



GAK
EXPERTENDUELL

Augmentation

Dr. Margret Bäumer M.S.C., Köln



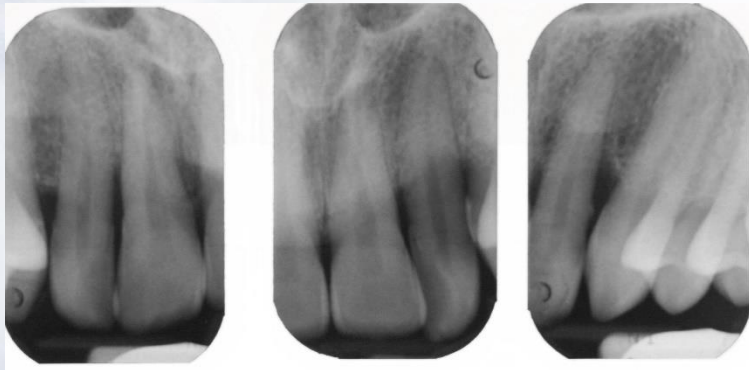
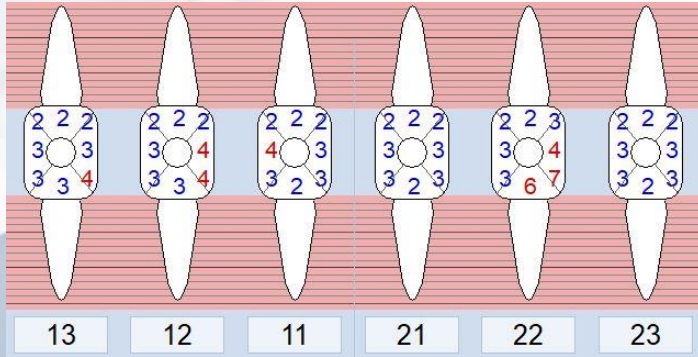
forcierte Extrusion

Dr. Sabine Hopmann, Lemförde

Dr. Margret Bäumer, M.S.D.(USA)



Jürgen



Michael



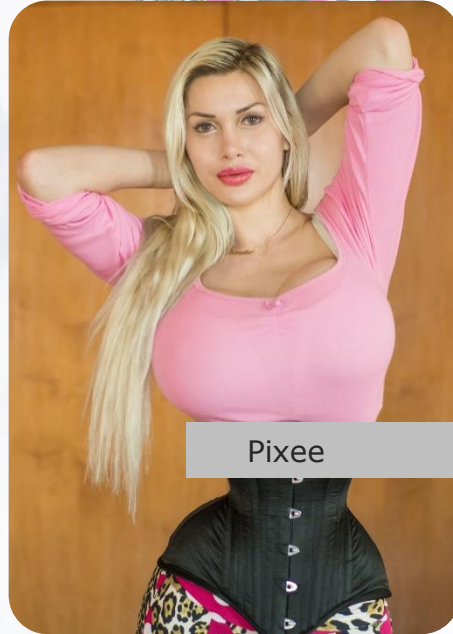
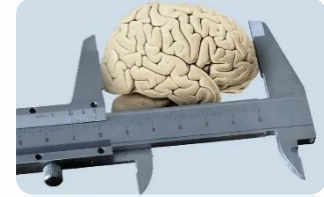
Aufbau Seminar:

14:00:	Einführung und Fallvorstellung
14:15 - 15:15h	Sabine stellt Tissue Master Concept vor
15:15 - 15:45h	Pause
15:45 - 16:45h	Maina stellt Augmentations-Methoden vor.
16:45 - 18:00h	Themenbereiche: Chirurgische klinische Kronenverlängerung Parodontale Vertikaldefekte Längsfraktur Extraktion unter Sinus
18:00 - 19:00h	Abendessen
19:00-20:00h	Fallauflösung und Zusammenfassung



