

Bone augmentation in preprosthetic surgery

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Implant therapy

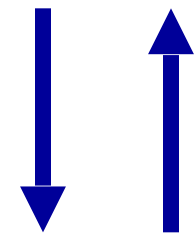
- In the past
 - Only in case of ideal anatomical circumstances
 - contraindication: bone-defect
- Present concept
 - The extension of bone defect do not contraindicate the setting of implants
(in 40%- of the cases previous bone augmentation)

Important factors of bone formation

Matrix

/collagene, trabecular pattern, bone substitutes/

Time



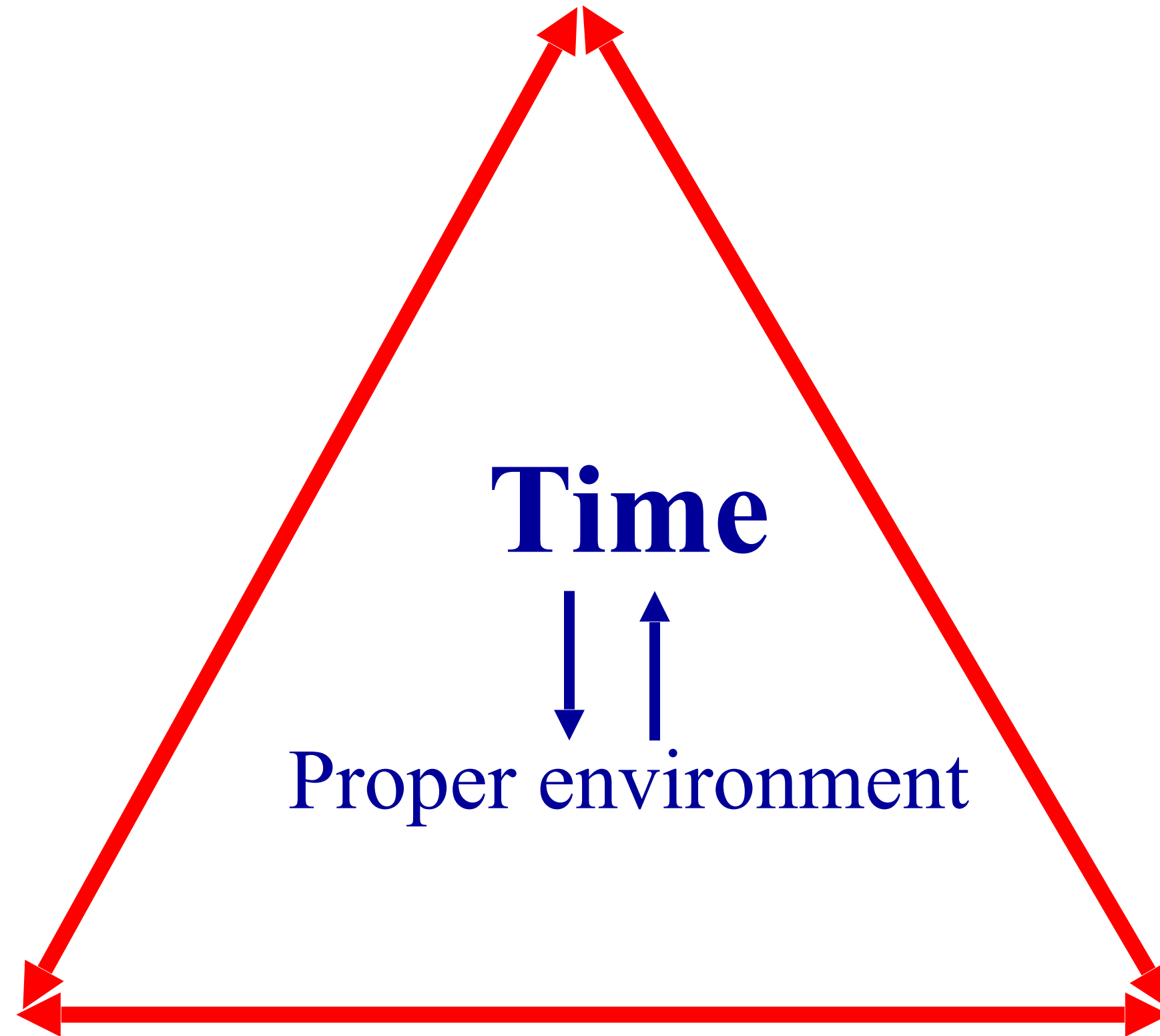
Proper environment

Cells

/osteoblasts, fibroblasts/

Growth factors

/BMP, PDGF, TGF- β , IGF/



Factors influencing bone formation

- Osteoinduction: All processes involving the activation of bone formation
- Osteoconduction: Proper framework, which determines and ensures the 3D guiding of bone
- Osteogenesis: osteogenetic potentiation

Autogenous bone

- Osteogenetic, osteoinductive, osteoconductive properties

- Gold Standard**- of the bone substitute materials

Healing procedurde of transplanted bone

- Local hyperaemia
- A number of osteoblast survives on the surface of the transplant with diffusion
- Angiogenesis- cappillary invasion into the matrix (providing necessary factors and cells for osteogenesis)
- Osteoclasts- they results from the beginning the resorption of the transplant from the periphery
- Continuous competition between the bone formation and the invasion of connective tissue

Autogenous graft types

- Spongius-, cortical bone or booth
- Bone formation by enchondral ossification (tibia, hip bone)
- Bone formation by desmoid ossification (skull, jaws)

