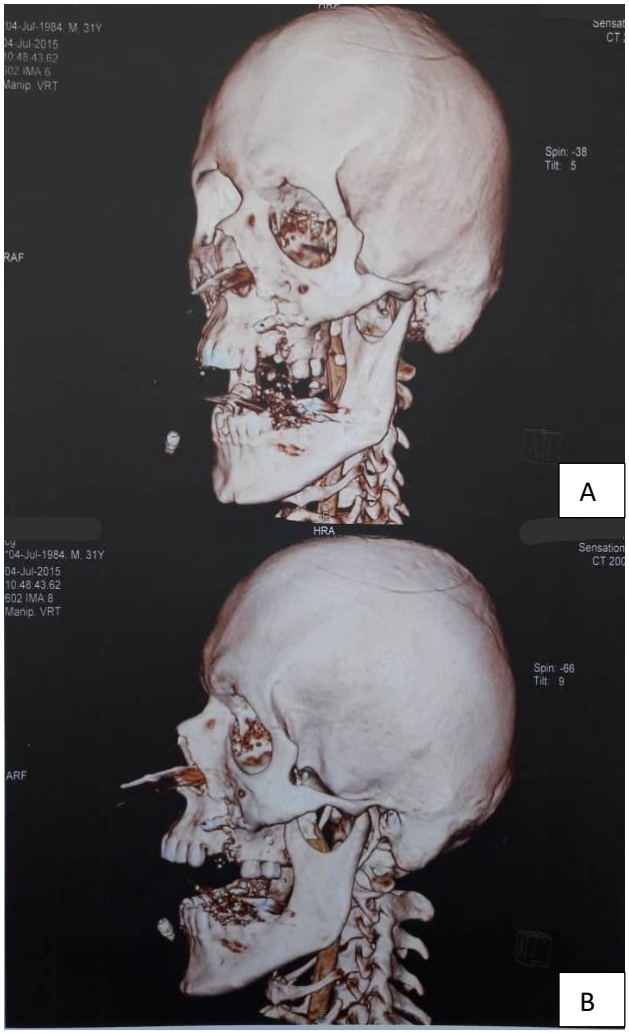

Figure 2 (A and B): Cone beam CT demonstrating irregular maxillary fixation and residual facial asymmetry after the failed primary reconstruction.

Figure 3: Preoperative occlusion demonstrating anterior open bite and malocclusion prior to corrective surgery.

Under general anesthesia, previously placed fixation hardware was carefully removed. Controlled osteotomies were performed to mobilize the malpositioned maxillary segment, followed by accurate anatomic repositioning guided by intraoperative occlusal splints and intermaxillary fixation. Stable rigid internal fixation was achieved using titanium miniplates. Scar bands within the floor of the mouth were surgically released to improve tongue mobility. Intermaxillary fixation was maintained temporarily to stabilize the corrected occlusion.

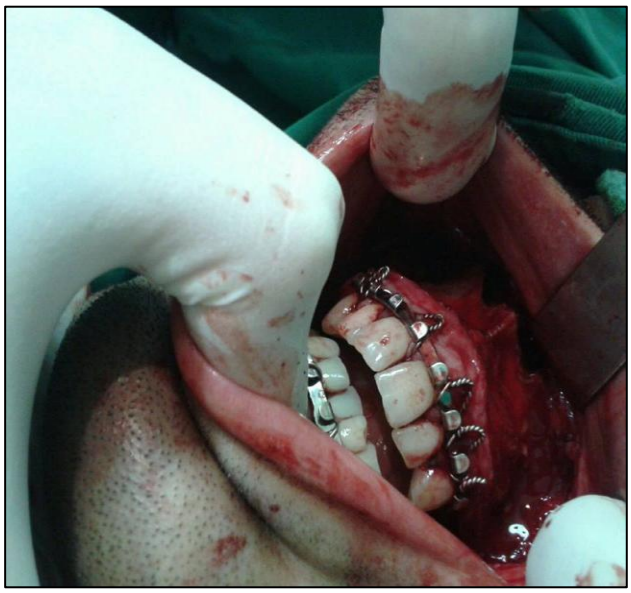

Figure 4: Intraoperative occlusal view during corrective surgery prior to definitive reduction.

Figure 5: Occlusion immediately after proper reduction showing restored symmetry and alignment.

Postoperatively, the patient demonstrated gradual improvement in mouth opening, neurosensory recovery, and facial symmetry. At subsequent follow-ups, a stable Class I occlusal relationship was achieved. Final prosthetic rehabilitation was completed using implant-supported restorations, resulting in satisfactory masticatory function, speech improvement, and esthetic outcome.

Figure 6: Occlusion following corrective reduction and intermaxillary fixation.

Figure 7: Final postoperative occlusion – frontal view after prosthetic rehabilitation.

Figure 8: Final postoperative occlusion – right lateral view.

Figure 9: Final postoperative occlusion – left lateral view.