Augmentation

Spätlateinisch = Vermehrung

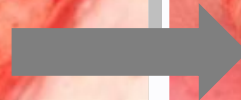
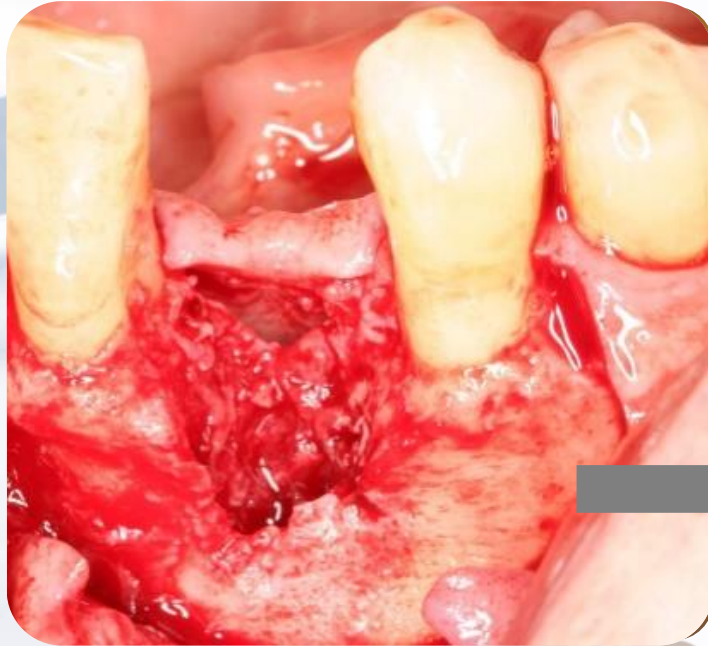


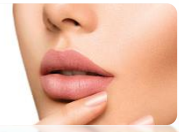
Pixee



Augmentation

Spätlateinisch = Vermehrung





TMC – nein, Danke !

1. Zahn fehlt



3. Zahn ankylosiert



2. Bukkale Lamelle fehlt



5. TMC nicht nötig

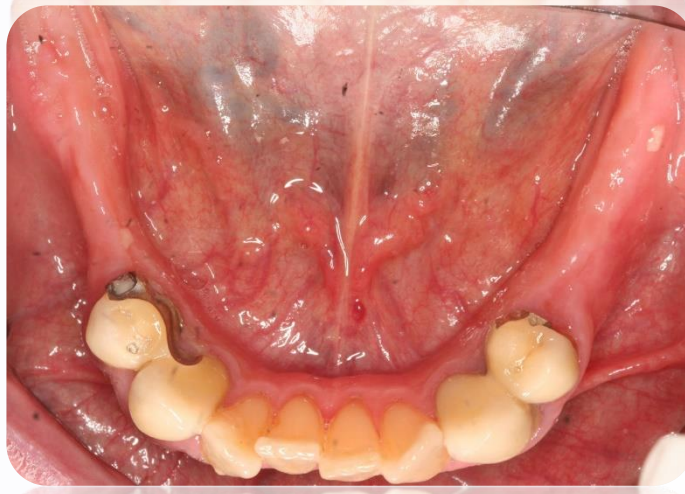


4. Pt will nicht



1. Zahn fehlt

Resorption



1. Zahn fehlt

Implantat möglich ?

Welche Frage interessieren Chirurgen & Überweiser ?

- 1. Wie lange dauert es ?**
- 2. Wie lange hält das ?**
- 3. Wie schmerzhaft ist das ?**
- 4. Was kostet das ?**
- 5. Wie funktioniert das eigentlich ?**

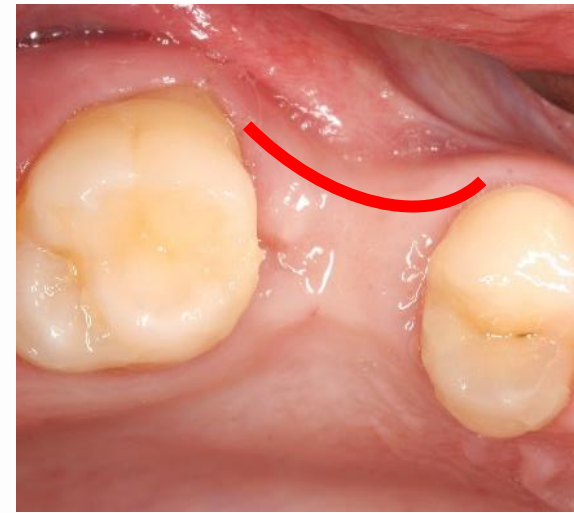
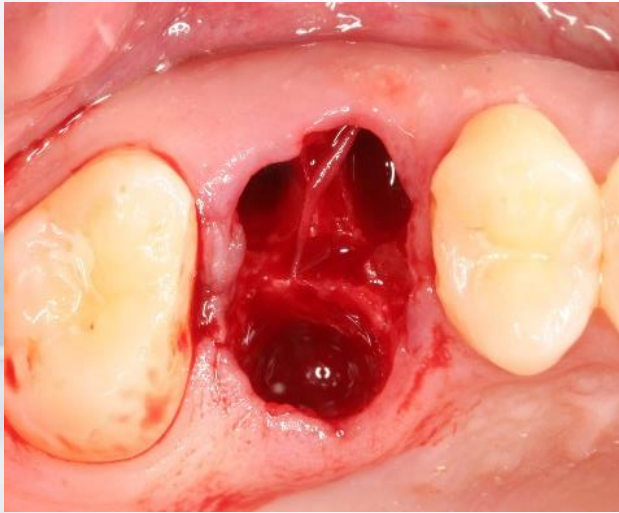


