Sheet #20 Dr.Hazem Al-ahmad

Many information were mentioned in the last year’s sheet but not in our lecture so I used their sheet and added some new informations from our record to write this sheet ☺

**Mid face fracture**

* Our main concern for this lecture is talking about midface fracture ;

In the Mid face we have many structures that can be subjected to trauma ; we have maxilla , zygoma , orbital , frontal , nasal bones , ethmoidal bones.

First of all ; for a general dentist it’s important to know the basics of diagnosis , management , options available for treatment.

\*Evaluation of patients with facial trauma:

 1 - **Immediate assessment :**

* Cardiopulmonary stability: (the maxillofacial trauma is subject for elective treatment not an emergency whereas the essential parts like airway ,breathing, circulation , blood pressure, no hypovolemia as a result of blood loss are the ones we should seek treatment for )
* Neurologic status & c-spine :

Neurologic :(glasgow coma scale can give indication about awareness of the patient from 1-15 , normal above 13 , 8 unconscious )

c-spine: Try not to move the patient (head and neck )till you rule out absence of cervical spine injury,and try to stabilize the head and neck with a sand bag for example and here we are talking about the trauma scene not the hospital

* Areas of potential trauma (chest, abdomen, pelvis) injuries to these areas may lead to a lot of blood loss (leters) which can be fatal so usually we try to save more risky areas before moving to other areas that can wait .

🡪After we do the immediate assessment in the ER and we make sure the patient is stable we go for :

**2-History and physical examination :**

* Complete history (from patient or family): How, When, What ..? analyzing the exact etiology of trauma can help us in treatment planning
* Physical examination:

 - Inspection of face & cranium, cranial nerves. Most importantly 5th 6th / and 3rd and 4th regarding orbital trauma / and the 7th ,so actually many of them are involved . facial and trigeminal nerves are responsible for facial muscles so injury to them might lead to paresthesia , anesthesia in maxilla, upper lip, lower lip .

Orbital trauma might affect the abducent nerve and the muscles of the eye .trochlear ,oclear , olfactory in nasal trauma .

 **\*Assessment of midfacial bones**

🡪 **extraoral** examination :

- check for presence of mobility of nasal bone , Anterior maxilla , posterior maxilla, and the zygoma .

-if there is any clinical depression.

- asymmetry affecting the base .

- swelling (difficult to assess ; it but if it’s in the early stage you can auto palpate it, if there is any step , mobility , clicking ,crepitus )

 - flatness of cheeks.

- laceration.

 - active bleeding

**🡪 Intra-oral** assessment : bimanually or bidigitally try to mobilize the maxilla , if there is any anterior open bite ,lateral open bite or diastema, all of these signs should be reported and they help to decide what to do next .

- tounge and it’s muscles should be examined .

- all the soft tissue should be checked .

- teeth and occlusion should be checked too .

***\*characteristic signs and symptoms :***

* Periorbital ecchymosis : blood around the orbit (black eye if unilateral, racoon eyes if bilateral).
* facial edema .
* Epistaxis : blood coming from the nose , can be an indication of general maxillary fracture which can lead to bleeding to the sinus .

-it might be mixed with whitish fluid, CSF, if trauma reached anterior cranium fossa.

* cerebrospinal fluid leakage (clear fluid mixed with blood, “tram lines”) should be identified might lead to meningitis .
* Asymmetry of the nose: fracture of nasal bones
* traumatic telecanthus : increased distance between the eyes, possibly following nasal-ethmoidal fracture that result in distortion and loss of attachment in medial canthal ligaments.
* flat nasal bridge :fracture of nasal bone , it get depressed .
* dish-shaped face :all the facial skeleton goes in .
* Intraorally : fractured teeth, vestibular ecchymosis .
* edema, palatal ecchymosis, mucosal lacerations and bleeding, steps or diastema of maxillary teeth and malocclusion.

\*The doctor presented a case for a patient who fell from 5th floor

In the picture we saw He had periorbital acchymosis , deviation of the nose, flat nasal bone,edema , tracheostomy ,and he looked unconcious .

The patient was stable for short period of time, then had disseminated internal bleeding and died at the end.

