MAXILLOFACIAL RECONSTRUCTIVE SURGERY

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Restoration of

- Form
- Function

Animation

Speech

Swallowing

Chewing

Replace

- Skin
- Bone
- Muscle
- Soft tissue
- Teeth
- Nerve function

Methods of bone reconstruction

- Local manipulation
- Extensive grafting
- Distraction osteogenesis
- Tissue engineering

Bone grafting

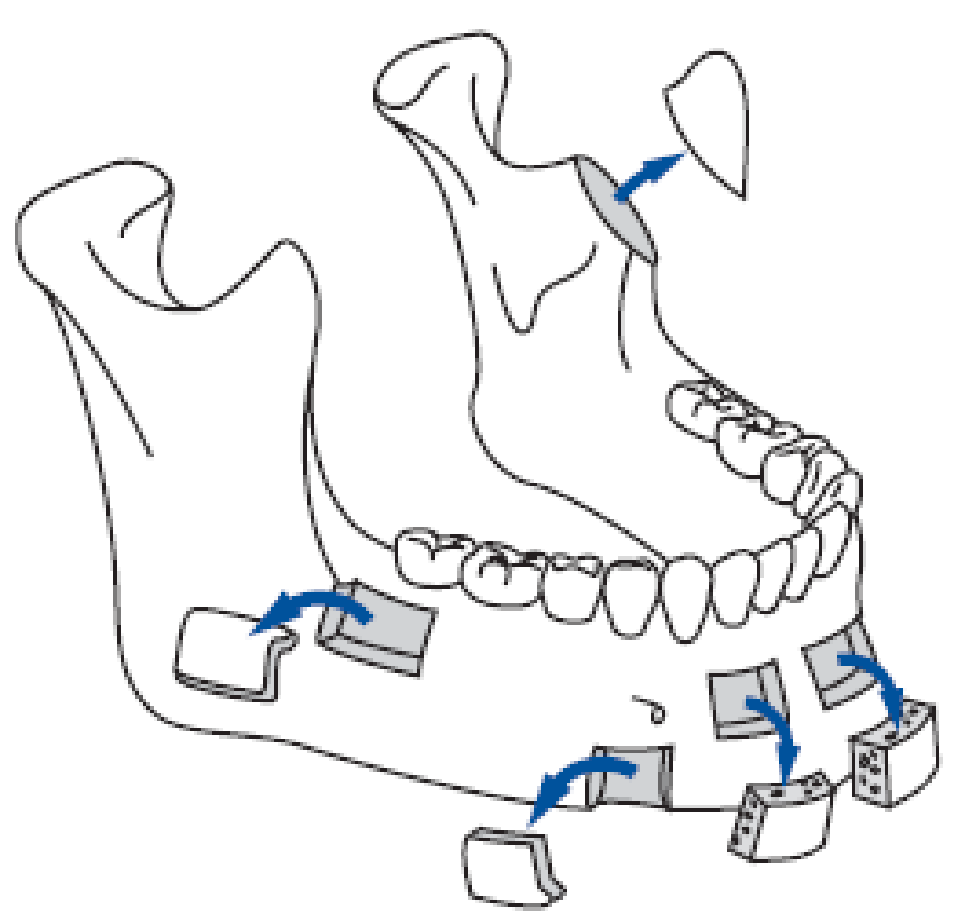
- *-Non-vascularised*
- *Vascularised*

Non-vascularised bone grafting

- Non-vital bone grafts harvested without a blood supply, gain this from the recipient bed

Donor sites

- intraoral donor sites
- Illiac crest
- Rib
- Outer table of calvarium



- ***Biology:***
- Bone cells survive for 5 days

Central parts of large grafts become necrotic Become revascularised within weeks to months

Sources of newly formed cells

- Osteoprogenitor cells
- Undifferentiated mesenchymal cells

– differentiate into bone producing cells (inductive period)