Koagel

Organische Matrix

Geflechtknochen

Lamellärer Knochen



Knochenremodelation

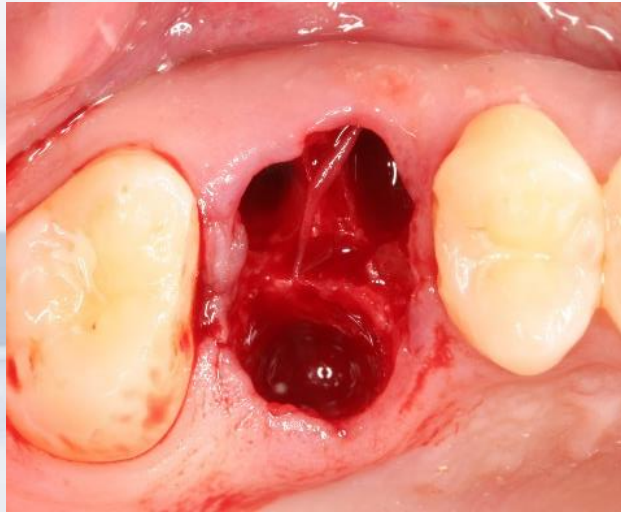


Koagel

Organische Matrix

Geflechtknochen

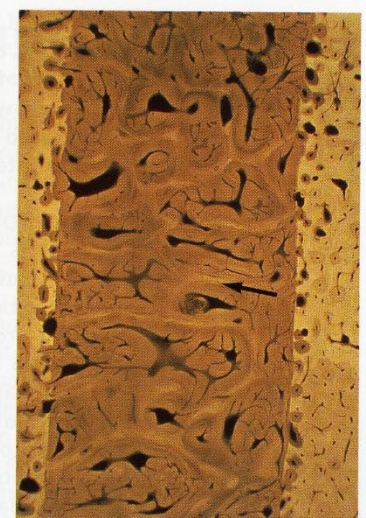
Lamellärer Knochen



3-19



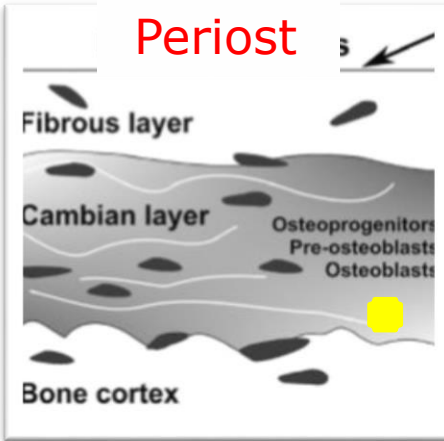
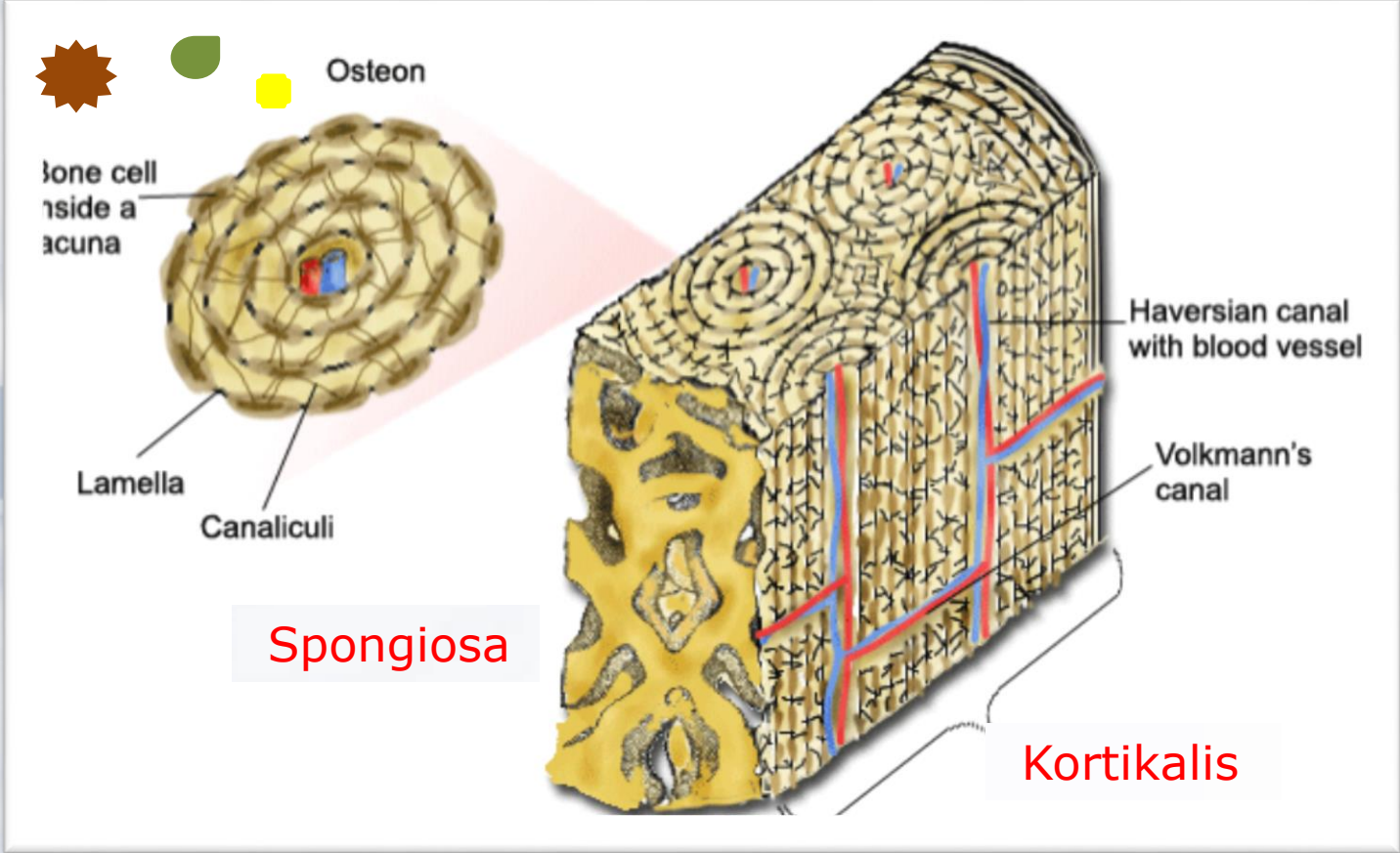
3-20



