Oral Surgery   
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Dentofacial Deformities -Orthognathic Surgery

A patient with a severe class II (chin is more backward), class III skeletal relationship (mandible is more forward), or a skeletal open bite are all examples on skeletal disorders rather than dental ones. So malocclusion is not the only problem; there is deformity in the jaws (the bone is not at the right position). This could be due to genetics or trauma especially those occurring at a certain age.

* To treat dentofacial deformities a team consisting of an Orthodontic, Surgeon, general dentist, pediatric dentist is necessary.   
  - Role of pediatric dentist: detects the skeletal deformity and refers the patient to an orthodontist. In turn, the orthodontist starts with an interceptive treatment by using orthodontic appliances mainly functional appliances, they try to intercept at an early stage to induce growth. Eg: delay in the growth of the maxilla, we give the patient a functional appliance to push the maxilla forward during the growth period.
* When interceptive treatment is not done - because of lack of awareness on the subject or any other reason- patient presents to the clinic late -growth has ceased- and in these cases, we go for a combined approach (ortho & surgery).
* sometimes even if the patient does receive interceptive tx it might not be enough or it may reduce the problem but not solve it, so we would do surgery as well. In this case the surgery would be easier (instead of performing surgery on the upper & lower jaws, we only perform it on one of them)
* Sometimes the orthodontist can camouflage the dentofacial deformity with orthodontic treatment only.

Dentofacial Deformities requires teamwork starting from the patient at a young age to detect growth abnormalities and intervene while the patient is still growing. This is usually done by referring the pt to an orthodontist at an early stage which in turn would start treatment with a functional appliance to either avoid the problem or reduce it.

Three lecs on the subject. The first was about treatment planning -Dr Hazem-.   
  
Tx planning for a dentofacial deformity (eg. For a pt with severe class 3 skeletal relationship, facial asymmetry, deviation of the jaw to one side, skeletal open bite...) involves clinical examination and gathering records from the pt by the orthodontist and the surgeon including study models, OPG, lateral cephalogram. Treatment involves both specialties so there must be a plan.

Assessment and planning: the orthodontist needs to prepare the pt for surgery, and good planning with the surgeon is required because if the surgeon tries to move the maxilla and the mandible into their right positions they might not occlude correctly (no co-ordination) this is due to the malocclusion which could involve a narrow maxilla, wide mandible. So what happens is that the orthodontist starts ortho tx then surgery then ortho again.

Role of the orthodontist before surgery:

1. Alignment of teeth
2. Coordination between the upper and lower teeth so that when they are moved by surgery the teeth occlude correctly

Role of the surgeon after the initial ortho tx:

There are certain cases where surgery is done without ortho tx. But its indications are very few.

Choice of Surgical Procedure should be Discussed with the pt before starting the ortho tx and the pt must understand that the ortho tx in this case is not the definitive tx. Also, the pt should be aware that the ortho tx includes dental decompensation which will make him look temporarily worse.

\*\*The following topics were covered last lec :   
Surgical Management

Patient Management

Continual Care and follow up

History

Clinical examination

Records

Model Surgery:

models mounted to an articulator in the correct position that we should achieve after surgery. A wafer is constructed (wafer is a plastic sheet) to guide the surgeon in the surgery in moving the jaws.

The model surgery helps in putting a plan for the surgical procedure and orthodontic tx, it ensures that the there will be no interferences in the occlusion when the jaws are moved.   
Helps in figuring out how to fix the mandible to the maxilla

Surgery:

Could be done on the

1. Mandible
2. Maxilla
3. Both
4. Midface
5. Segmental: part of a jaw is removed

Like any other surgical procedure there is pre and post operative care

These types of surgeries are considered major surgeries which involve bleeding since we are working close to the airway areas and so good planning is mandatory.

Some patient may require blood transfer so you should be prepared.

