MAXILLOFACIAL INJURIES- DIAGNOSIS AND IMAGING- WHEN AND WHICH??

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ABSTARCT-

Traumatic dental injuries are emergent situations that need quick assessment and appropriate management. The proper diagnosis and treatment rendered determines the prognosis of the case. However, in dental practice, practitioners depend almost entirely on two dimension plain films. But, with the introduction of Three dimensional imaging offers the diagnosis and treatment planning have become much easier. This article focuses on the diagnosis of maxillofacial injuries and recent advances in the field of dental radiology.

KEYWORDS-

Maxillofacial, Lacerations, Three dimensional imaging, Trauma, Computed tomography, Cone beam computed tomography

INTRODUCTION

Maxillofacial injuries occur in a significant proportion of trauma patients. They are the most disruptive and distressing emergencies to the dental patients. Diagnostic imaging has traditionally played a central role in providing information essential in the initial diagnosis and treatment of facial injuries. In conventional radiography, anatomy is depicted in only two dimensions[1]. With the development of three dimension technique even smaller changes in the tissue density differential can be identified. Although the field of radiology has long played an exciting and critical role in dentistry, maxillofacial imaging has added a third dimension to the effective diagnosis and management of patients with facial bone fractures[2].

CLINICAL EXAMINATION-

The affected area should be exposed and examined for swelling, lacerations, bruises and bony steps. Diplopia should be checked following trauma to the orbital floor. Pooling of tears and leakage from the eye indicate damage to the nasolacrimal apparatus, ecchymosis behind the ear i.e 'Battle's sign' is suggestive of basilar skull fracture involving middle cranial fossa where as circumorbital ecchymosis i.e 'Panda eyes'(and dish deformity are features of bilateral maxillary fractures. Sublingual hematoma is the most common sign indicative of mandibular fracture and laceration of the chin indicates associated subcondylar fractures[3].

General Radiographic Features Suggesting Fractures[4] (Fig.1)-

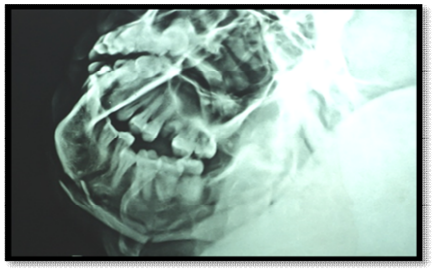

Fig.1: Step Deformity (radiolucent line)- change in normal anatomic outline

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1. Presence of uniform radiolucent line between fragments
2. Line extending beyond the boundaries of mandible is suggestive of overlapping fracture
3. Any change in normal anatomic outline of a structure
4. Presence of step deformity
5. Increase in density of bone caused by overlapping to two fracture fragments.

Imaging Of Maxillofacial Injuries-

Maxillofacial injuries are broadly categorized as Dentoalveolar, Mandibular and Maxillary complex fractures-

(A) Dentoalveolar injuries are mostly overlooked as they are rare in newborn and most prevalent in 8-9yrs of age. (1) These injuries are best diagnosed by periapical projection which shows entire tooth, its surrounding structures and terminal end of root, as well as they are diagnosed on occlusal radiograph which shows larger area of maxilla and mandible[5].

(B) Mandibular injuries are most common and represent 2/3rd of all facial fractures.(fig.2) They are best diagnosed by Panoramic radiology which shows the entire dentition, surrounding alveolar bone, maxilla and mandible, sinuses, right and left temporomandibular joints. Apart from Orthopantomogram, Reverse Towne's and Lateral oblique projection can also be taken[6].

Fig.2: OPG- fracture of symphysis

(C) Maxillary complex injuries are mainly classified as Lefort I, Lefort II and Lefort III, Zygomatic complex fracture, Fracture of nasal bone and Fracture of the floor of the orbit. On conventional radiograph, these fractures can be visualized most commonly on PA Skull and Submentovertex projection[2]. But they are best diagnosed by digital radiography including computed tomography and cone beam computed tomography[5].

Computed Tomography- is truly a revolutionary development. Smaller changes in the tissue-density differential can be identified. All dimensional measurements are readily available at the sub millimeter level of accuracy. Above all, image information data are acquired in sequential thin slices of a volume. This imaging modality is best suited for detecting transfracial (Lefort) fractures (Fig.3), zygomaticomaxillary complex fracture, Naso-orbital-ethmoid fractures. Thin section axial bone CT(1-3mm) are the ideally recommended slice thickness. 3D CT reformatting images improves appreciation of disrupted facial architecture for surgical planning.(Fig.4) It can be complemented with MRI to assess associated intracranial and orbital injuries.

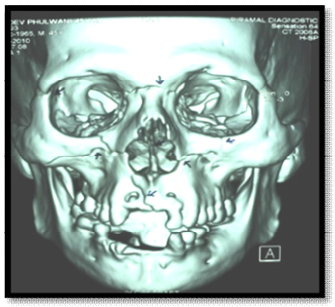

Fig.3: CT image- Lefort fracture

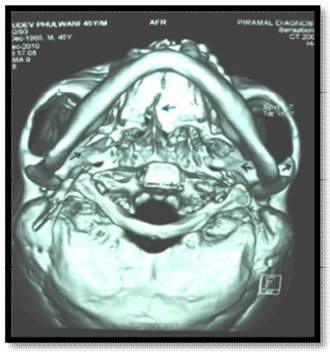

Fig 4: CT image- Mid Palate bone fracture

Cone Beam Imaging- Cone beam computed tomography has gained a broad acceptance in dentistry in the last 5years although its root goes back about 2 decades. The major innovation in cone beam imaging compared with intraoral and panoramic imaging is that it provides high quality, thin slice images. CBCT equipment is smaller, compact and less expensive than traditional CT. These machines emit x-ray shaped like a cone so that the beam covers the entire region of interest. They are most appropriate for examining individual teeth for fracture, pre and post operative assessment of craniofacial fractures.

Thus, CBCT combines the strength of medical CT with those of conventional dental radiography to accommodate unique diagnostic and treatment planning applications[8]. Recently, Ultrasound has been introduced as an alternative diagnostic modality in maxillofacial traumatology and traditionally used in diagnosing orbital and mid-facial injuries especially for visualizing Zygomatic arch fracture and Nasal bone fractures[9].

CONCLUSION-

Gradually and insidiously dental radiology is becoming rather unique with introduction of specialized imaging procedures. Thus, diagnostic ability specifically of maxillofacial injuries will improve with the presently available imaging modalities which in turn will reduce the morbidity and mortality rate after injury.

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