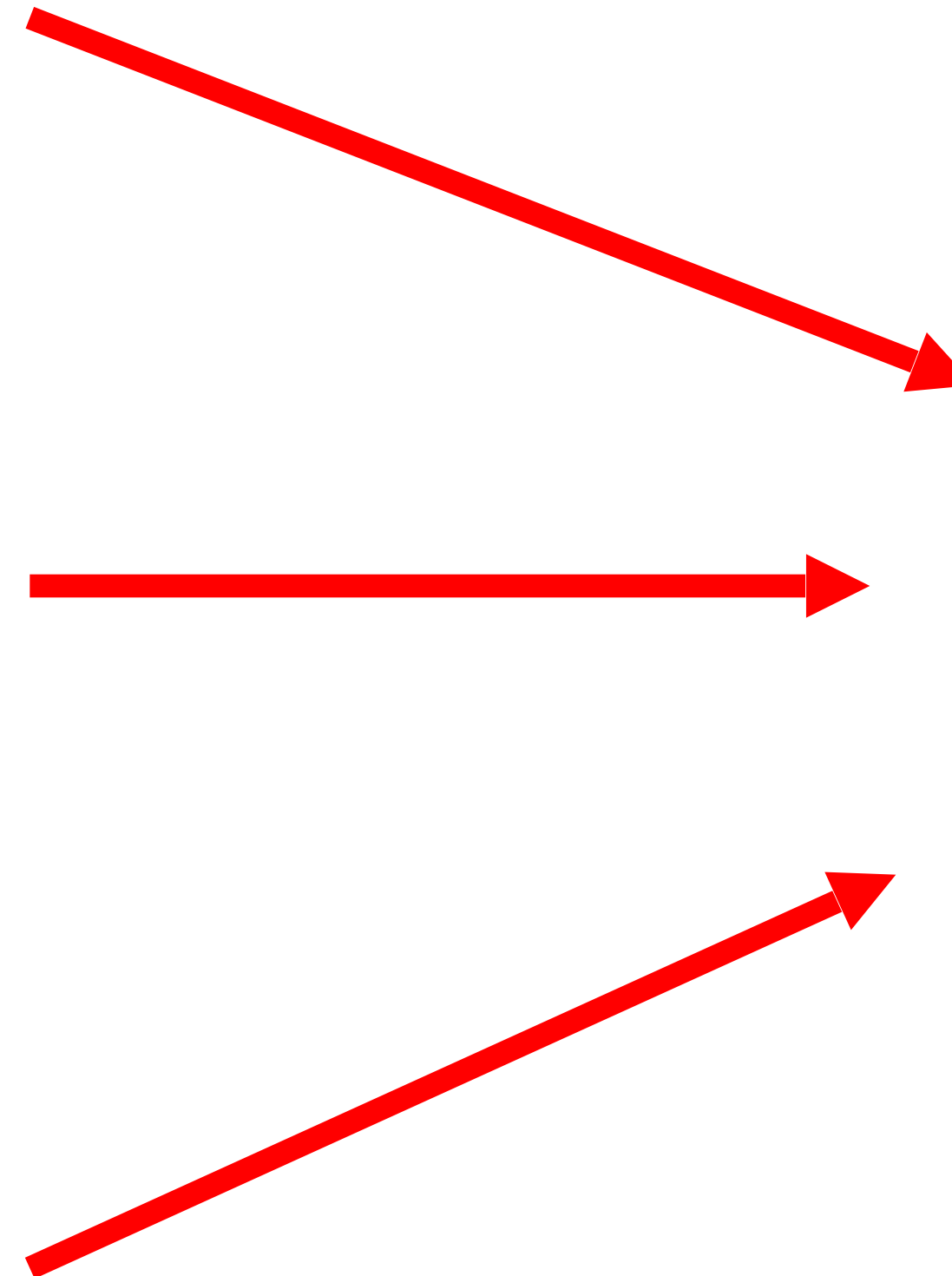
Autogenous graft types

Bone formation by desmoid
ossification

Bone formation by enchondral
ossification (tibia, hip bone)

Autogenous graft types

- Spongy bone
- Cortical bone
- Spongy and cortical bone



Grafting of the jaws

lateral augmentation

vertical augmentation

sinus floor grafting

Intraoral donor sites

- mentum (symphysis mandibulae)
- retromolar area
- maxillary tuber
- zygomatic bone

