Clinical Report

Maxillary Contraction Appliance of Orthodontic Treatment in the Maxilla Multiple Fractures

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Abstract: This study reported a 42-year-old male who suffered a maxilla multiple fractures with additional complicating injuries. In this case, a maxillary contraction appliance was used as an alternative treatment with good results. This method provided fracture healing and functional occlusion. No facial surgery scar was left after treatment. Besides, the speech, swallowing, chewing function returned to normal.

Key words: Orthodontics, Maxillary contraction appliance, Maxillary fracture

Introduction

The choice of treatment for maxillary fractures is open reduction and internal fixation with miniplates¹⁾. And for a maxillary comminuted fractures, it is important to progress from stable bone to stable bone²⁾. However, trauma, a long time fixation, poor oral hygiene, sensitization and nerves injury may happen due to the surgery. The alternative option to treat the patient, with a maxillary contraction appliance, was chosen. This clinical report demonstrated successful maxillary contraction appliance treated sagittal maxillary fracture.

Material and Methods

Patient

Patient was a 42-year-old male, who suffered an injury in a traffic accident 22 days before, with the chief complaint of painful swelling in the left lower jaw and dysphagia. Immediately following the accident, he had loss of consciousness temporarily with multiple fractures. The treatment of oral injury was delayed because of the prior treatment of other fractures.

Ethical approval was obtained from the Local Research Ethics Committee of China Medical University. Clinical examination included symmetrical face, normal mouth gape, left premolar premature contact, the left condylar abduction and subluxation, a 25mm posterior hard palatal cleft connecting with the nasal cavity, no contact in bilateral molar region, bilateral upper

molar area widened reverse cross-bite, no mandibular movement disorder. There was no airway obstruction (Figure 1).

Diagnostic testing included computed tomography (CT) scan and panoramic radiograph. Based on a physical examination and additional examination, panfacial fractures, oronasal fistula, traumatic deformity of saddle nose were diagnosed.

Computed tomography (CT) scan and panoramic radiograph revealed the location of fracture, which could help making the final treatment plan. (Figure 2)

Treatment Progress

We took impression of the patient for the maxillary contraction appliance (Figure 3). During the contraction phase, the patient was instructed to activate the appliance twice daily (0.25 mm per activation) resulting in 0.50mm of contraction per day. Patient was monitored weekly until the transverse discrepancy was corrected. The treatment was stopped once the posterior crossbite was corrected satisfactorily. After the cleft palate fistula operation, the patient was asked to continue wearing the appliance for maintaining 3 months.

Results

The patient recovered with symmetrical face, palate fistula with primary healing. Balanced and functional occlusion with normal crossbite was obtained (Figure 4). No pain, sensory paralysis, infections or other complication developed after the treatment. In the period from posttreatment to the end of the observation (6 months later), no further orthodontic treatment was carried out. And good apposition and bony union were achieved.

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Figure 1. Intraoral photographs of pretreatment

Figure 2. Fracture demonstrated by 3-D CT

Figure 3. Maxillary contraction appliance

The patient was satisfied with the result of treatment.

Discussion

The major therapeutic goal is to salvage the fractured bone in place and to provide the best possible environment for healing³⁾. Traditional treatment of maxillofacial fracture is usually used in intermaxillary fixation, titanium plate osteosynthesis in jaw, arch bar splint, and so on. However, there are many shortcomings. In recent years, rigid internal fixation has become the main method of treatment. Manson¹⁾ pointed out that fractures which splited the maxilla and palate in a sagittal direction might demonstrate instability with conventional methods of fixation. In order to stabilize unstable fractures and rehabilitate occlusion and vertical height, line piriform aperture, the zygomatic the jaw pillar and palate for open reduction and internal fixation were needed.

Generally speaking, surgery is the main treatment method for jaw fracture⁴⁻⁶⁾; however, trauma, a long time fixation, poor oral hygiene, sensitization and nerves injury may happen due to the

surgery. Compared with conventional surgery, the advantages of maxillary contraction appliance are time-saving, safe, stable and less recurrence. It is not only comfortable to the patient and easy to keep up oral sanitation after operation, but also arises less complications, which will be acceptable by the patients easily and deserve to be recommended.

In this case, a maxilla multiple fractures with additional complicating injuries, we used a maxillary contraction appliance as an alternative treatment. Besides, few limitations of this minimal invasive technique, we obtained good results. This method provided fracture healing and functional occlusion. No facial surgery scar was left after treatment. And the speaking, swallowing, chewing function returned to normal.

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Figure 4. Intraoral posttreatment photographs

Figure 5. 3-D CT of posttreatment

China.

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