3-21

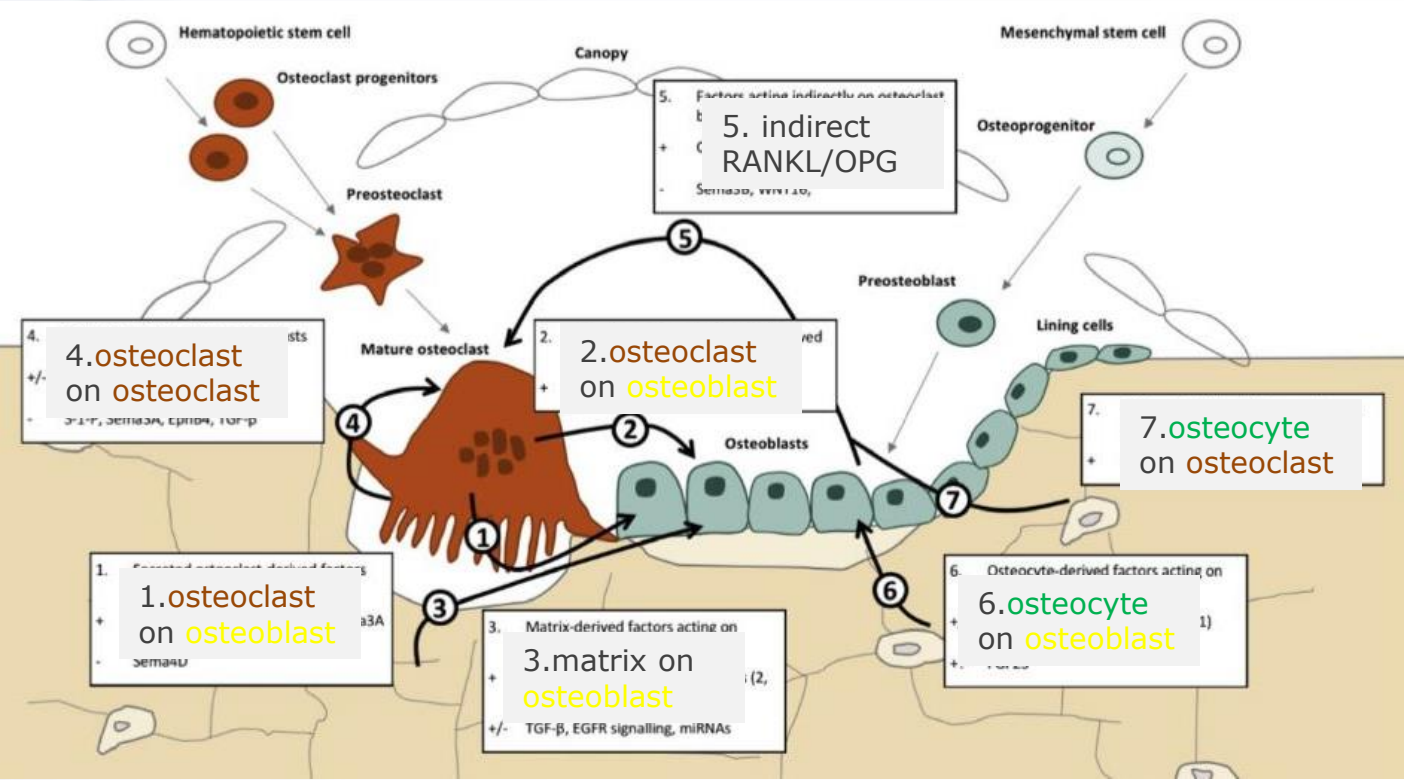
turnover





osteoclast
osteocyte
osteoblast





turnover

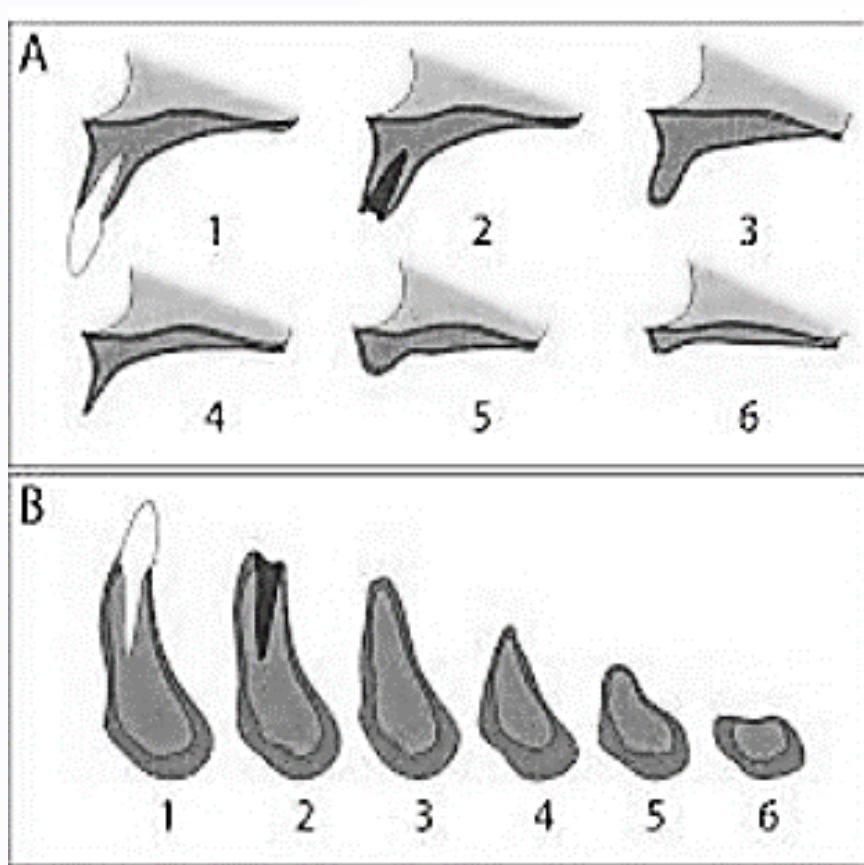


coupling

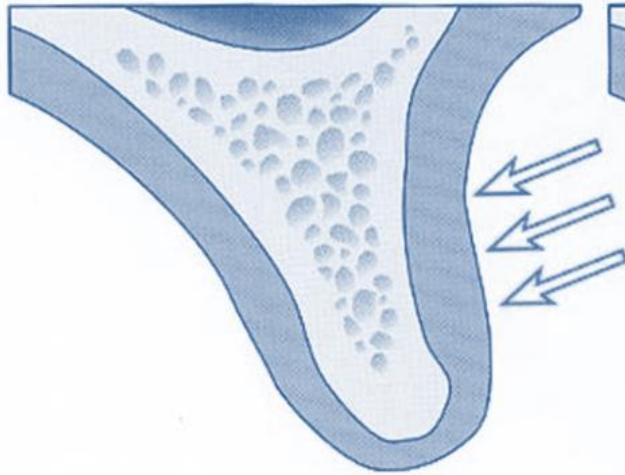




Stage 1: preextraction,
 Stage 2: postextraction,
 Stage 3: high well-rounded ridge,
 Stage 4: knife-edge shaped ridge,
 Stage 5: low well-rounded ridge,
 Stage 6: depressed bone level.