Antibiotics are given post op

We must make sure we prevent thrombosis in some pts

proper care/medical management is necessary and these surgeries shouldn’t be taken lightly

Post-op:

Airway security   
Replacement Fluid -since the pt won’t be able to intake a proper diet in the first few days  
check occlusion  
proper antibiotic, pain killers, antiemetic to prevent vomiting, steroids (because of edema).  
proper nutrition  
maintain very good OH

Dentofacial Surgery / under the category of orthognathic surgery

Procedures in the mandible:

1. sagittal split osteotomy
2. Vertical sub sigmoid
3. Subcondyle
4. Body osteotomy
5. Anterior ridge ?
6. genioplasty

Most important two are:  
1) Bilateral Sagittal Split Osteotomy (BSSO) / Obligasi Technique (Father of all surgical procedures):

99% of procedures on mandible

2)Genioplasty: procedure done on the chin

1. **Sagittal Split osteotomy:**

Cuts  
2 cuts – one on the angle of the mandible, one on the other side (Hence bilateral), so the mandible is now 3 pieces (one from the angle to the angle, and the angle to the condyle is the second (R &L) .

This procedure is a versatile procedure, I can move the mandible in all directions (up,down, right and left).   
  
Fixation is with miniplates and screws -Rigid Fixation-: rigid fixation has the advantage that the pt can open and close his mouth normally and intake a soft diet without any problems within weeks.

Most imp disadvantage:  
 – paresthesia of the Inferior alveolar nerve(numbness in the lips bilaterally) in most of the pts (24-40%)-the doc says it’s more than this-why? I am cutting the mandible on the angle of the mandible on both sides and the nerve will show through the two cuts, the surgeon should be able to see it and locate it.

Most recover normally, no complete anesthesia unless you cut the nerve completely. Recovery takes time.

So the most common complication of the BSSO is the paresthesia!!

Technical difficulties:

during osteotomy something called bad split could happen; when splitting of bone does not occur the way intended.

Procedure:   
- under GA.   
- LA is given for vasoconstriction, and to reduce post op pain.   
- Done through an INTRA oral approach.   
- Flap should expose the area of the angle of the mandible, keep exposing till you reach the condyle (distal to the 6) (looks similar to the one done for wisdom teeth extraction but a bit more extended).  
- Aim: separating the bone SAGITTALY.   
Sagittal means “bilwarb”. Why? To achieve contact between the two bones during sliding. It also allows proper healing.   
if I do it horizontally there will be a gap and healing won’t take place.   
The nerve is exposed coming out of both pieces & connecting between them.   
- Three cuts (on each side):

1. Horizontal-in the ramus **above** the lingula – only in the lingual cortex (to protect the nerve)
2. Vertical – in the body of the mandible only on the buccal cortex (to protect the nerve)
3. A cut that connects the two

the split is done so that the nerve stays on the inner side.   
the cut is done on both sides, allowing sliding movement.   
The only thing holding the bone is the soft tissues.   
Now all movements are applicable -clockwise/anti clockwise rotation,R,L,UP,DOWN.

Slide till you reach the desired position, then fixate it with a miniplate and 4 screws. Elastic bands /guiding elastics are used with miniplates for intermaxillary fixation. Here elastics are enough, other cases you might need to use wires or other means.

Summary:

* Intraoral
* Both sides
* bone cuts using surgical saws/burs/osteotomes
* we need to protect the nerve
* there is always a high risk of paresthesia
* low risk of anesthesia
* miniplate and screws for fixation
* used to move the mandible in all directions. Of course, there is a limit for the movement allowed to be done, usually 7-8mm. If we move it more than this the relapse rate would be greater (due to the muscle pull).

**2) Genioplasty**

We are only working on the chin.   
Use:

for reduction -to reduce a prominent chin   
or augmentation – increasing the prominence   
or forward slide  
or backward slide

Main concern:

a lot of cases are followed by mental paresthesia because the cuts are made between the mental nerves(R&L).