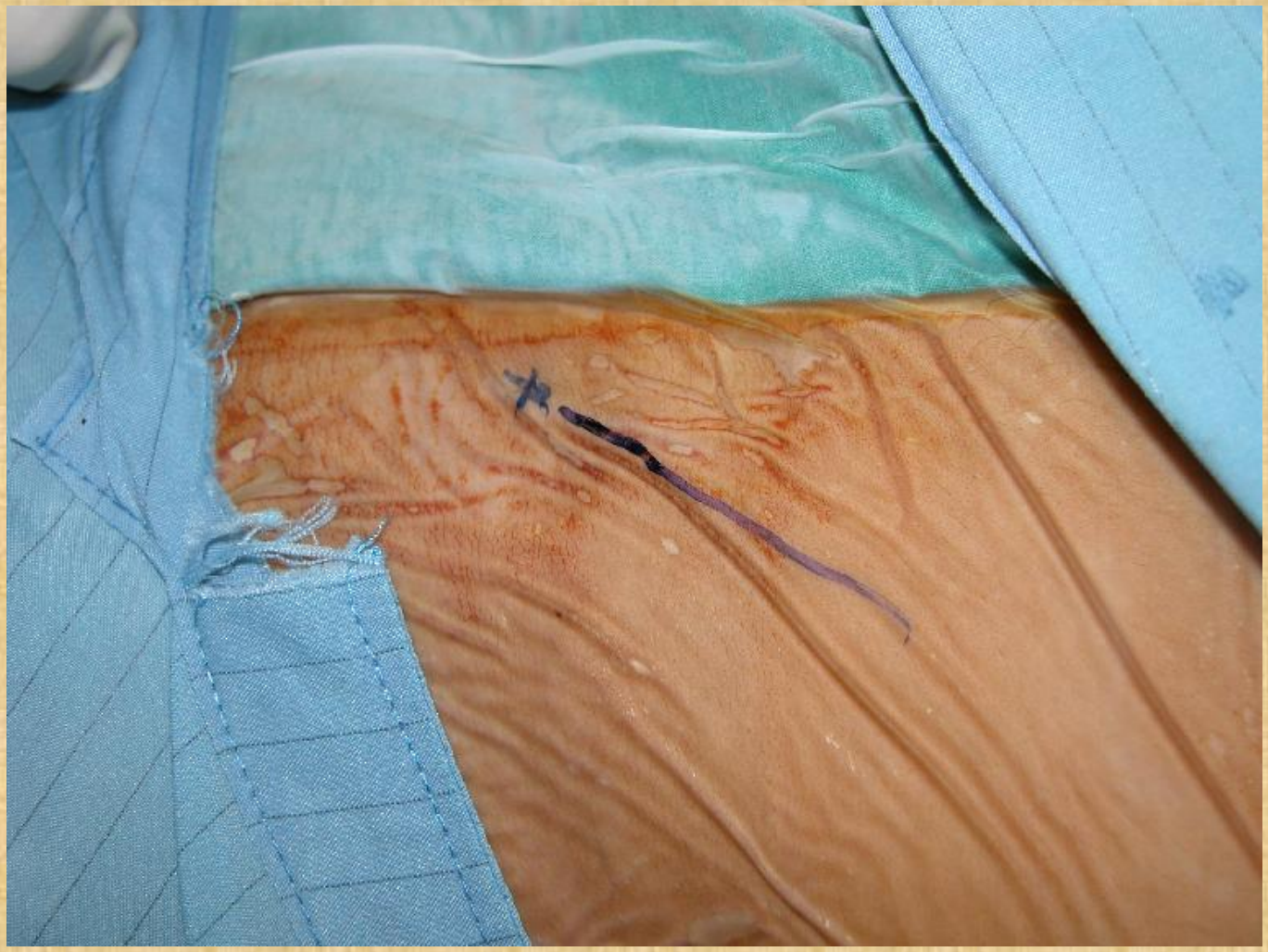
Criteria for success

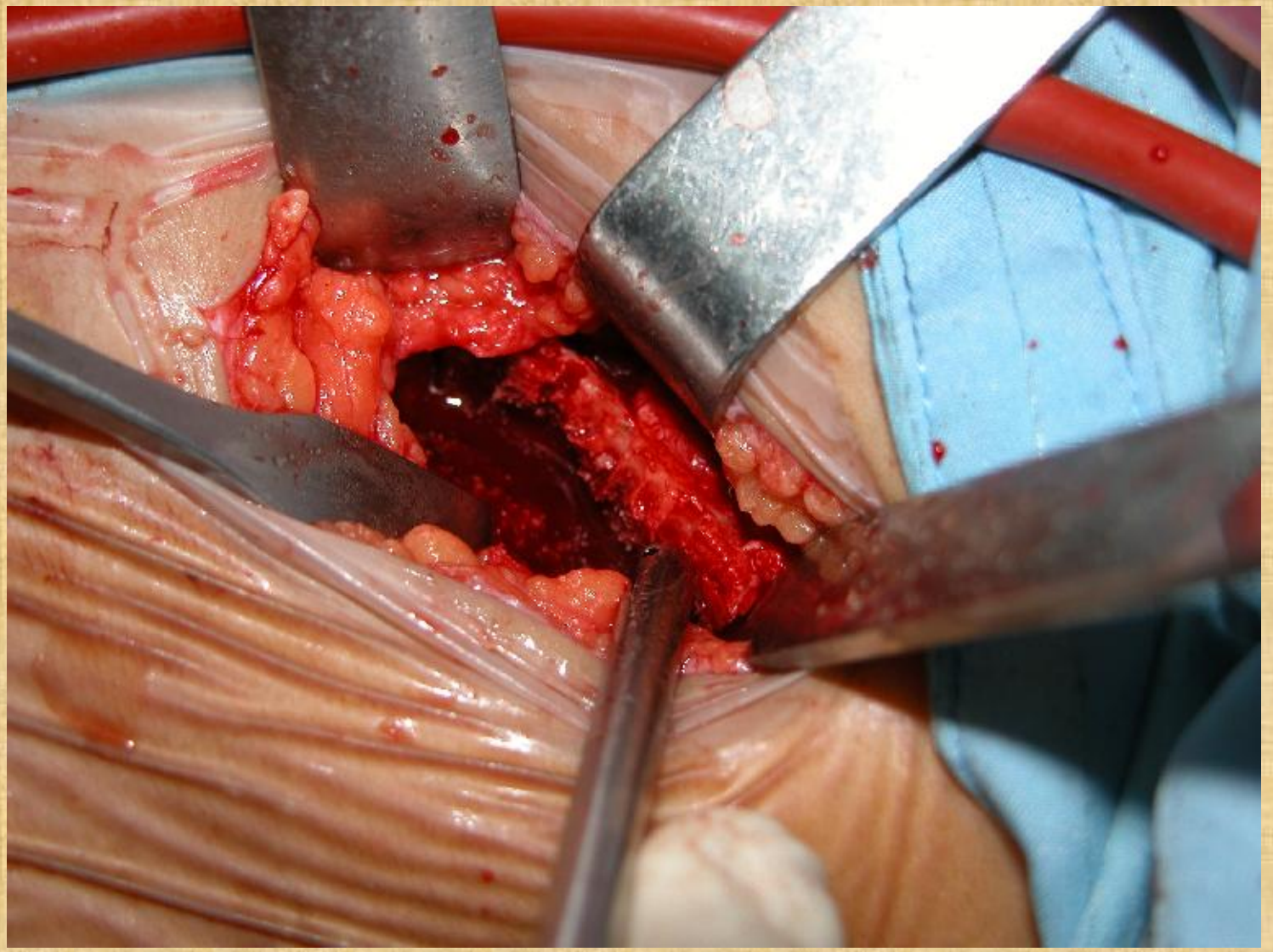
- Firm fixation
- Intimate contact to recepient site
- Minimal contamination

- *Vascularised grafts*
- Radial forearm
- Iliac crest (DCIA)
- Scapular
- Fibula

- *Mandibular reconstruction*
- Continuity - grafts bicortical– iliac crest
- Joint replacement – costocondral graft