**3-Radiological examination:**

* OPG ; its really helpful but not easy to take it especially if the patient is unconscious , patient should be standing during taking the OPG so its not always possible to take it.

Plain x-rays: in the old days we used to take plain x-rays .“ Occipitomental, lateral skull, PA skull, submental vertex “. we need to take two views 

* **CT scanning** (& 3-d reconstruction) 🡪most common and most useful “ **golden xray** “ , it even covers chest and abdomen , so it gives full assessment of the patient and gives us a good diagnosis .
* C-spine series : to rule out the presence of any cervical fractures .
* Cone beam .
* Dr. showed a 3D radiograph for patient with gunshot. Such type of photos contain more artifacts and not precise as segmental CT. Multiple fractures and discontinuities in multiple facial bone: frontal bone, lateral side of orbital wall, orbital floor, lateral side of nasal bone and the mandible. Patient relatives claim that the pt was trying to suicide! But that was not the case, they were trying to kill him!. This important for forensic issues and patient safety as his relatives should not be allowed to enter ICU.

**Causes midface traumas :**

Motor vehicle accidents, Fights, falls, sport-related incidents, work-related incidents, gunshots.

 (each society has different causes , in Jordan gunshots are more common especially in weddings ,fights as well )

**Classification of mid-face trauma:**

the most famous classification is that of French surgeon, LeFort classification, related to pattern of trauma.



 I: separation of the maxilla from the mid face. So the fracture is within the

 maxilla, above roots of teeth, below the nasal fossa and extend

 posteriorly to ptyregomaxillary fissure. 

 II: fracture in maxillary and nasal bone.It is pyramidal or triangular in shape. 

 III: full detachment of the mid facial bone from the cranial base , including

 nasal bones , orbital floor , lateral orbital rims and the maxilla . 

* its not a must to have the same classification bilaterally , we can have different LeFort classes on each side of the face.

Example ; we can have lefort 1 on the right and lefort 2 on the left.

Note : we have something called orbital blow-out ; it happens when we have facial trauma “ ex. Zygomatic arch fracture “ , herniation of the orbital contents happen , eye muscles get trapped , so the patient will not be able to move his eyes neither left or right and he will end up having blurred vision .

The most commonly fractured area in blowout fracture is the floor of orbit.

* **GOALS of our treatment :**

- esthetics.

-Oral functions should get back to normal .

-Bone healing,we have to accelerate bone healing.

-Retain ocular, masticatory and nasal functions.

-Speech (teeth and alveolus) .

- maximal rehabilitation ;

In rehabilitation operation of the face we have to achieve good reduction of facial pillars into their original sites so that successful re-contouring of the face can be achieved.

 **Facial pillars:**

 - frontal bone.

 - zygomatic arch: give anterioposterior contour or what is called cheeks

 prominence.

 - maxilla: give nice complex profile of the face.

 - mandibular plate or chin: any depression in it result in what is called

 retrognathia.

***So what do we usually do to treat these patients ?!***

**Immbilization :** we try to minimize the movement of the bony segments by fixing the two jaws together using arch-arch wires for example so we can guarantee that healing will happen in the correct anatomical positions**.**

**Reduction** : we try to put back the bone in its original position .

We have -open/closed reduction 🡪 Open:by openening and seeing bone surgically (making incision) to reach the area

 🡪closed: without reaching area surgically. For example: when we have unilateral condylar fracture, reduction is done by intermaxillary fixation for 6 weeks.

 **Fixation**: fix the fractured bone by different methods,now a days we use titanium plates and screws with difrrent sizes (5,6,8 mm,microscrews).

In old days we used wires (SS wires) but it can't really maintain the bony segments in their position.

So we avoid using them esp. for facial pillars fixation. And in case we use them we have to make IMF(intermaxillary fixation) as well and that will not work for pillars

IMF: not used a lot recently, with development of Ti plates and screws. In the past they were common with SS wires. Note: Ti plates and screws are more modern and stable method, no need to do IMF with them, instead ortho. Elastics can be used to provide proprioception and guidance. The dr. showed us how IMF is done, we arch bar on upper and lower teeth and we tie them by interdental wires after that the two bars are joined together. There is another method in which screws are used instead of the bars.