Also you might injure the roots of the teeth if you made a cut near them.

Incision:

intraoral, mucosa -muscle (genial tuberculum)- bone cuts   
  
Fixation:

miniplates and screws  
mental nerve shows through on both sides and we need to locate it not to injure it.

Summary:

* Simple procedure compared to BSSO
* could be done in a day case unit – the pt can leave the next day
* complications include injury to sublingual arteries resulting in hematoma in the sublingual area which is dangerous because it would raise the tongue and compromise the airway.
* paresthesia of mental nerve
* Chin could be moved forward, backward, downward, upward,
* sometimes we can open the chin and place an implant – chin synthetic implant
* companies produce custom made implants: CT models are made and the implant is fabricated, placed under the periosteum and fixed with two screws.
* post op care is needed.

The previous two procedures are the most common ones, the rest are a bit advanced and hence we won’t discuss them.

MIDFACE:

Recall the classification of the fractures due to trauma – le fort 1,2,3.   
Similarly, with a growth disturbance in the midface, the cuts done by the surgeon resemble those of the fractures (le forts).   
  
Le fort 1: Maxilla only  
Le fort 2: maxilla + part of midface+ part of zygomatic petrous   
le fort 3: the whole face with the floor of the orbit and we advance it as one piece

Segmental: small pieces of the maxilla

Le fort 1 is the most common (99% of the cases the doc does in the midface)

This procedure is Versatile because when we cut the maxilla we can move it forward, downward, upward, rotational movement. There is always a problem with moving the maxilla backward because of the presence of the base of the skull so the movement backwards is limited.

Like in the mandible, we can advance the maxilla up to 7-8 mm (not more) because of the greater risk of relapse.   
Note: downward movement has the greatest relapse risk.

Procedure:

-The procedure is done under general anesthesia.

-Intraoral approach.

-Incision in the buccal sulcus usually form the 6 to 6 then elevate a mucoperiosteal flap.   
  
- Cuts: anterior wall of the maxilla, go down a little to stay away from the roots of the canines, go all the way back then make a cut in the lateral nasal wall using an osteotome.   
Make a cut in the nasal septum with something that looks like a fork. Then go back and separate the maxilla from the pterygoid plates.   
After performing all the cuts a “down fracture of the maxilla” could be done where the piece is separated from all the veins and base of skull. The maxilla is only held by soft tissue mainly the palate and a bit of mucosa buccally from the right and left.

- Impaction forceps: used to perform “down fracture” of the maxilla.

So the maxilla is separated from the base of the skull.

* Fixation: two plates on each side R&L (total of 4 plates).

The procedure involves cutting through the sinus so one of the complications of the procedure is sinusitis (but it’s not severe, don’t worry about it).

* Cuts and fixation are done on the buccal side.

Complications of le fort 1:

1. Bleeding during the procedure not post op-because of the presence of arteries (pterygoid plexus of veins)
2. Infraorbital nerve damage
3. Nasolabial esthetics – nose changes with the change in position of the maxilla- if I move the maxilla upward for example, the nose becomes wider-
4. Basal skull fractures
5. Non-vital teeth
6. Sinusitis up to 50% - the pt is already covered with antibiotics
7. Sulcus depth
8. Relapse

Factors to decide if you should go for surgery:

1. Stability with ortho tx only
2. Facial appearance – which cannot be improved with ortho tx

Revision:

This lecture is about the surgical procedures:

1. BSSO: versatile / nerve injury / rigid fixation / bilateral advancement/ clock /anti clockwise rotation
2. Genioplasty: chin/intraoral approach/ most simple surgery
3. Maxilla – le fort1 : intraoral approach/ fixed with plates/ risk of bleeding / risk of nerve injury/ fixed with plates/ mx is moved in different directions except post it’s difficult

\*We only need to know the basics; these procedures are very difficult to understand if you haven’t seen them.