Maxillary reconstruction



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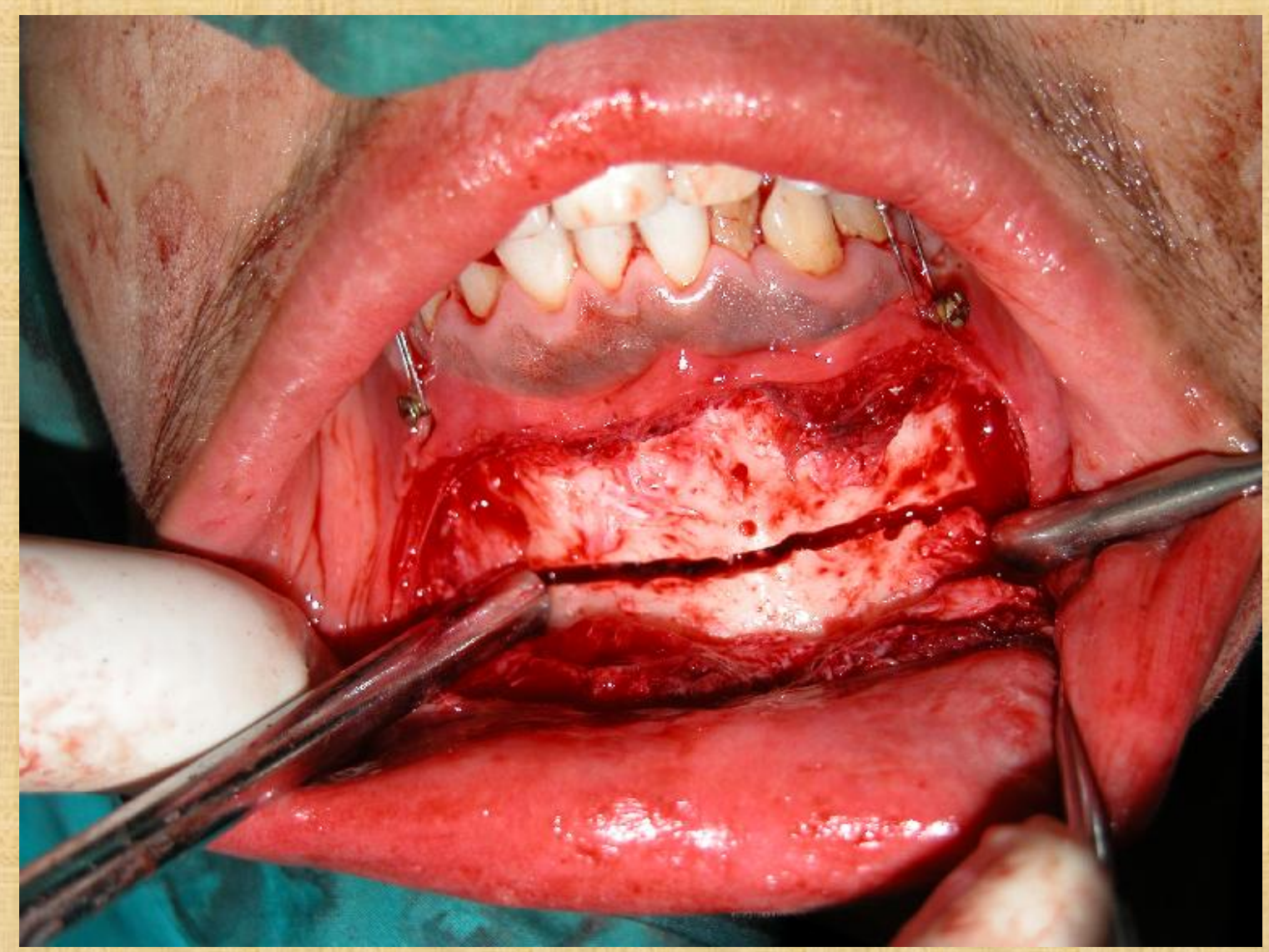
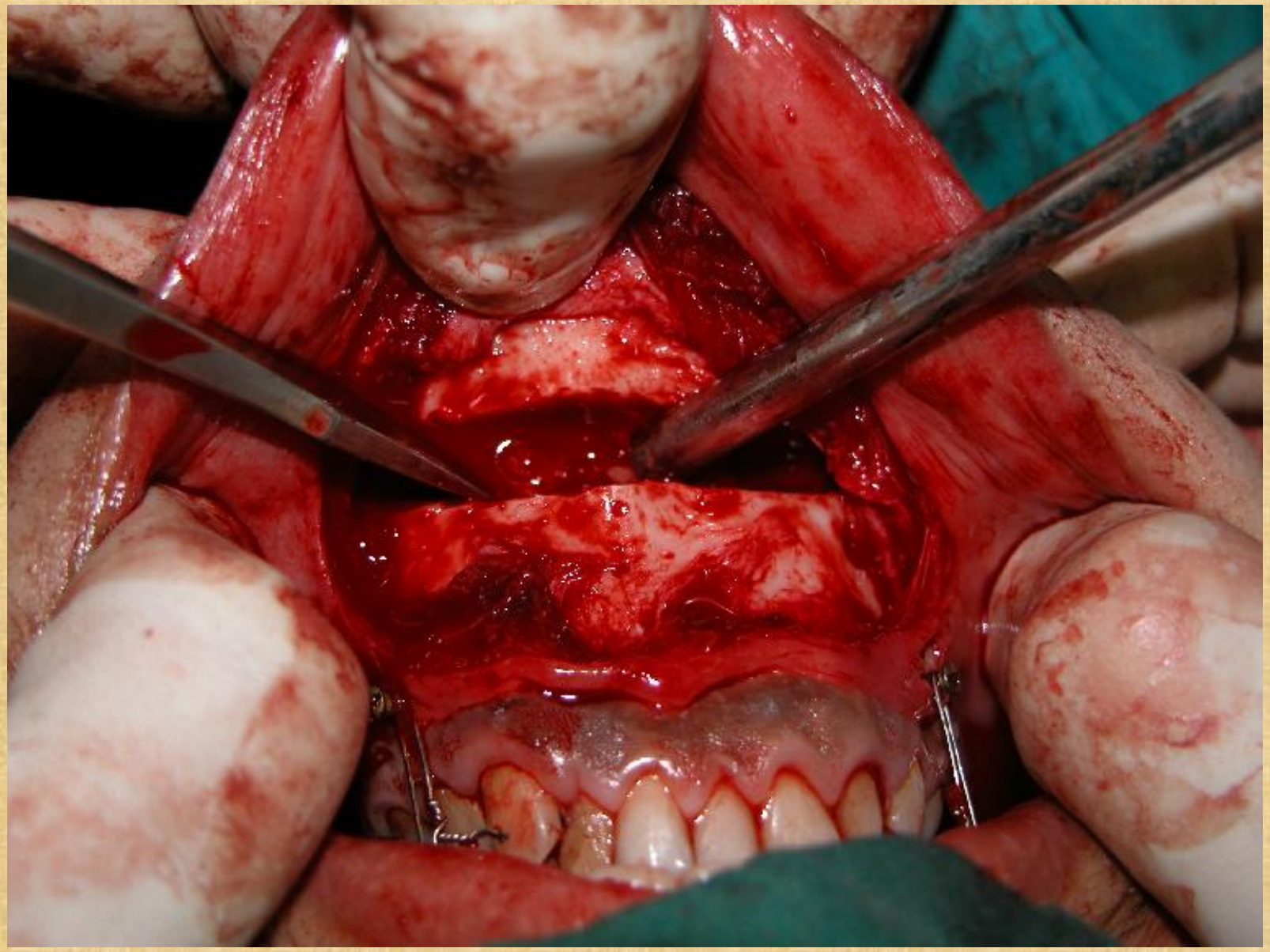
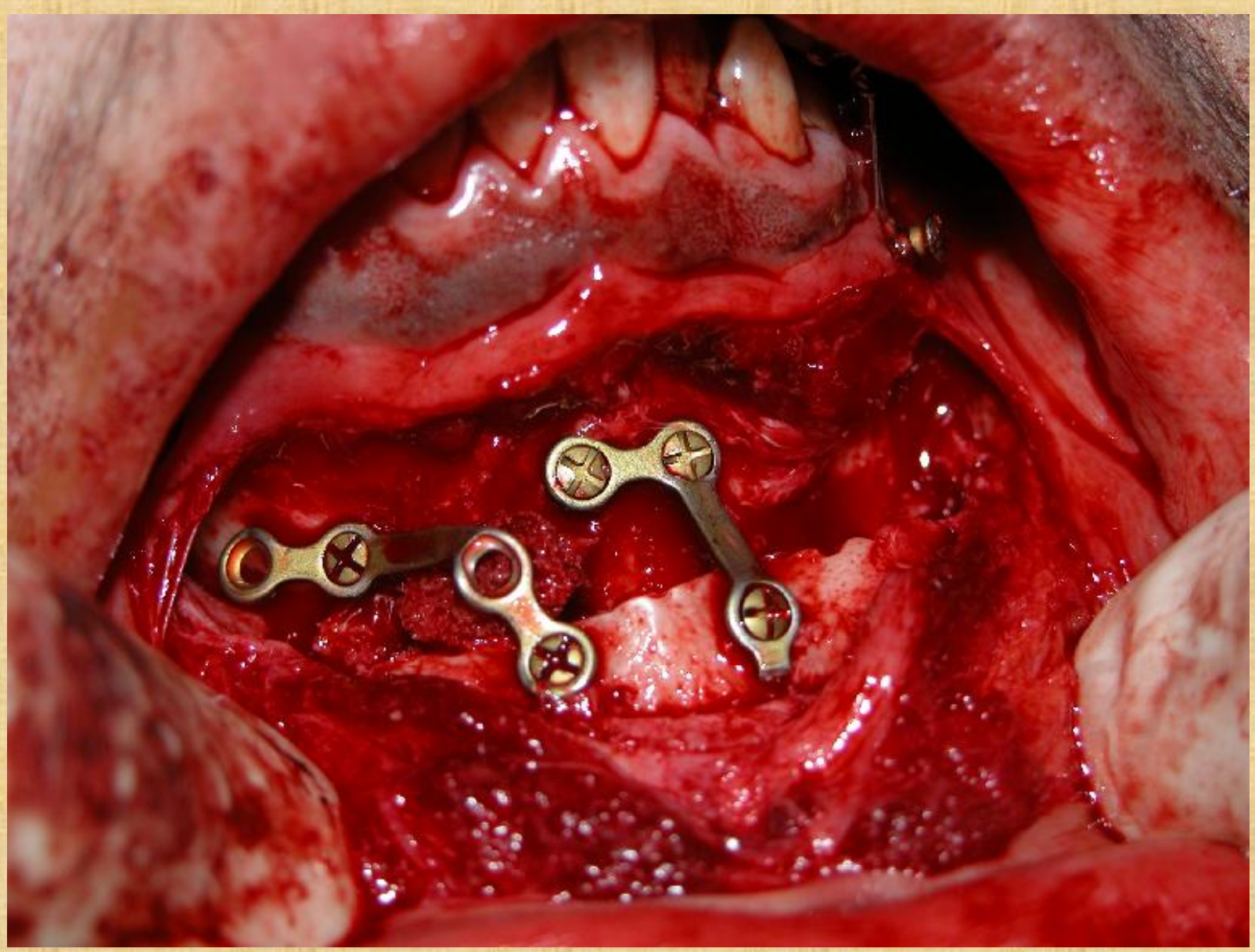


