Management of Parasymphyseal Fracture Mandible

An Essay
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INTRODUCTION

The mandible is a horse shoe bone that forms the lower jaw which comprises a horizontal body on each side that fuses at the symphysis menti. From the posterior part of the body projects a vertical ramus which bears an anterior coronoid and posterior condyloid process *(Ellis, 2004).* The parasymphyseal region is bounded by two vertical lines just distal to the lateral mandibular incisor till the mental foramen *(Scott & Symons, 1977).*

Mandibular fracture is one of the most common facial skeleton injuries. It's main causes are road accident, violence followed by falls from height and assaults. The prevalence of mandibular fracture was higher among males. The male to female ratio was 3.6:1 in a study conducted at Alexandria dental research center *(Sakr et al., 2006).* Parasymphyseal fracture are the most frequent, accounting for 35% of mandibular fractures. Children and young adults seemed to suffer more with parasymphyseal fracture, while older adults from body fractures. There was a significant association between motor vehicle accidents and parasymphyseal fractures (45%), whereas assault victim had a higher than predicted frequency of angle fractures (27%) and a fewer parasymphyseal fractures

(19%). Parasymphyseal fractures were the most frequent associated with fracture at other sites within the mandible *(Ogundare et al., 2003).*

Studies of the relationship between the nature, severity and direction of the traumatic force on the resultant mandibular injury found that over 75% of all experimentally produced fractures of the mandible were in the primary areas of tensile strain. In response to loading , the mandible is similar to an arch because it distributes the force of impact through it's length. When the force is directed along the parasymphysis body region of the mandible, compressive strain develops along the buccal aspect, whereas tensile strain develops along the lingual aspect. This produces a fracture that begins in the lingual region and spreads toward the buccal aspect *(Haulke et al., 1964).*

Classification of mandibular fractures categorize the type of fracture as green stick, simple, compound and comminuted fractures (either intra or extra oral). These categories describes the condition of the bone fragments at the fracture site and possible communication with the external environment. Another system of classification depending on the angulation of the fracture and the force of the muscle pull proximal and distal to the fracture

classifies the fracture into favourable or unfavourable *(Leathers et al., 2003).*

Diagnosis of a parasymphyseal fracture is suggested by the presence of pain, swelling, tenderness and malocclusion. Fractured loose teeth, gaps or level discrepancies, indentation, assemetry of the dental arch and the presence of intra-oral lacerations and the crepitance also suggests the possibility of the fracture. Numbness in the distribution of the mental nerve could be present as well *(Shetty et al., 2001).*

The radiographic evaluation of the parasymphyseal fracture consists of plain films, a C.T. scan (computed tomography) and a panorax examination. A great deal of information including the exact area and the extent of the fracture is obtained by axial and coronal cuts of the C.T. scan to delinate obliquity of the fracture. A panoramic examination is one single examination if the C.T. scan is not available but it requires the travel to dental facility. Panoramic C.T. scan is now available. Specialized dental films such as occlusal, palatal or apical views of the teeth may be indicated *(Markowitz et al., 1999).*

Management of parasymphyseal fracture could vary from conservative follow up till open reduction and internal fixation depending on a variety of factors

including age and type of the fracture and the associated fractures. The first and most important aspect of management is to reduce the fracture properly or place the individual segments of the fracture into the proper occlusal relationship with each other *(Thaller, 1994).*

Establishing a proper occlusal relationship by wiring the teeth together is termed maxillomandibular fixation (MMF) or intermaxillary fixation (IMF). The most common technique include the use of prefabricated arch bar that is adapted and circumdentally wired to the teeth, Where maxillary arch bar is wired to mandibular arch bar. Heavy elastic traction can also be used, Treatment of the fracture using only MMF is called "closed reduction". In case of fracture of edentulous patient, the mandibular denture can be secured to the maxilla using either wiring techniques or bone screws to hold the denture in place *(Luyk, 1992).* Other wiring techniques, such as IVY loops or continuous loop wiring, cast cap splints, piriform aperature wiring have also been used for the same purpose. Splinting technique involves the use of lingual or occlusal splints is particularly useful in treatment of mandibular fractures in children in whom placement of arch bars and bone plates is difficult because of the developing permenant teeth.

Indication for open reduction and internal fixation include displacement of the bony segments or unfavorable fractures. When open reduction is performed, direct surgical access to the area of fracture must be obtained. Anterior mandibular areas can be easily approached through an intra-oral incision *(Luyk, 1992).* Lag screw fixation of mandibular parasymphyseal fractures is a practical and effective way of fixing such fractures internally *(Dawson & Chigurupati, 2002).*

When external wounds are present extra-oral approach can be performed which can be extended in the submental area if cosmetically acceptable. Also extra-oral approach can be performed in cases of concomitant posterior body or angle fractures and to facilitate insertion of mandibular reconstruction plate or bone graft to bridge small gap or augment a thin atrophic mandible after the plate have been applied in case of mandibular bone defects extending to the symphyseal area *(Ellis & Miles, 2007).* Currently, techniques for rigid internal fixation are widely used for treatment of fractures, these methods use miniplates or larger stabilizing plates (with 2.3mm and 2.4mm plates). Bioresorbable plates are being increasingly used in cases of trauma to avoid problem associated with conventional metal osteofixation devices especially in the young age group *(Eppley et al., 1999).*

AIM OF THE WORK

The aim of this study is to review the different modalities in the management of parasymphyseal fractures of the mandible.

EMBERYOLOGY OF THE MANDIBLE

The mandible forms in dense fibromembranous tissue lateral the inferior alveolar nerve and its incisive branch and also in the lower parts of Meckel's cartilage. Each half is ossified from a center appearing near the mental foramen about the sixth week (figure 1). From this, ossification spreads medially and posterocranially to form the body and ramus, first below, then around the inferior alveolar nerve and incisive branch and upward, initially forming a trough and later crypts for developing teeth.

By the 10th week meckel's cartilage below the incisor rudiments is surrounded and invaded by bone. Secondary cartilages appears later. The condyler cartilage, extends from the mandibular head downwards and forwards in the ramus contributing to its growth in height; though it is largely replaced by bone by midfetal life its proximal ends persists as proliferating cartilage under articular fibrocartilage until third decade *(Ferguson, 1993).*

The orientation and growth patterns in the condyler cartilage are one (of many) important determinants of co-ordinated craniofacial growth. Another secondary cartilage, which soon ossifies,