



CASE STUDY

A NOVEL METHOD FOR ANATOMICAL REDUCTION OF MULTISEGMENT MAXILLA FRACTURES - SCREW WIRE TRACTION TECHNIQUE

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ABSTRACT

Stable anatomical fracture reduction and segment control before miniplate fixation can be difficult to achieve in comminuted maxilla fractures. Various methods have been employed for mobilization and anatomical reduction of fracture segments though no single method is used universally. Disadvantages include imprecise segment alignment and poor segment stability/control. We have employed Screw-Wire Traction (SWT) to address this problem. The successful fracture reduction achieved by Screw-Wire Traction alone or in combination for multisegment maxilla fractures.

INTRODUCTION

The maxilla is a vital bone of the mid face that forms the roof of the oral cavity, houses the upper teeth, forms part of wall of the orbits, forms the floor and lateral wall of nasal antrum. It absorbs energy with impact, thus protecting the orbits, intracranial contents, and nose. Maxillary fractures usually result from blunt trauma. Accurate repositioning of fractured skeletal fragments is crucial for both function and facial aesthetics. Maxillary fractures can be very complex and challenging to repair surgically as stable anatomical fracture reduction and segment control before miniplate fixation can be difficult to achieve in multisegment maxilla fractures. We have employed screw wire traction technique for reduction of multisegment maxilla fractures in a male patient.

Technique

26 gauge stainless steel wires are used for construction of Screw-Wire Traction (SWT) device in a sterile operating environment. The free edges of stainless steel wire are held with artery forceps and is twisted to a dimension of 3 mm loop around a straight artery forceps or probe and then cut to a length of 5 cm. The screw is placed through the wire loop ready to be applied to the predrilled screw hole and tightened. 2 x 10mm screw size is used to provide traction force and aid in reduction however

screw length depends on the size or thickness and stability of the segment and varies from 4 to 10 mm. One or more such devices are placed into the fractured bony segments that require reduction and used to apply forces in different directions simultaneously and manipulated for anatomical reduction. Once fracture segments are reduced SWT is used to hold the fracture segments in position and fixation is done. Screw-wire traction can be used alone, or as an adjunct to other methods of reduction.

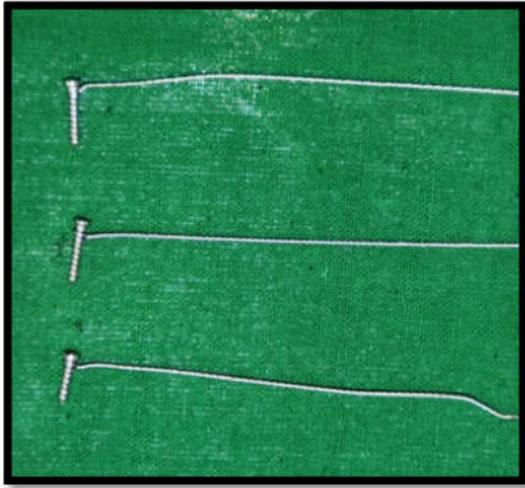
Case report

An 18 year old male patient reported to the Department with chief complaint of swelling in the mid face region, patient gives history of Road Traffic Accident 3 days back following which there was bleeding from mouth and nose. Patient was conscious and shifted to Government Hospital where primary aid was given and later referred to our Department. He was diagnosed as having Bilateral Multisegment Maxilla fractures. Open Reduction and Internal Fixation was planned for the patient, Screw Wire Traction Technique was used for the anatomical reduction of displaced fracture segments prior to fixation with miniplates.

Advantages and disadvantages

The device required basic equipment and is easily available in all maxillofacial units. The technique can be used alone or as an adjunct over other methods.

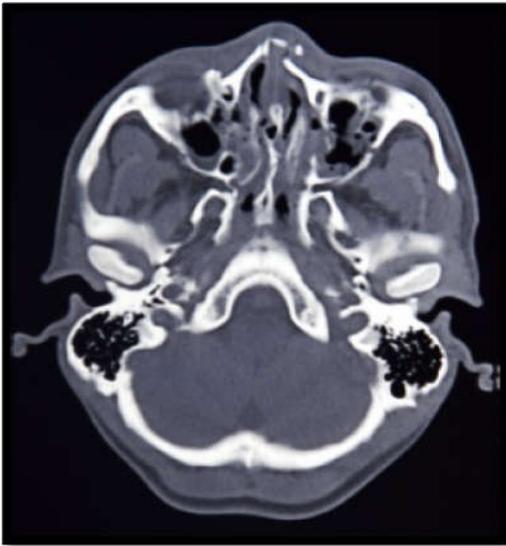
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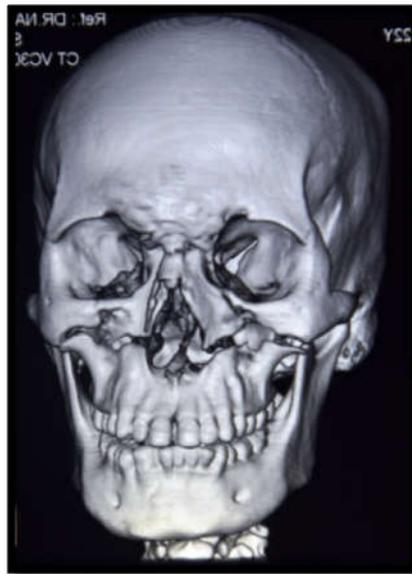
Placement of screw through wire loop



Screw-wire traction shown on synthetic skull



PRE-OPERATIVE AXIAL CT



PRE-OPERATIVE 3D CT



POST OPERATIVE PNS



Preoperative



Clinical application of technique



Postoperative

It provides anatomical fracture reduction with improved mechanical access, allows multiple reduction forces to be applied simultaneously, and avoids the need for repeated set-up before fixation. It can also give counter stability when drilling and tightening screws. Although the disadvantages include, it is technique sensitive and requires practice to apply effectively, with experience it can save time, the wire or screw head can get fracture and minor bony segment can be avulsed. It cannot be used for reduction of comminuted fractures if stable bony segments is not available It should be used with caution in anterior wall of maxilla or in regions with thin bone as bone can get fracture.

Conclusion

We have presented a case report on use of screw wire traction technique for multisegment maxilla fractures as the commonly encountered difficulty in this type of fractures is the capacity to simultaneously reduce and stabilize multiple segments prior to fixation with miniplates. However the technique can also be used for multisegments upper third facial fractures, ZMC fractures and in orthognathic surgeries to facilitate osteotomy, segment mobilisation and segment reduction control during osteosynthesis.

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