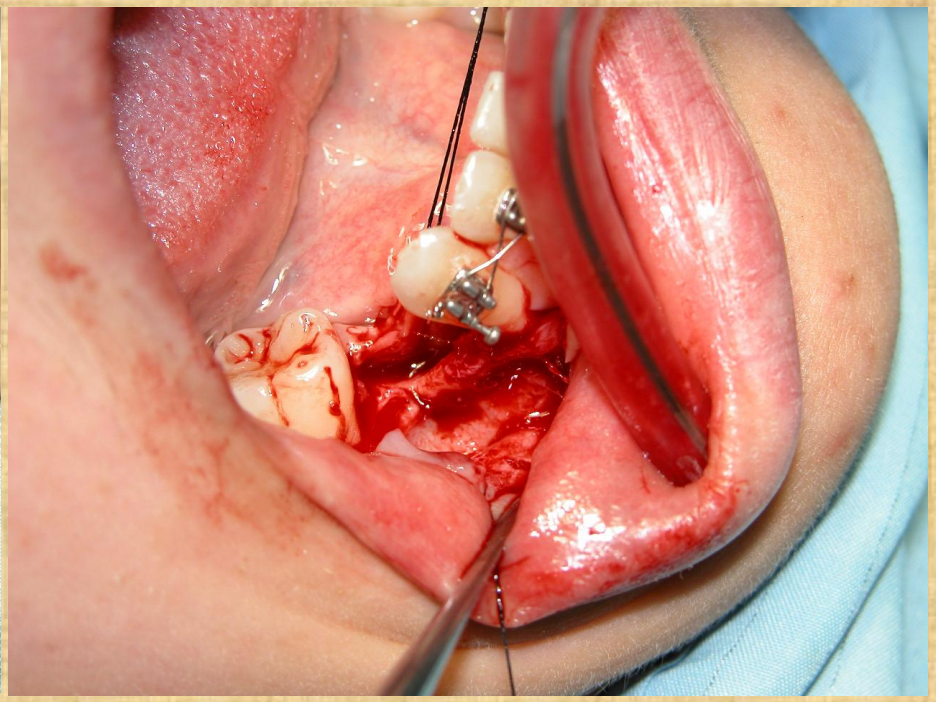


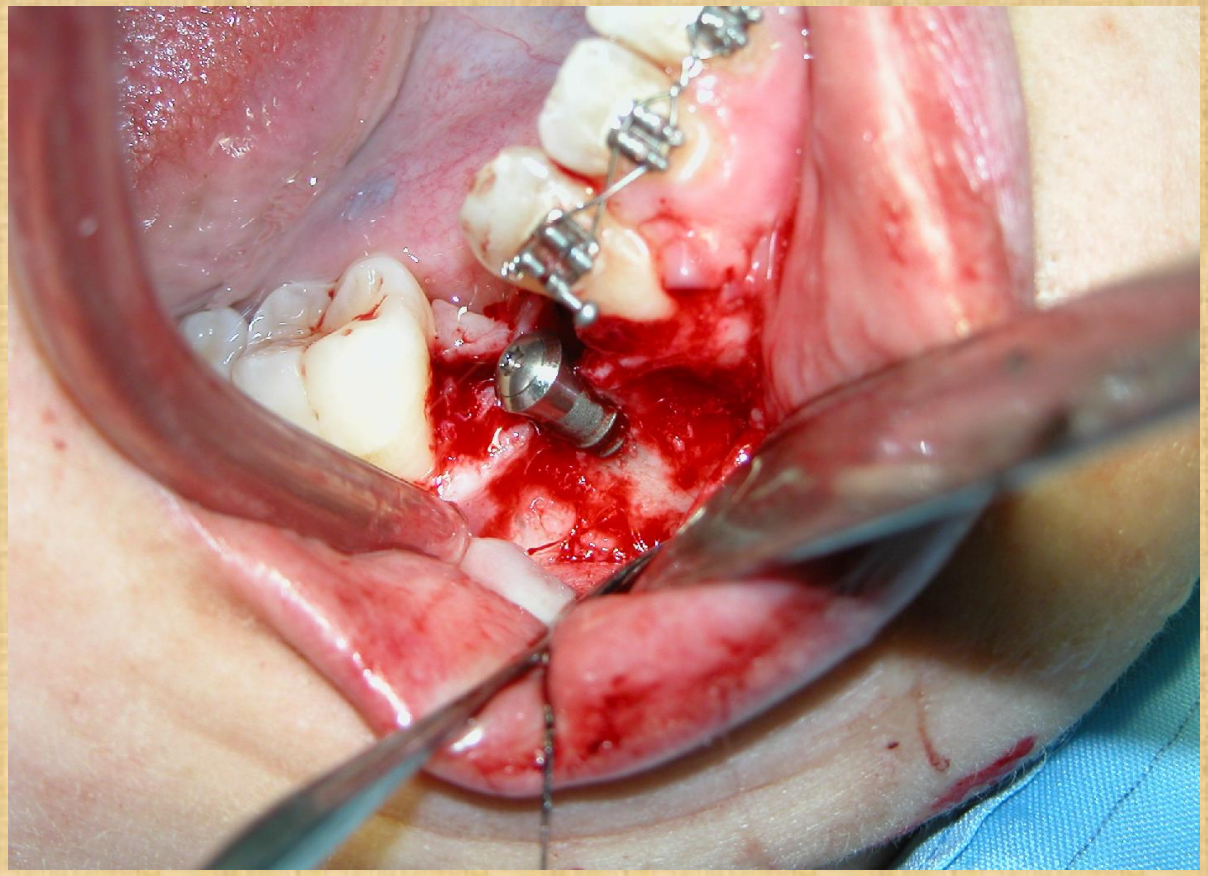


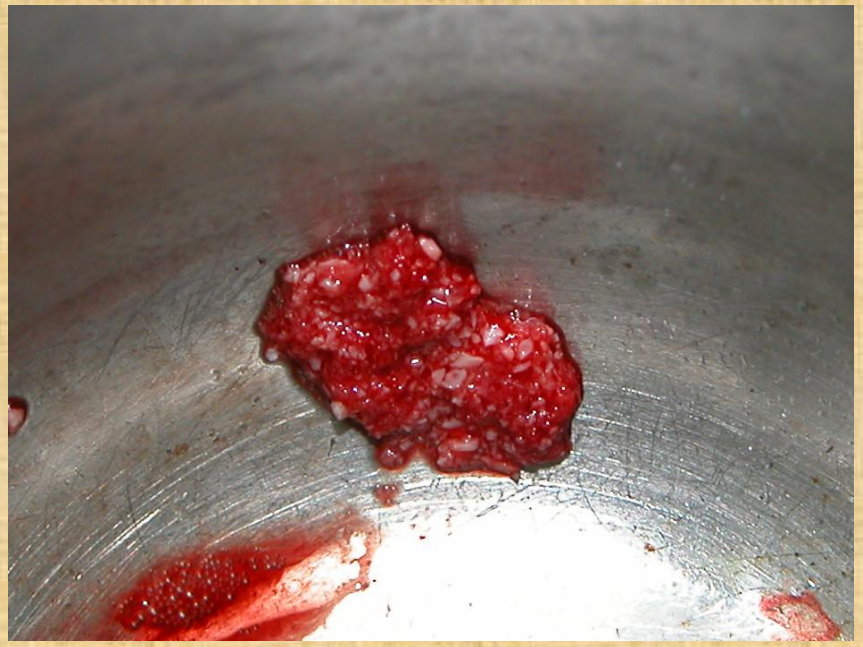
Alloplastic materials

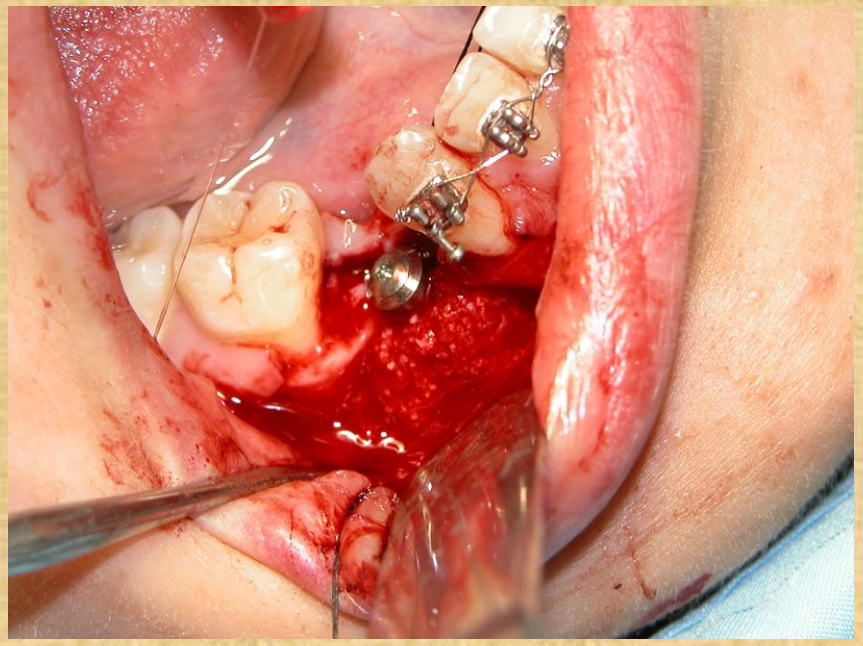
- Hydroxylapatite crystals
- Bioactive glasses
- Calcium sulfate
- Beta tricalcium phosphate
- Biphasic calcium phosphate

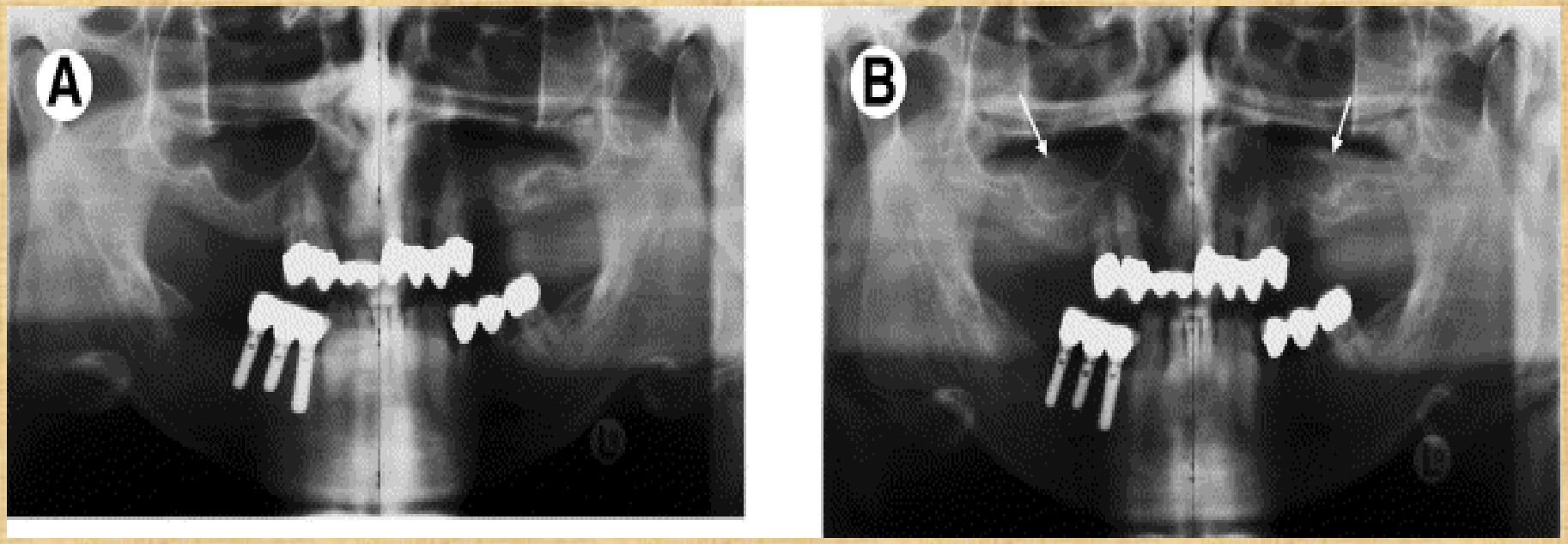
Alloplastic materials










A
B

Platelet rich plasma (PRP)

Computer-assisted planning and modeling for surgical reconstruction of facial asymmetries

