Fabrication of surgical splint by split cast technique

ABSTRACT
Restoration of proper occlusion poses a challenge to the management of jaw fractures. There are several treatment options available, each with their own advantages and disadvantages. This case report describes and illustrates a simple method of restoration of normal occlusion using an acrylic splint. These splints are commonly used in stabilizing jaw fractures and are both effective and economical.

Key words: Jaw fractures; Splints

Introduction
Maxillofacial fracture occurs when the facial bones are subjected to forces that exceed their impact tolerance. Maxillary and mandibular fractures in dentate patients are usually associated with a malocclusion.

The primary aims of treatment include the restoration of correct midfacial vertical height and anterior projection, and restoration of occlusion. The most important aspect of surgical correction is to reduce the fracture properly and place the teeth into a normal occlusion. Merely aligning and interdigitating the bony fragments at the fracture site with poor postoperative functional occlusion may lead to permanent malocclusion.

Open surgical reduction and fixation with a plate or interdental wiring for stabilizing fracture fragments is difficult in some patients. An acrylic splint is an alternative surgical option for closed reduction. A surgical splint results in good occlusion.

Case report
A 30-year-old male reported to the Department of Oral and Maxillofacial Surgery, Government Dental College, Raipur, India in October 2010 due to motor vehicle accident 3 hours earlier. The patient was conscious and responded well to the questioner, though he was in severe pain. Left facial swelling, circumorbital ecchymosis, laceration and bleeding on left zygomatic region were also noted. On computed tomographic scan examination, a left-sided, comminuted zygomatic fracture with a unilateral Le Fort I fracture was seen. Intraorally, the fracture line started between the maxillary left central and lateral incisors, with another fracture line between the maxillary left canine and left first premolar.
extending posteriorly to the distal part of the hard palate. Intercuspation was seen on the premolars on the right side and first and second molars, whereas there was no intercuspation on the left side. The maxillary left canine was luxated and touching the mandibular left first premolar. The clinical plan was to extract the maxillary left canine as it was on the fracture line (and was clinically mobile), and to stabilize the fractured fragment in proper occlusion using a surgical splint.

An alginate impression was made and a diagnostic cast was retrieved, which depicted fracture lines (Fig 1). On the basal surface of the diagnostic cast, a partial depth groove was made along the fracture line using a diamond disk and the cast was sectioned (Fig 2). The fracture fragment was stabilized using a polyacrylic adhesive in the same relation to that of the original diagnostic cast. A wax sheet was adapted on the basal side of the fracture fragment to facilitate the split cast technique (Fig 3) and the base was poured, extending the sulcus to the base plate wax.

Jaw relation was recorded and transferred to an Artex Articulator type AB (AmannGirrbach, Austria). Using the patient’s bite record, the mandibular cast was mounted in the articulator (Fig 4). The fracture fragment was separated and mock extraction of the canine was done on the maxillary cast. The fractured section was adjusted to proper occlusion and stabilized in this relation with baseplate wax (Fig 5).

A transparent acrylic palatal splint was fabricated in this relation and retentive holes were drilled at the interdental region. Reduction of the fracture fragment was done under

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**Figure 1** Diagnostic cast with fracture lines

**Figure 2** Incomplete groove orientation and cast fracture along the fracture line

**Figure 3** Fracture component stabilization with polyacrylate adhesive and baseplate wax adaptation

**Figure 4** Lateral views of mounting in an articulator

**Figure 5** Fracture fragment demounted and remounted in proper occlusion
general anesthesia, guided by surgical splint and proper occlusion was achieved (Fig 6).

These splints are commonly used as construction is simple, rapid, and economical. This technique not only provides better stabilization but also helps in establishing a normal occlusion and supports soft tissue healing of the palate. However, splints have been known to cause gingival irritation and also to interfere with speech. In addition, oral hygiene is compromised. Splints are indicated in complex facial injuries involving the dentition and cases where wiring of the teeth will not provide adequate fixation. They cannot be used in growing children with deciduous or mixed dentition.

References


Corrigenda

“Alternative treatment using topical tacrolimus for erosive oral lichen planus resistant to steroids” (2012;9:39-42). On page 39, we have been informed by the corresponding author that the academic qualifications of the first author, Dr Chun-Lei Li, should have read ‘DDS, MSc’.

“Non-surgical treatment of severe maxillary dentoalveolar hyperplasia with miniscrews” (2012;9:47-51). We have been informed by the corresponding author that on page 50, in the section ‘Position of the miniscrews’, line 4 should have read “in that it prevents the unattached gingivae from covering” rather than “in that it prevents the unattached gingivae from covering” as printed.