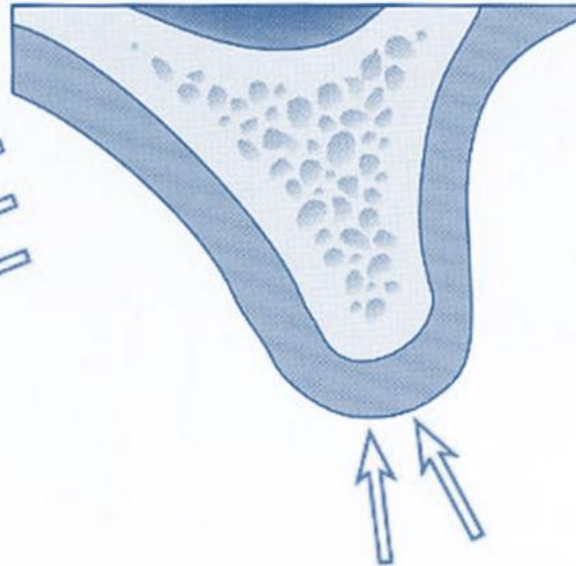


Class I



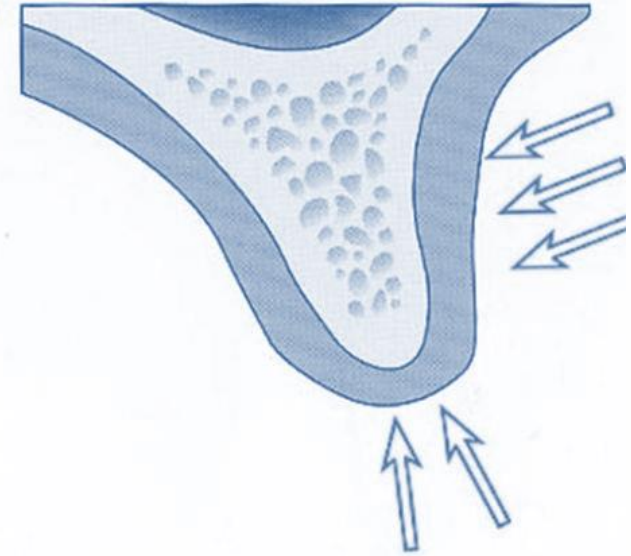
horizontal

Class II



vertikal

Class III



horizontal
&
vertikal

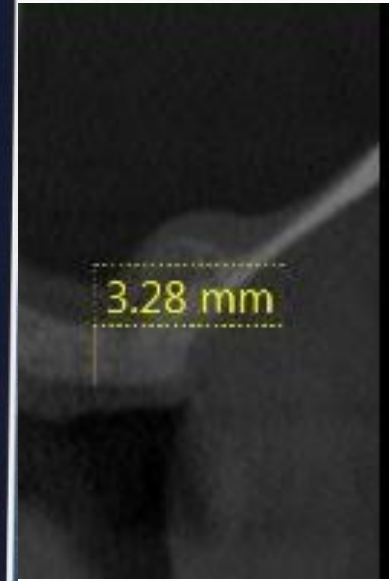


Typ A

Class I

Class II

Class III



Special: Sinus



Typ B



Typ C



Typ D

Special: Sinus



Risikoprofil des Patienten

Ästhetische Risikofaktoren

Patientengesundheit

Ästhetische Ansprüche
des Patienten

Höhe der Lachlinie

Gingivaler Biotyp

Form der Zahnkronen

Infektionen an
Implantationsstelle

Knochenhöhe am
angrenzenden Zahn

Restorativer Status
des Nachbarzahns