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- The diagnosis and treatment of facial deformities, can pose a significant clinical problem.
- The limitations, accuracy and predictability of treatment options available and the expectations of the patient can further compound this problem.

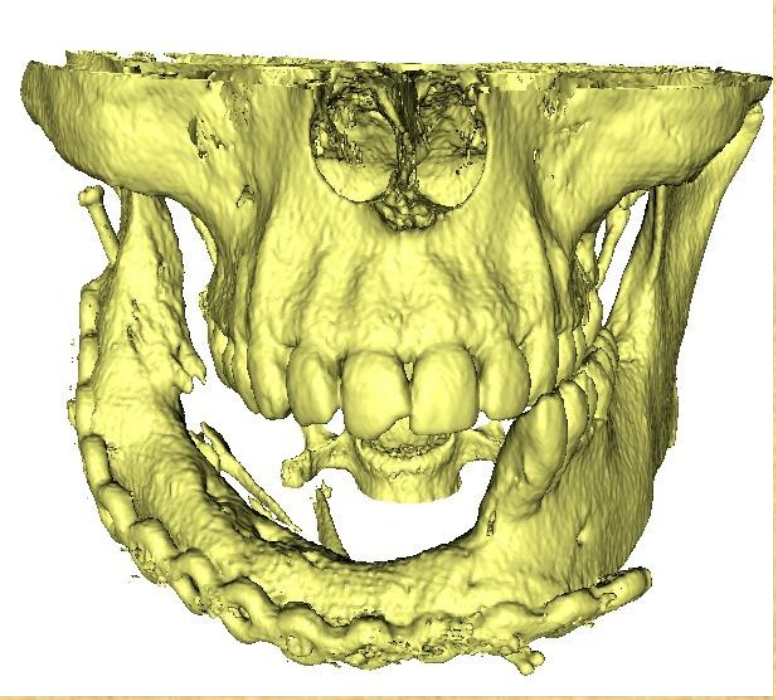
The treatment of facial asymmetry:

It is complex , and involves:

- accurate diagnosis
- planning
- awareness of treatment limitations and an understanding of patient expectations.