Reduce bone with Rigid fixation will give stability, good facial appearance.

-Doctor showed us photographs for a patient with a road traffic accident ; symptoms : bilateral ecchymosis, swelling, nasal deviation, laceration and mid palatal fracture which resulted in severe median diastema. In the 3D CT, subcondylar fracture and zygomatic fracture are obvious. The patient has LeFort class I on one side and class II on the other. Treatment for this patient is reduction and fixation. Inside the operation there was difficulty in attaining occlusion anteriorly because the patient already has anterior open bite, what the doctor realize following the operation.

Another case: an axial scan of CT for a patient with mid facial trauma, both maxillary sinuses are filled with fluid (blood), there is nasal symptoms , and on the right side the whole zygomatic bone is depressed. In such a patient oral function (chewing, speech, and esthetics are lost, so the treatment goal is to **achieve a maximum reduction** in order to attain rehabilitation and accelerate bone healing so that ocular, nasal and masticatory function can be recovered along with acceptable facial and dental esthetics.

 🡪The doctor then started talking about zygomatic bone :

* **Zygomatic bone** : classically zygomatic arch has four attachments temporalis,frontal , facial and coronoid process of the mandible which make check prominence, frontal process, maxillary process and that process of zygomatic arch.

Any fracture in this bone will cause loss of support in the lateral aspect of the face. So this bone is like a star and when it fracture it will rotate. If we have trauma on that bone we access it through the laceration, if it’s existing. If no laceration was there, we can reach frontal process through eye brow incision, through infraorbital incision we can reach infraorbital ridge and intra orally by going sublabially then up we reach the body of zygoma. So we can get accesses in esthetic way.

Talking about zygomatic arch fracture, patient will suffer from swelling, pain .etc but the characteristic feature is limitation in mouth opening because when this bone goes inward following fracture coronoid process movement will be hindered. It can unilateral, which is more common, or bilateral .

The most common approach to treat such type of fracture is called Gillies, a British surgeon. It is closed type of reduction, used when the fracture is simple and not comminuted. An incision at temporal area is done and we insert Gillies elevator between superficial temporal fascia and the temporalis muscle fascia( deep temporal fascia), there is a gap between them and by getting there we are beneath the process so we push it outward. By this approach we avoid facial nerve braches injury and any scar in pt face because the incision area is covered by hair.

In our lecture the record wasn’t that much clear at this part , so I actually copied the last year’s one , but the whole idea is to get an access with an esthetic way . you can refer to the record if you want to understand it further more, its on min 36.

🡪The doctor presented a case for a lady who had a fight with her husband in the car , so he pushed her out of the car & went back to treat her

On the CT scan there were no fractures, so it is simple soft tissue injury but the blow can be transmitted into the orbital floor resulting in increased intraorbital pressure which can lead to orbital floor fracture because it is so thin. Through that fracture hernia of muscle and orbital content occurs (orbital blow out). Those pts will complain of double vision esp. at lower gaze due to muscle entrapment. This can be associated with zygomatic fracture.

To treat that type of fracture we make incision through lower eye lid ( infraorbital ridge incision), so we go through skin then through orbicularis muscle to reach lower orbital ridge. Then we free muscle and orbital content and add bone graft that is fixed by titanium mesh.

The last case was about pt that had a road traffic injury in the UAE in the past and he went through treatment but still has telecanthus due to fracture in nasoethmoidal bone and medial orbital wall. In these cases earlier attendance end with more successful outcome than later because of scaring and fusion of segments so the anatomy is distorted and complete recovery cannot be achieved. The pt was informed about that but he wanted to go through the operation.

We cannot reach that area entirely unless we make a coronal incision (very useful incision) or what is called face off, and through cranium we go down reaching nasoethmoidal, that is aggressive but it is the only way!

After reaching the area sectioning is done in attempt to fined medial canthal ligament and fixes it by S/S wires so that some reduction in intercanthal ligament can be obtained. To reconstruct medial orbital wall, bone graft and mesh is used. Molding of the mesh can be performed on a model that was produced by mirror image of the opposite side aided by computer and modern technology.

Best of luck ♥