



Recent advances in Oral and Maxillofacial surgery

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Introduction

- As clinicians involved in direct patient care, it is our fundamental duty to keep abreast with latest advances in the field of medical sciences and use these technologies judiciously for the benefit of the patients.

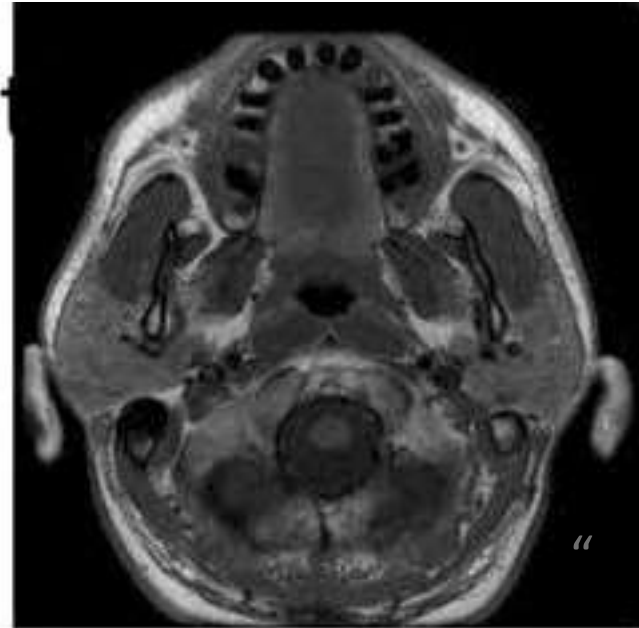


Advances in the Field of Radiology and imaging

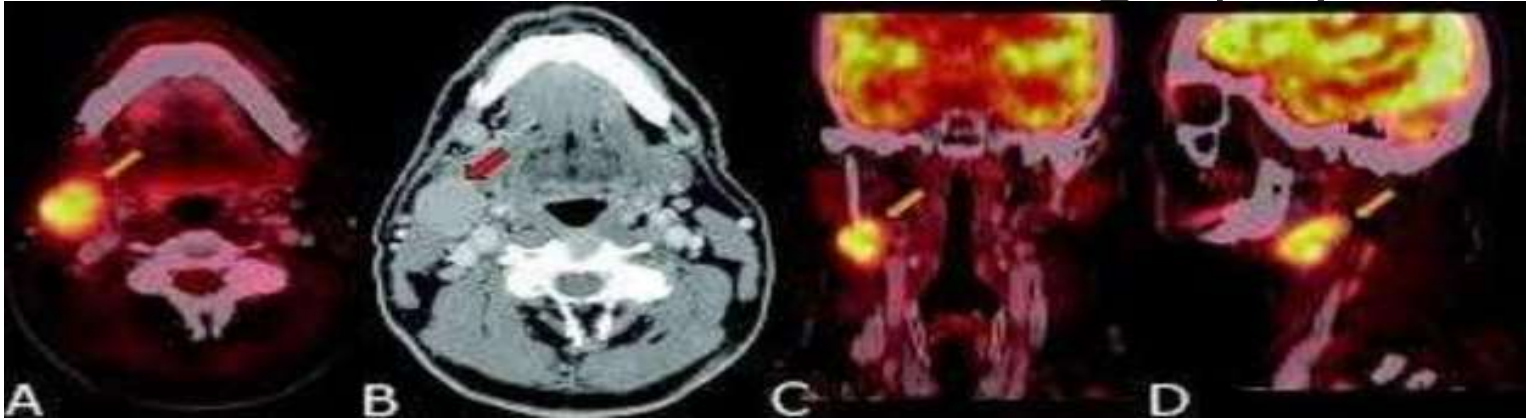
- CT and MRI imaging (MRI) : capability to capture images of any part of the body in great detail.
- With the use of digital radiography it is possible to see images instantaneously with decreased dose of ionizing radiation. The images can be stored, manipulated, and retrieved easily.

MRI

- MRI is an important tool in the **diagnosis of head and neck pathologies**.
- Major advantage is that it **does not use ionizing radiations and gives excellent soft tissue details**.
- It is useful in evaluation of **head and neck malignancies, temporomandibular joint (TMJ) pathologies and vascular lesions**.