- Three methods that are routinely used for correcting bony deformities around the face include:
- osteotomies
- alloplastic enhancement
- Sculpting

- The development of a computer-generated 3D virtual model and computer-aided design and computer-aided manufacture of the inlay.



Cases presentation

Case 1

Case presentation:

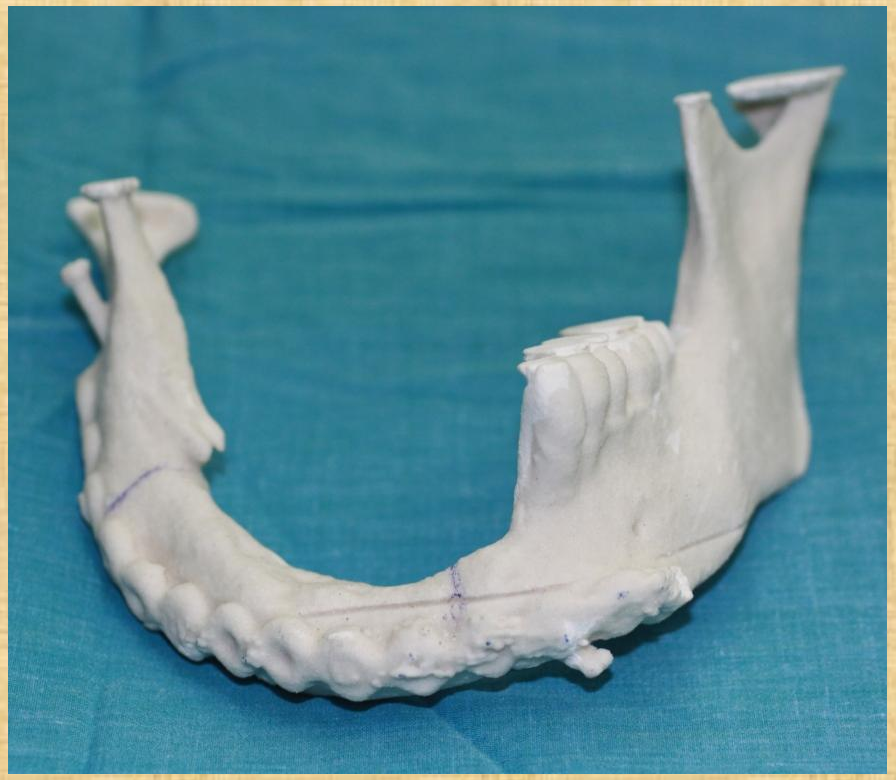
- a computerised tomography (CT) scan was requested in order to allow construction of a ‘virtual’ and conventional stereolithographic model

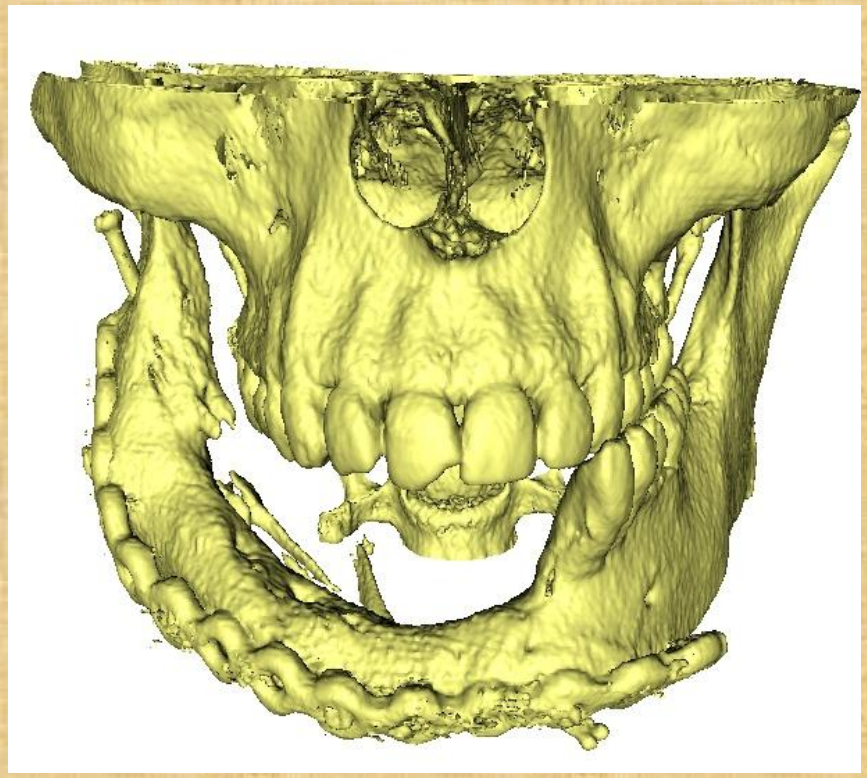
Manufacture of titanium onlay

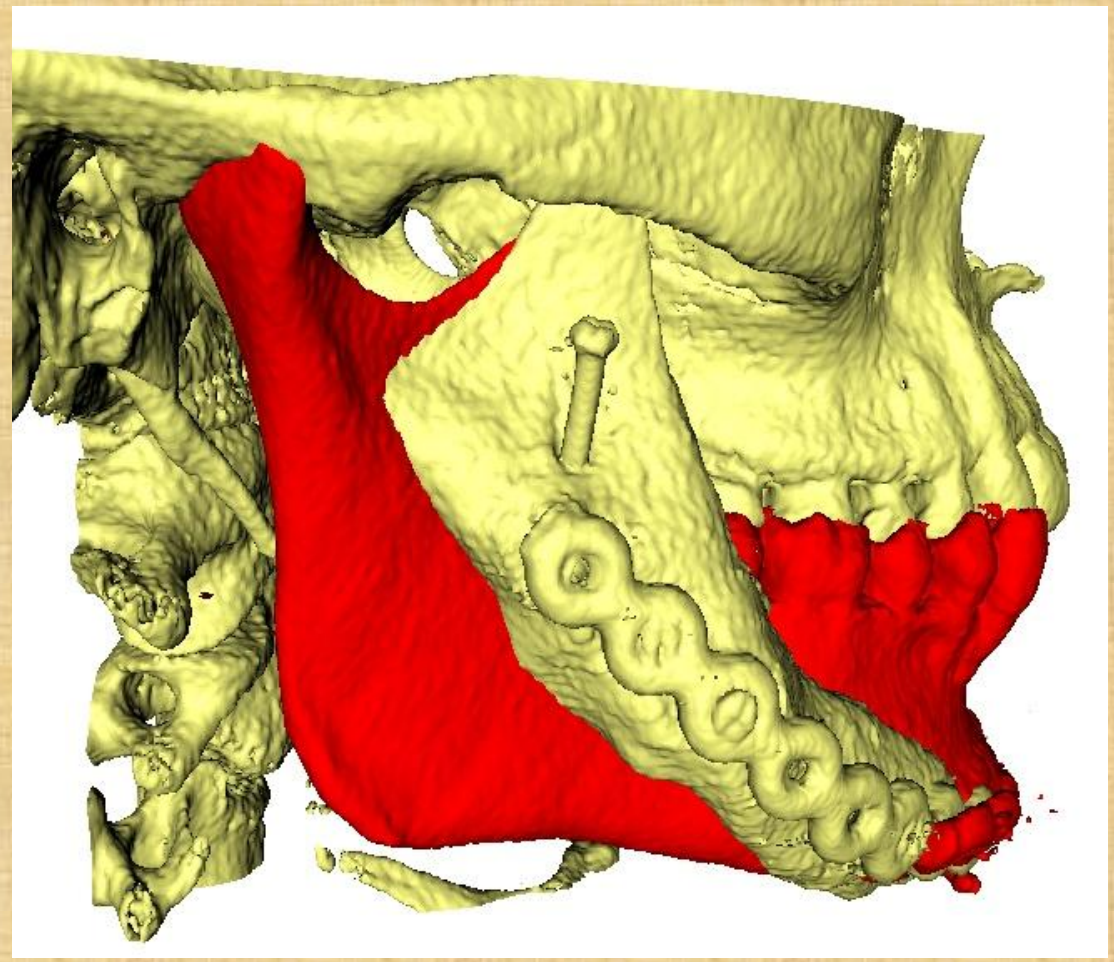
- 2 virtual steriolethographic models (3D printing) are produced , virtual mirroring and fabrication of a corrected model is performed, which is printed out.
- Waxing up – titanium investment and casting (Type 2 and 4) followed by sand plasting, then autoclaving.