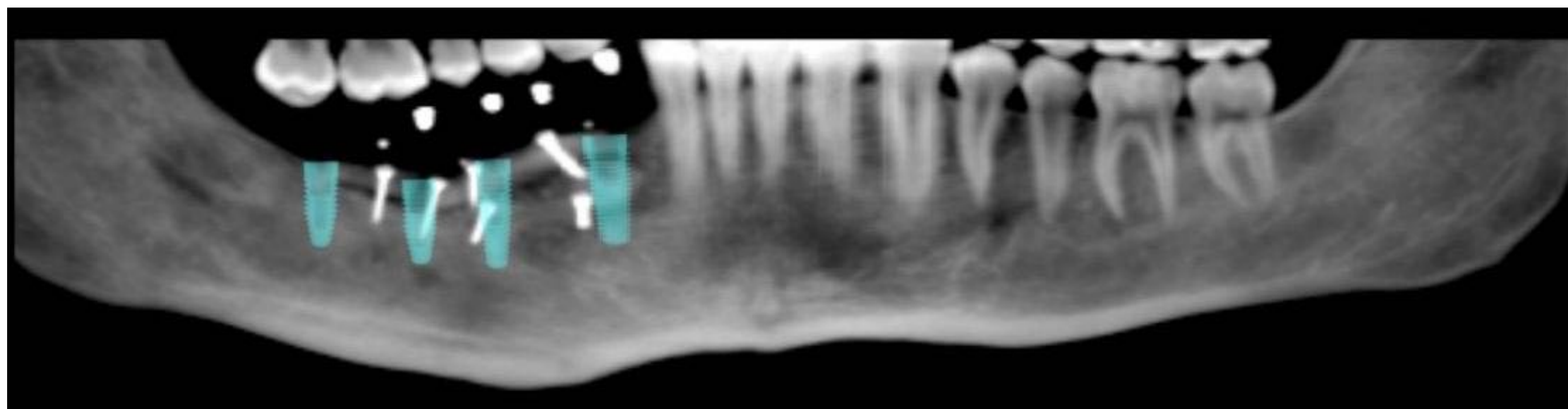
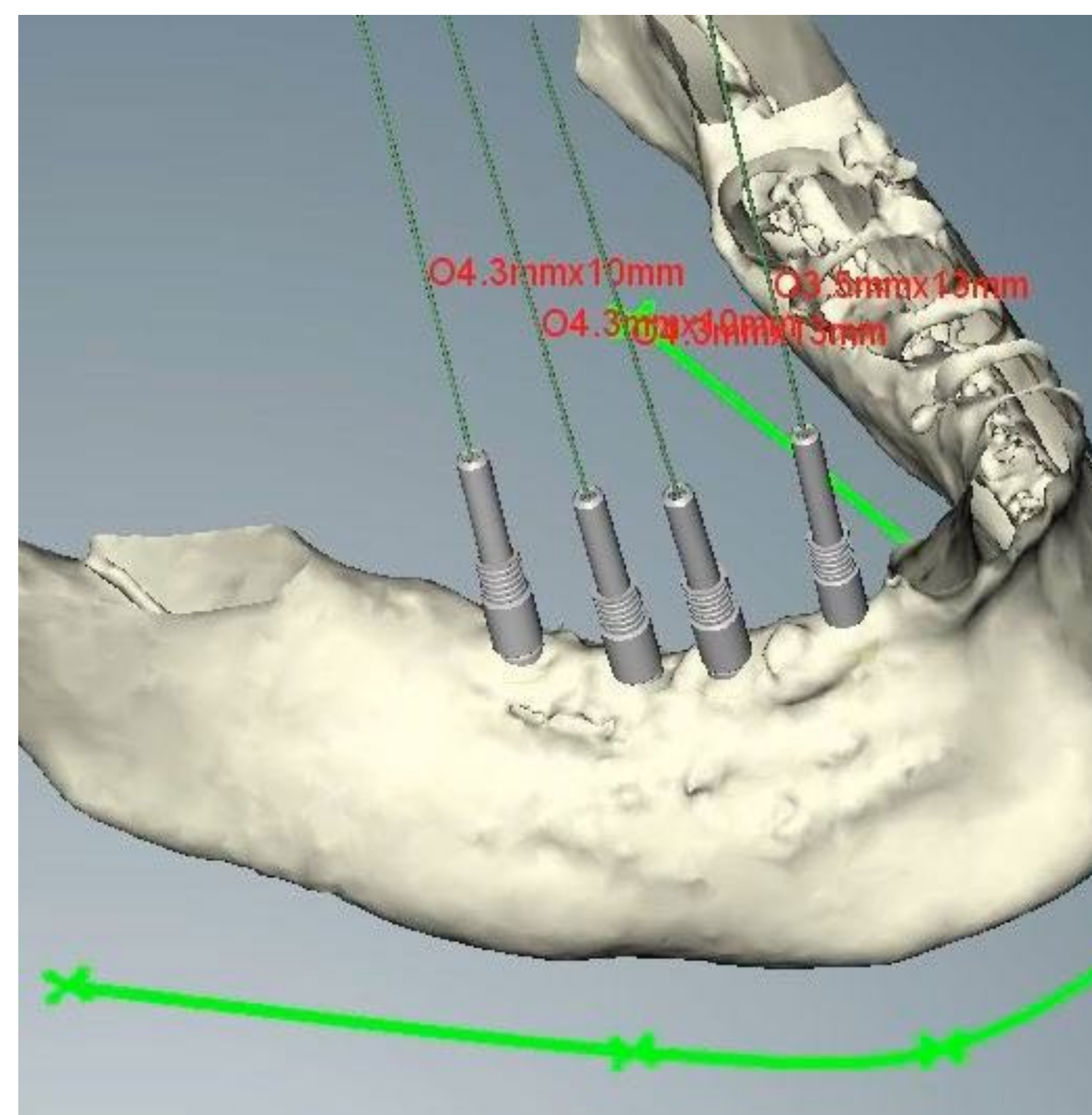
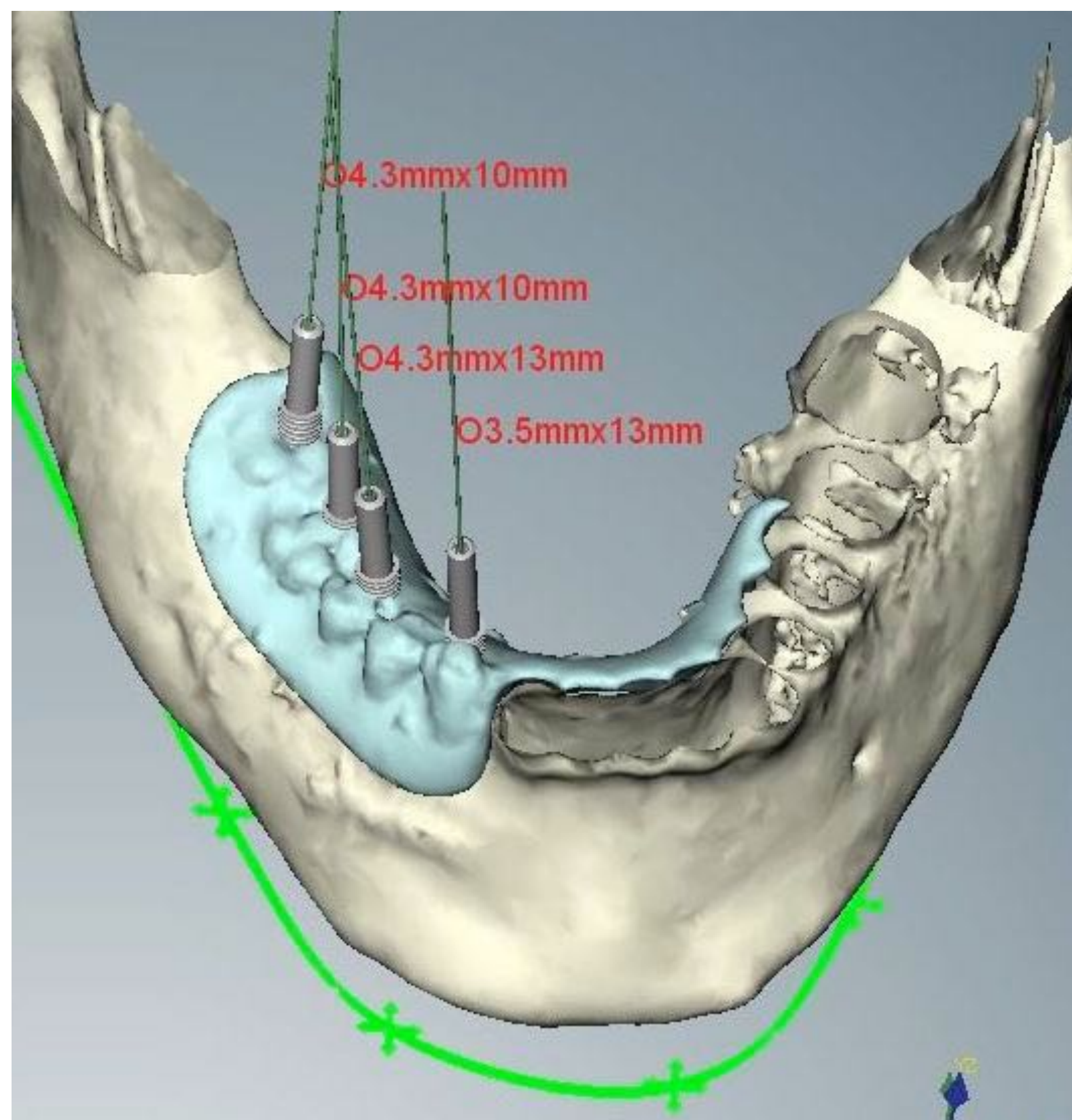
Mentum (symphysis mandibulae)

exploration of the chin

Retromolar area

Retromolar area

Bone harvesting from the retromolar area



Extraoral donor sites

- iliac crest (anterior, posterior)
- calvaria
- proximal epiphysis of the tibia

Iliac crest

The most common (reference) donor site

Advantage:

- „unlimited” graft volume
- spongy and cortical bone

Disadvantage:

- second operation site
- the most frequent donor site morbidity
- enchondral ossification
- high rate of resorption (even 40-60 %)
- intratracheal narcosis
- maxillofacial surgical background

The proximal epiphys of Tibia

Advantages:

- minimal invasive exploration
- 20- 25 cm³ spongious bone
- minimal postoperative complain

Disadvantages:

- second operation site
- only spongious bone
- maxillofacial surgical background

Calvaria

Advantages:

- favourable cosmetic result
- dense desmal bone
- low resorption rate
- minimal postoperative complaint

Disadvantages:

- second operation site
- donor site morbidity at „unfavorable” spot
- only cortical bone
- intratracheal narcosis
- maxillofacial surgical background