Positron Emission Tomography

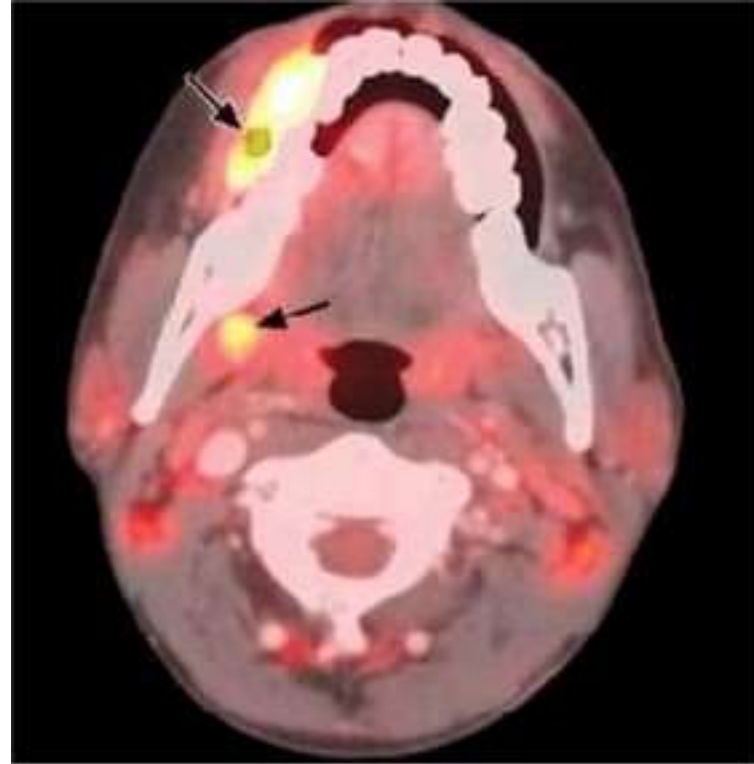


(PET) and PET/CT

- Help in **staging, identifying responses to nonsurgical therapy and allowing early detection** of recurrence of patients with head and neck cancer.
- **Detection of malignant cells** - because of the hallmark of the malignant cells, which is increased glucose metabolism.



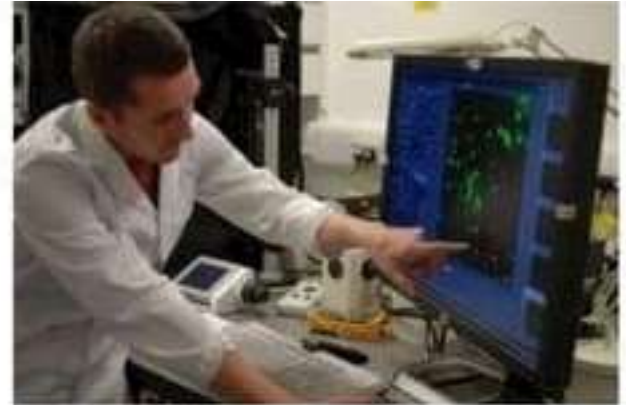
- One of the main advantages of PET/CT is that, it **can pick-up the lesions in early stage before these are morphological evident**, which leads to earlier diagnosis of tumors.
- **To detect metastatic or recurrent disease and occuh primary unknown cancer.**
- Can **demarcate tumor margins**
- Helpful **to identify recurrence** from changes resulting from previous treatment, such as surgery and radiotherapy
- Growth abnormalities of the temporomandibular joint such as **condylar hyperplasia**