Case 2

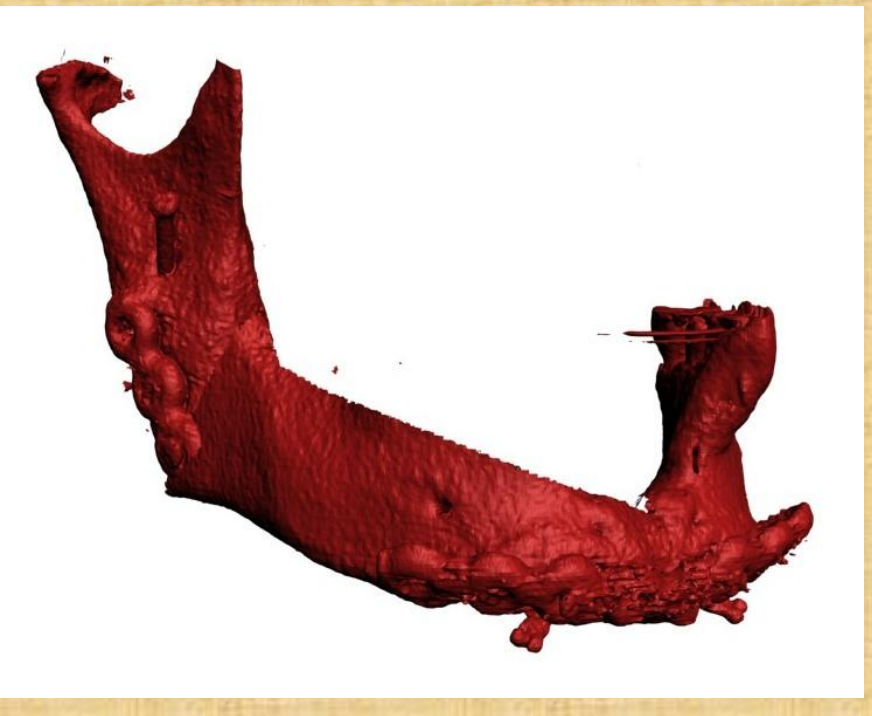
Pre surgery

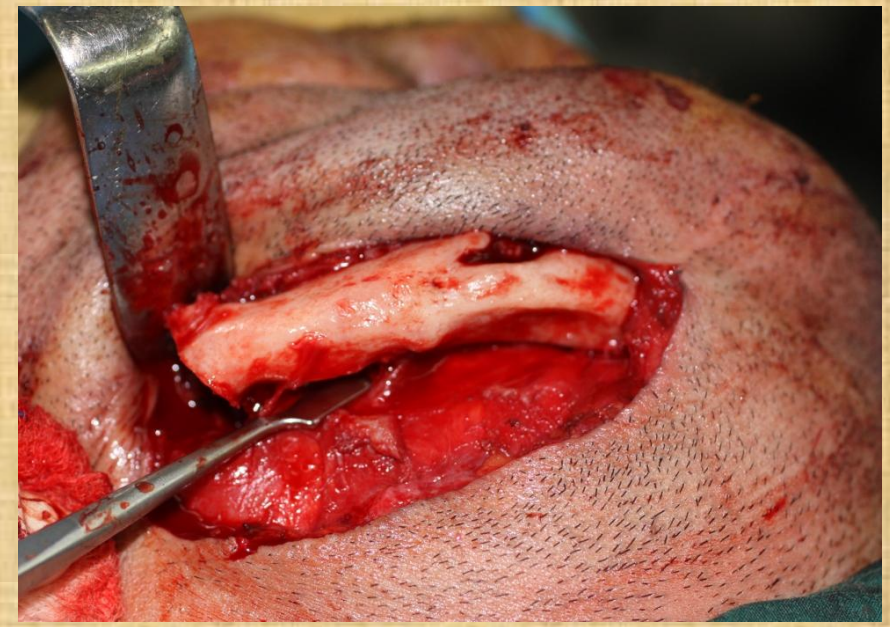






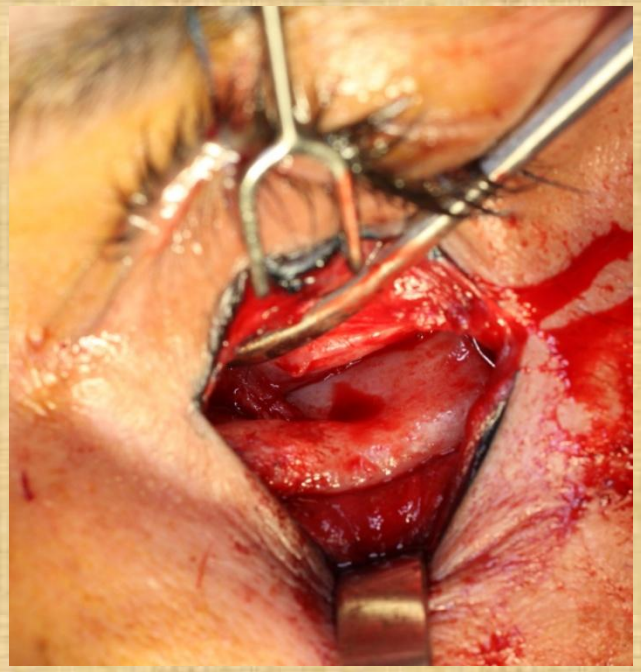
3 Digital images illustrating a ‘virtual’ stereolithographic

