Model surgery is undertaken to verify that the planned surgical moves are appropriate, and to allow construction of an orthognathic wafer in order for the surgeon to know exactly what to do.

During the surgery the surgeon will drop the maxilla downward in the picture the maxilla is completely free, the surgeon has to know where to move the maxilla, we put the wafer that will rely on the lower teeth, then intermaxillary fixation will be applied by the wires, so he fixes the maxilla to the mandible, because the mandible is in the right position and the maxilla should be moved forward, this is called Fixation by screws.

In order to achieve fixation, before the surgery rigid stainless steel arch wires and hooks should be put on the teeth.

Sometimes we go through two stages:

Starting with the forward movement of the maxilla and constructing 1st wafer, and then we move the mandible and construct the 2nd wafer.

**Post surgery :**

We go through five stages :

**1. Guiding elastics:**

After the patient finishes the surgery the way he bites will be different even the muscles will be repositioned during the surgery, so the patient will take time to get used to the new occlusion, guiding elastics will help the patient to know how to bite in the new position of occlusion.

**2. Complete any movement not undertaken before the surgery :**

Such as: Cross bite

**3. Root paralleling at any osteotomy (surgical) site:**

After the osteotomy we'll have spaces which we should close them.

**4. Detailing and Settling:**

Settling means maximum intercuspation in the teeth achieved by moving them vertically, the case in the slides shows that the patient has a posterior open bite, so we place the elastics to achieve settling.

**5. Correct minor discrepancies resulted after the surgery:**

In the slides a patient called Ahlam her chief complaint is that her mandible is setting backward when she looks at herself from the side, her occlusion is normal, but she has a big over jet, when the doctor asked her about her history accompanied by some pictures he discovered that she already went for an orthognathic surgery and she was happy about the results, but her case relapsed.

She already did a surgery, and we can do another surgery but relapse might happen again.

So this case, is one of the rare cases that we can make the surgery first without interfering with the occlusion, because she already put braces in the first time she did the surgery.

After she did the second surgery, we found a massive anterior open bite, the problem is that she already did two surgeries so we can't send her to do a third surgery.

 We placed a continuous arch wire to extrude the incisors which is unstable, so we intruded the posterior teeth, when we intrude the posterior teeth auto rotation of the mandible will take place, and the open bite will be closed, in this way we saved the patient form going to a third surgery, and we treated the open bite othrodontically.

We dont always have to treat the patient orthordontically and send him to surgery.

A female patient attended the clinic complaining of a gummy smile, we took an impression, mounted it on the articulator, we made the surgical procedure on the articulator, we found that autorotation of the madible will take place and the occlusion will be fixed, so we sent her to the surgery without treating her orthodontically first, we did a maxillay impaction surgery.

Q: What's the problem with sending the patient to the surgery without an Ortho treatment?

A: we won't be able to put the elastics, that's why there's something called bondable bars, they wear it before the surgery and will be taken off after the surgery.

A funny cute female patient attended the clinic.

they planned to advance the mandible surgically, when she showed up after the surgery she looked worse than before, because in the pre-operative picture she looked cute, funny and chubby, after the surgery her face became thinner not suitable with her body, her expression changed toward being mean, the doctor preferred how she looked before the surgery but he could not tell her that because what's done is done and can't be fixed, that's why the surgeon should be very careful with planning.

**Proper planning should be done.**

They invented a device called 3D prediction and planning.

It predicts how the patient will look like after the surgery.

In the past they used a software for the planning; like photoshop, they move the maxilla and the mandible in the wanted position and see how the patient will look like.

They also used photographs for the patients, they cut it and start moving it anteriorly and posteriorly to predict the results, but this did not work because it's a 2D photo.

There's a patient who looks normal from the side, but when you look anteriorly he has a massive asymmetry ( all his chin is shifted to one side), this case is very difficult to diagnose, plan and predict.

We should plan how much the mandible should be moved.

In order to plan it properly we take CBCT, then we make 3D reconstruction on the computer, we'll have the 3D bone picture for the patient, and in this way we can diagnose that the shifted mandible is due to bone.

Soft tissue will be added to the picture, but the soft tissue provided has no texture or color, so we take 3D imaging, they have six cameras that take a picture at the same time on both sides, they will be combined by a software, giving us a 3D picture that will be superimposed on the bone.

We make the surgery on the computer, in this way the results will be predicted properly.

It's a great tool, but there's one risk which is we aren't sure if the results after the surgery will be exactly the same as the predicted results on the computer, because in the computer the soft tissue follows the bone based on a logathrim that is set by us, but during the real surgery we don't set these values, however we'll have an idea how the patient will look like afterwards.

We still need a wafer, we create a wafer on the computer and it will be printed through 3D printer.

Stability:

There are surgical procedures more stable than the others, such as maxillary impaction surgery we'll end up with bone to bone contact which is very stable , however when the maxilla is moved downward we'll have a big space afterwards.

Stretching of muscles might not be stable as well causing relapse.

Please refer to Laura Mitchil book for this lecture and study retention and relapse as well.

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