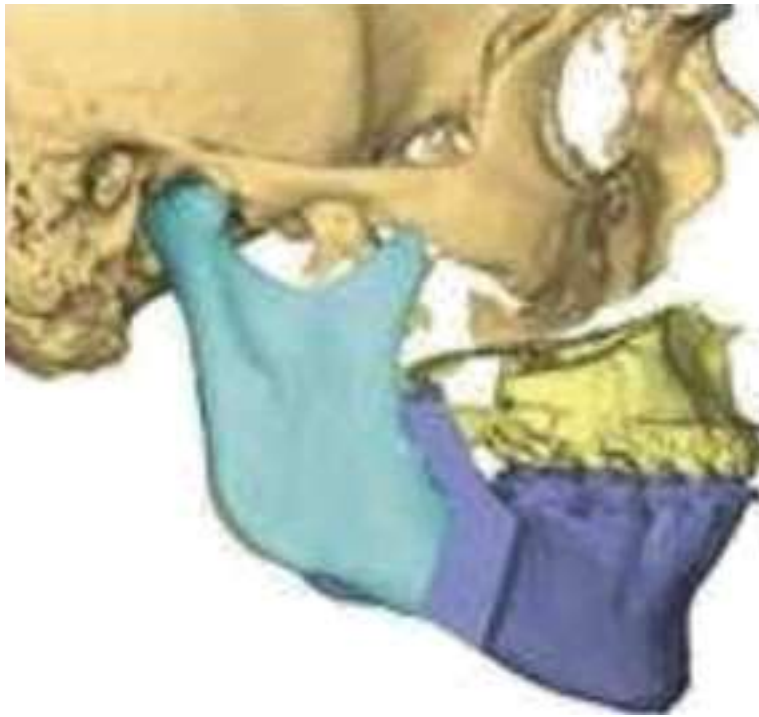




Stereophotogrammetry and Laser Surface Scanning

- These are the two most commonly used techniques to capture the three dimensional surface images of face.
- Stereophotogrammetry uses two or three cameras configured to a computer to capture a stereo image of face by means of triangulation.





The maxillofacial applications of these 3D cameras are growing, especially in orthognathic surgery, orthodontics and evaluation of craniofacial deformities.

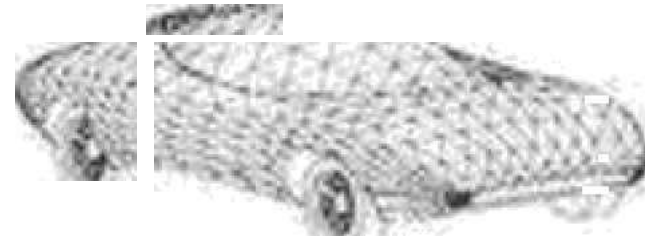
It is possible to superimpose photographic soft tissue data over the bony data set obtained from CT or CBCT. This fusion of hard tissue images and surface images of face provides opportunities for diagnosis and planning corrective surgeries and postoperative comparisons.

- 3D cephalometric measurements can be done on these images.



Rapid Prototyping

- Rapid prototyping is the process of **creation of physical models from medical scan data**.
- The physical model is built in a layered manner and it **reproduces internal and external anatomy accurately**.
- Medical scan data can be obtained from CT, CBCT or MRI. There are many technologies for manufacturing of medical models.





Stereolithographic models can be used for diagnosis, surgical planning, teaching, custom made implants and prosthetic devices.

For replacement of avulsed structures or generation of mirror-image structures, prebending of osteosynthesis bone plates



Advances in Local Anesthetics

Articaine

- It is a new aminoamide class of local anesthetic, approved by FDA in 2000 for clinical use. It is available in 4% strength with 1: 100,000 or 1: 200,000 epinephrine.
- It has thiopentone ring instead of benzene ring, which makes it more lipid soluble. Therefore, it has got **better tissue penetration and diffusion than the** lidocaine.
- Because of better bone penetration and diffusion it can **anesthetise palatal side and anterior lingual sides with buccal infiltration** only.



Submental Intubation in Maxillofacial Trauma Patients

- Intraoperative assessment of occlusion and maxillomandibular fixation is often required for exact reduction of facial fractures.
- Conventional oral tracheal intubation does not allow intraoperative assessment of the occlusion and maxillomandibular wiring.

Cont.....

- Submental intubation is a procedure in which endotracheal tube is passed through a **surgically created opening in submental** region.
- It allows free intraoperative access to the dental occlusion and the nasal pyramid.
- Therefore, simultaneous treatment of all the facial fractures, without interference of the tube or the need of switching tube from nasal to oral or vice versa during surgery.



Retromolar Intubation Technique

- In this technique, the endotracheal tube is placed in the retromolar space behind the last erupted teeth.
- Arora and Rattan, for the first time demonstrated that there is sufficient space in retromolar region for successful placement of the endotracheal tube in children and certain adults.
- Intermaxillary fixation of teeth is possible