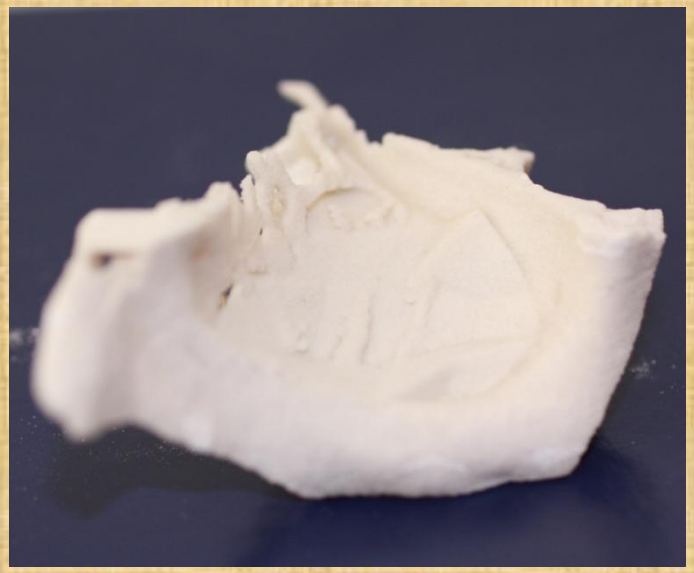


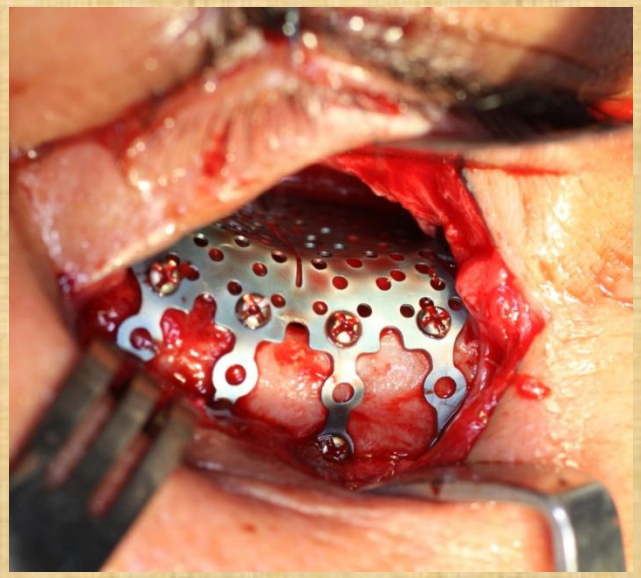


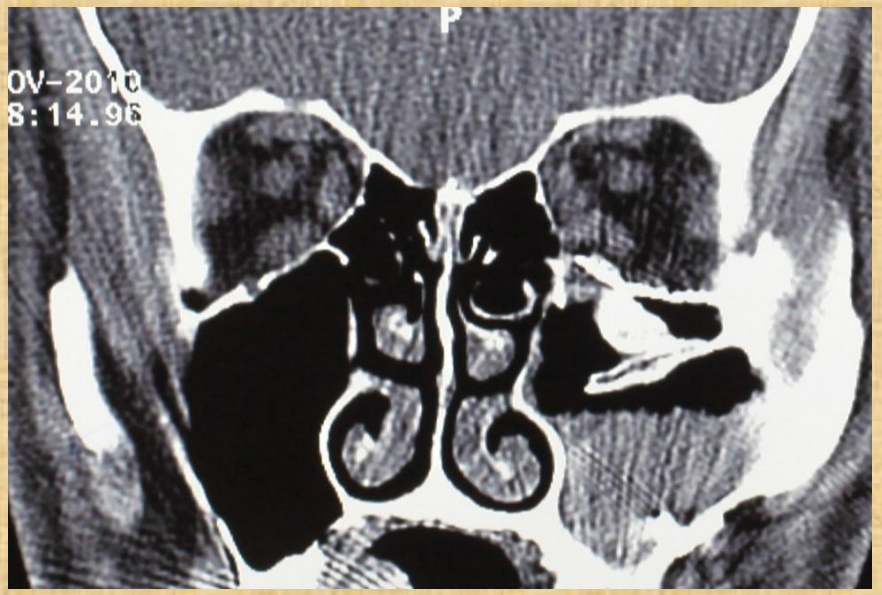
Case 3

- 2 virtual steriolethographic models are produced , digital mirroring and fabrication of a corrected model is performed, which is printed out.





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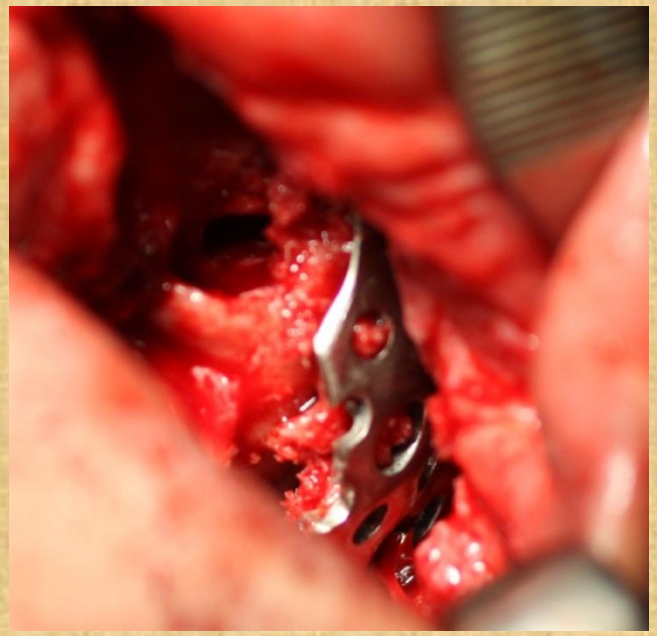
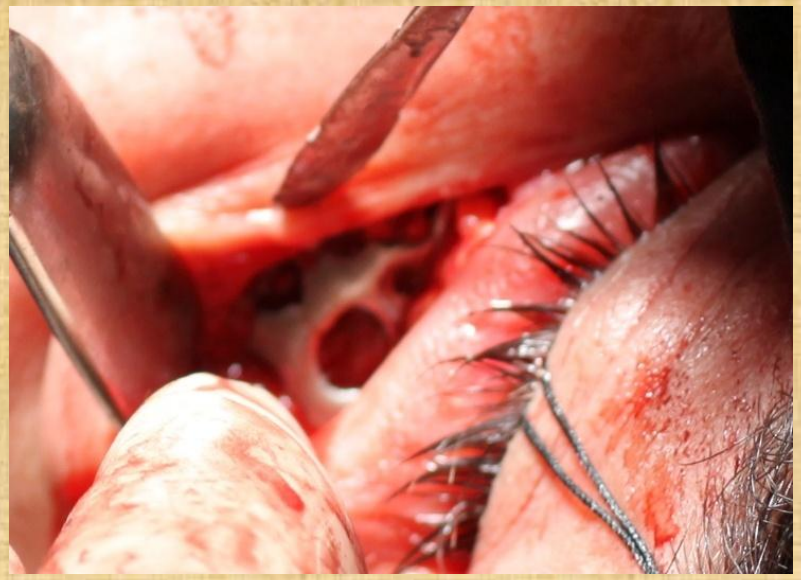
Case 4





Literature:

- Interest is mainly in nose, zygoma chin regions, using large pore polyethylene (Medpore) and titanium. *(Julian M et al 2009)*
- Facial alloplastic augmentation has a low incidence of complications *(Hinderer UT 1991, Epker 1994)*

Complications:

- poor choice of implant
- error in placement/displacement
- haematoma formation
- infection (most common, from 1 to 34%)

limitations

- Soft tissues.
- Mirroring technique limitations: Natural asymmetry in humans influences the accuracy of preoperative planning procedure (mean difference for face symmetry : F =0 .76 mm with a maximum modulus of 3.98 mm, and M= 0.65mm with a maximum modulus of 4.18 mm), with no difference in skull and face symmetry. (Marc Metzger et al 2007).
- Surgical challenges: accuracy depends on location, surgical approach, and matter of reconstruction
- Infections
- Bilateral defects

Conclusions

- the use of a custom-made titanium alloplast/prosthesis enabled successful treatment of a facial asymmetry.
- manufacturing a titanium structure of this size and complexity allowed to overcome many of the inadequacies of conventional surgical methods

Conclusions

- In cases of facial asymmetry it is important to evaluate each patient on an individual basis
- and also assess actual needs against perceived needs including psychological factors
- Further research and experience is needed to validate the accuracy and enhance the treatment outcome

Thank you