Breite der Zahnücke

Weichgewebsanatomie

Knochenanatomie des
Alveolarkamms



Abb. 4: Beurteilung ästhetischer Risikofaktoren bei
Therapy in the Esthetic Zone, Single-Tooth Repla

Special: Front



Entscheidungsbaum



Legende:



Prothetische Position



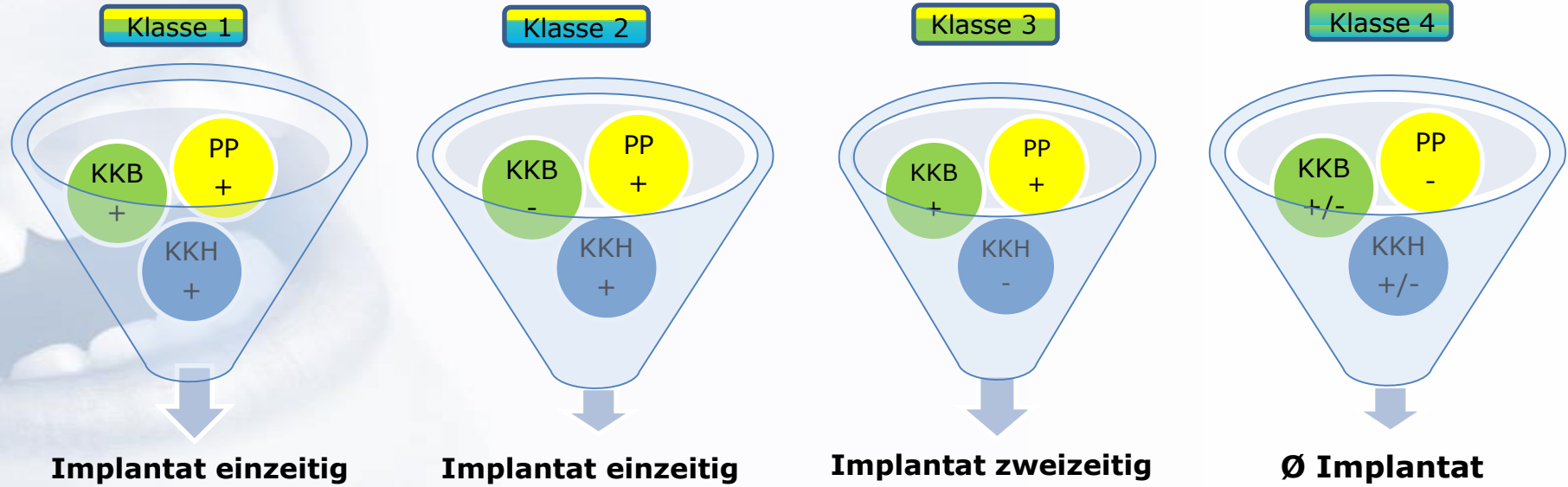
Kieferkammbreite. 5



Kieferkammhöhe. 6



Entscheidungsbaum



≤ 3 mm
Implantat zweizeitig

Sinus: ≥ 3 mm
Implantat einseitig

Legende:



Prothetische Position



Kieferkammbreite. 5



Kieferkammhöhe. 6



2 Fragen

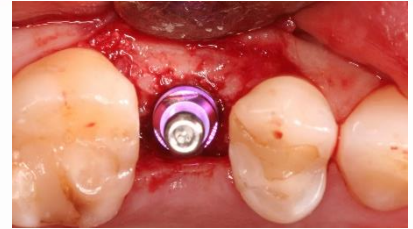
Kann ich **direkt** implantieren und augmentieren?