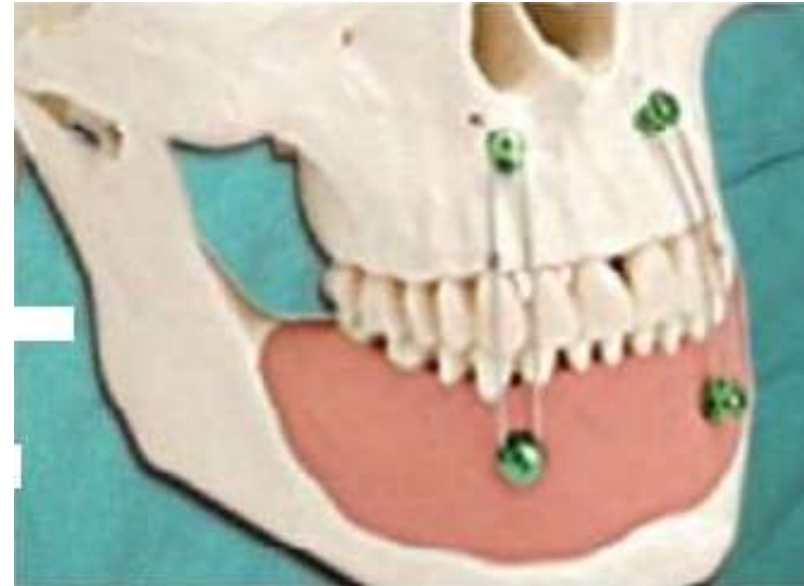
Advances in Maxillofacial Trauma Management

- To manage the panfacial complex fractures, there have been improvements in techniques of fracture fixation and reduction.
 - ✓ Other advances in the field of surgery are also applicable to trauma management. This include
 - ✓ improved diagnostic imaging,
 - ✓ minimal access surgery and endoscopic surgery,
 - ✓ biomaterial advances,
 - ✓ intra-operative imaging,
 - ✓ rapid prototyping techniques,
 - ✓ computer assisted surgery, and
 - ✓ customised implants.



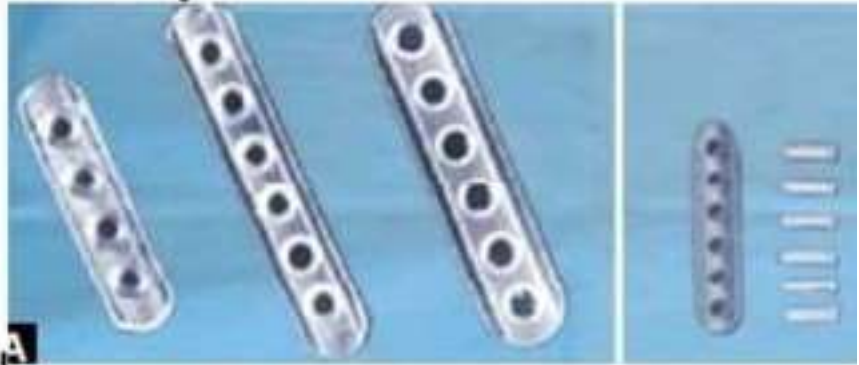
Intermaxillary Fixation Screws

- Special screws for intermaxillary fixation are available, which have a hole for passage of wire below the screw head.
- The screws are inserted above the root apices in maxilla and mandible, and wire is passed through the holes to close the mouth in occlusion.
- maintain better oral hygiene, and there is no risk of prick injury, as compared to fixation with arch bars and wires.



Resorbable plates

- Resorbable plates provide **initial osseous fixation strength for direct bone healing** and then they disappear over a period of time leaving behind no foreign body.





Self-Drilling, Self-Tapping Screws

- The self-drilling principle has the advantage of avoiding the necessity to drill a hole', thus shortening the process of osteosynthesis and requiring less instrumentation.
- These screws are essentially equal to the retentiveness of self tapping screws in thin bone