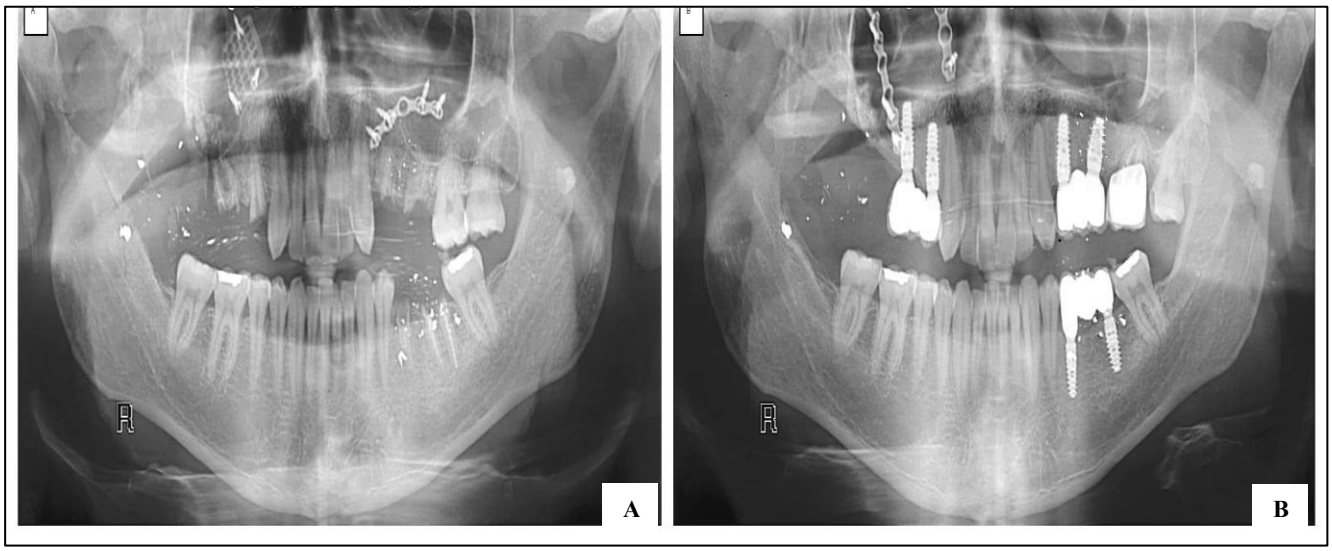

Figure 10: Panoramic radiographs: (A) before corrective surgery; (B) after completion of treatment demonstrating healed maxilla and implant-supported rehabilitation.

DISCUSSION

High-velocity maxillofacial gunshot injuries represent one of the most challenging categories of facial trauma due to their complex patterns of comminution, extensive soft-tissue disruption, and high risk of contamination. Successful management requires meticulous planning, accurate anatomic reduction, and staged reconstruction to restore both function and facial harmony.

In the present case, the initial reconstruction was complicated by improper maxillary positioning and mispositioned fixation hardware, leading to significant malocclusion, neurosensory deficit, restricted mandibular mobility, and facial asymmetry. Similar complications have been widely reported in cases where premature definitive fixation is performed in severely comminuted ballistic injuries without adequate stabilization of occlusal relationships.[3,4]

Malocclusion following maxillofacial trauma is a well-recognized sequela and is most commonly associated with inaccurate skeletal reduction. Open bite deformity, as observed in this patient, reflects vertical displacement of the maxillary segment and has been linked to functional compromise including impaired mastication, speech difficulties, and temporomandibular joint dysfunction. Delayed corrective osteotomy remains the treatment of choice in such cases when primary reconstruction fails to restore proper occlusion.[5-7]

Secondary corrective surgery in this case allowed controlled mobilization and precise repositioning of the maxilla, resulting in restoration of skeletal symmetry and occlusal stability. Removal of misplaced hardware and release of fibrotic scar bands further contributed to improved mandibular mobility and tongue function. Neurosensory improvement following decompression of the infraorbital nerve region supports previous reports highlighting the importance of relieving iatrogenic nerve compression in secondary reconstruction.[6,7]

Implant-supported prosthetic rehabilitation played a critical role in re-establishing masticatory efficiency and long-term occlusal stability. The use of dental implants following traumatic maxillary reconstruction has been shown to provide predictable functional and esthetic outcomes when adequate bone healing and alignment are achieved.[8-10] The favorable outcome in this patient reinforces the value of a staged, multidisciplinary approach combining surgical correction with prosthetic rehabilitation.

CONCLUSION

Secondary corrective surgery following failed maxillofacial gunshot reconstruction can achieve excellent functional and esthetic outcomes when accurate anatomic reduction, stable fixation, and staged prosthetic rehabilitation are employed.

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REFERENCES

1. Powers DB, Will MJ, Bourgeois SL Jr, Hatt HD. Maxillofacial trauma. Oral Maxillofac Surg Clin North Am. 2005;17(3):341–55.
2. Cunningham LL, Haug RH, Ford J. Firearm injuries to the maxillofacial region: an overview of current thoughts regarding demographics, pathophysiology, and management. J Oral Maxillofac Surg. 2003;61(8):932-42.
3. Manson PN, Hoopes JE, Su CT. Structural approach to management of Le Fort fractures. Plast Reconstr Surg. 1980;66(1):54-62.
4. Motamedi MHK. Primary management of maxillofacial gunshot injuries. J Oral Maxillofac Surg. 2003;61(12):1390–8.
5. Kaufman Y, Cole P, Hollier LH. Facial gunshot wounds: trends in management. Craniomaxillofac Trauma Reconstr. 2009;2(2):85–90.
6. Peled M, Leiser Y, Emodi O, Krausz A. Treatment protocol for high-velocity / high-energy gunshot injuries to the face. Craniomaxillofac Trauma Reconstr. 2012;5(1):31-40.
7. Adeyemo WL, Ogunlewe MO, Ladeinde AL. Management of facial gunshot injuries: a review of 20 cases. J Oral Maxillofac Surg. 2005;63(3):457-62.
8. Fonseca RJ, Walker RV, Barber HD. Oral and Maxillofacial Trauma. Elsevier. 2013.
9. Hupp JR, Ellis E, Tucker MR. Contemporary Oral and Maxillofacial Surgery. Elsevier. 2018.
10. Ugboko VI, Odusanya SA, Fagade OO. Maxillofacial gunshot injuries in Nigerians: an analysis of 21 cases. J Oral Maxillofac Surg. 1998;56(6):699-702.

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