- Self Mapping Screw •

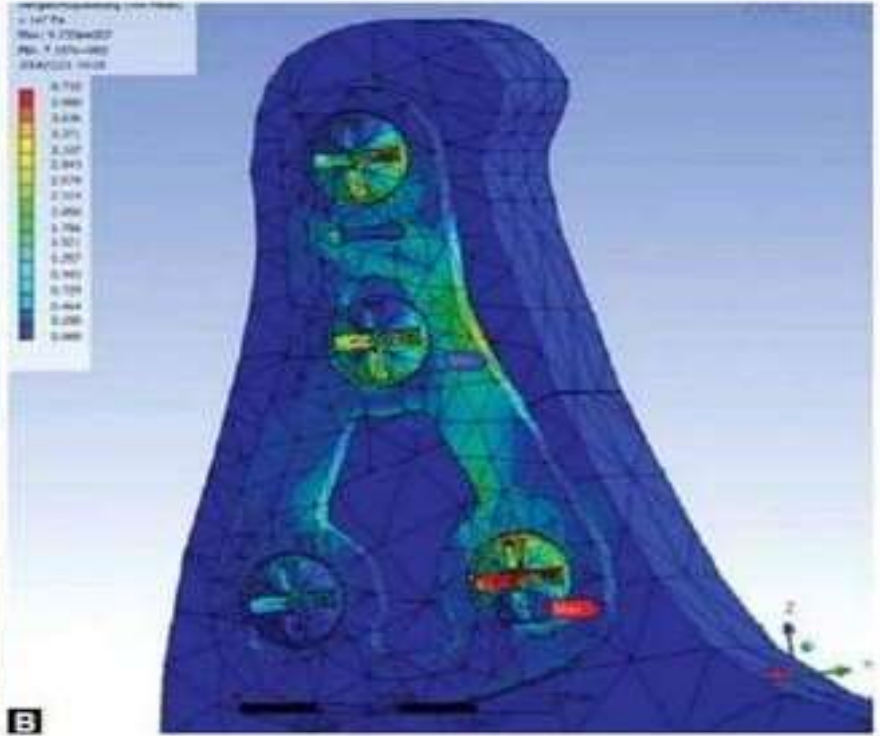
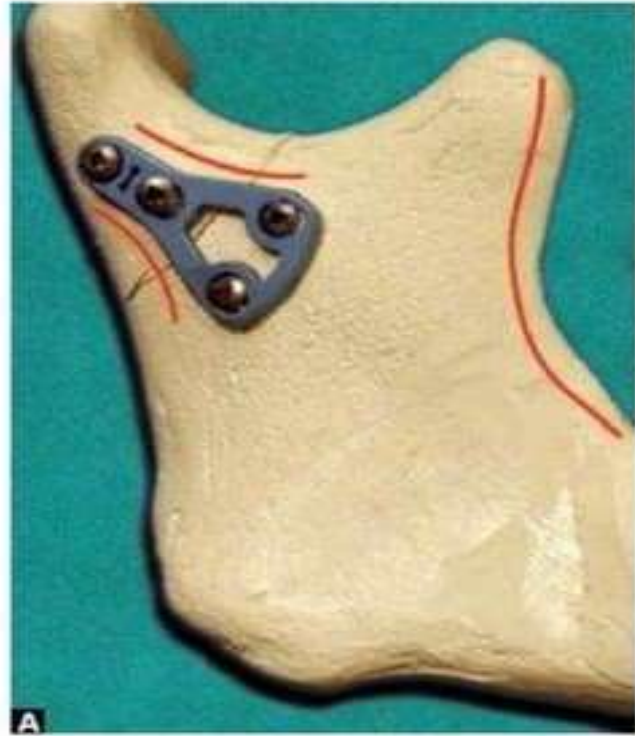


Rubber
head screw





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Trapezoidal plate for fixation of condylar fracture, based on the Meyer's concept. Red lines show tensile forces during chewing. Osteosynthesis plates should be placed on these lines to counteract functional forces

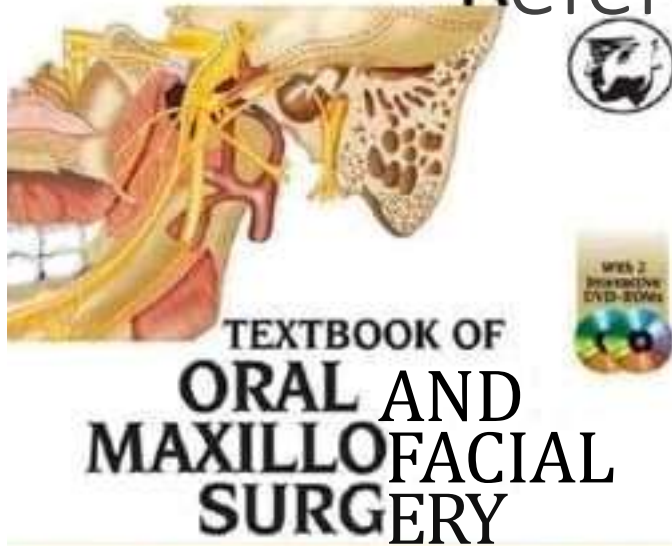


Delta Plate Fixation for Condylar Fractures

- The plates delta shape can handle changing loads, with the highest tensile strain occurring at the anterior and lateral surfaces and the highest compressive strains on the posterior surface.
- The plate can be easily placed in the confined space at the condylar neck.
- These plates are made of pure 1.3-mm-thick titanium and are fixed with 1.0-mm TriLock titanium monocortical screws.



References



Medscape