Einzeitiges Vorgehen

Muss ich erst augmentieren und kann **später** implantieren?

Zweizeitiges Vorgehen

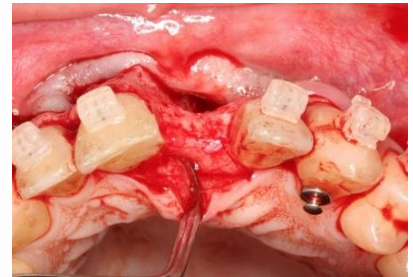
Klasse 1



Klasse 2



Klasse 3



Klasse 4



Wie erreiche ich Stabilität ?

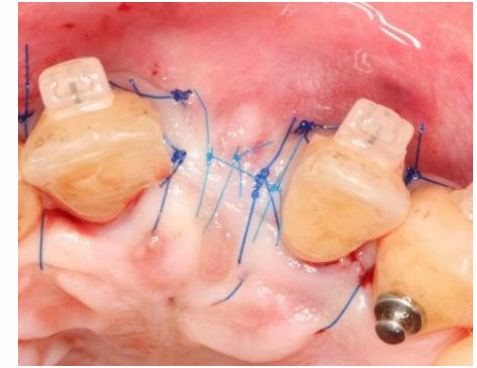
4 Voraussetzungen:

P. primary wound coverage (passive)

A. Angiogenesis

S. Space Maintenance

S. Stability



Wie erreiche ich Stabilität ?

über ein Augmentat

Block

homolog

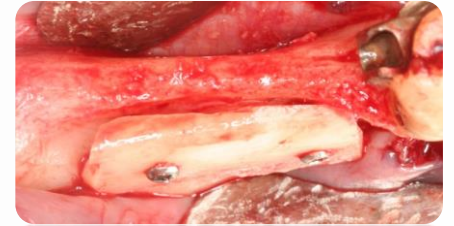
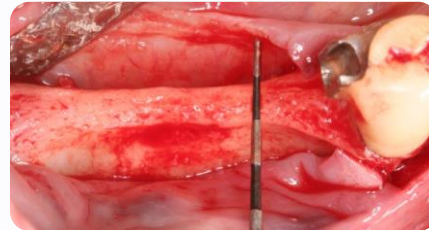
heterolog

„xenogen“

≠

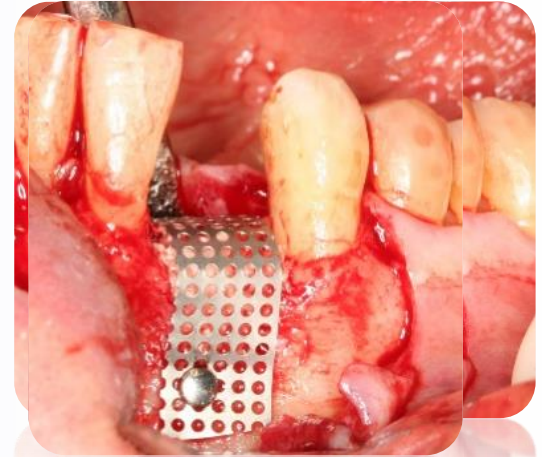
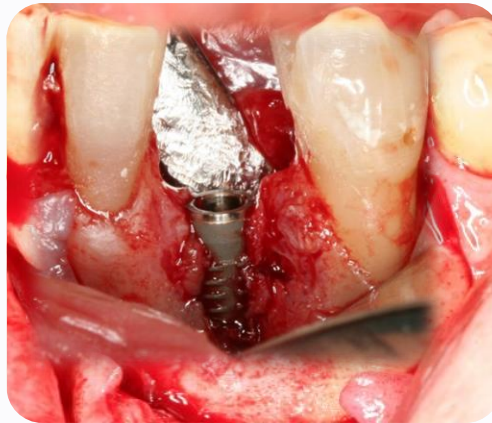
partikulär

(autolog – heterolog – xenogen – alloplastisch)



Wie erreiche ich Stabilität ?

über ein Augmentat



partikulär

(autolog – heterolog –
xenogen – alloplast



Woraus besteht das Augmentat ?



Autolog	eigener Knochen
Homolog	allogen - Mensch
Heterolog	xenogen - Tier
Alloplastisch	synthetisch

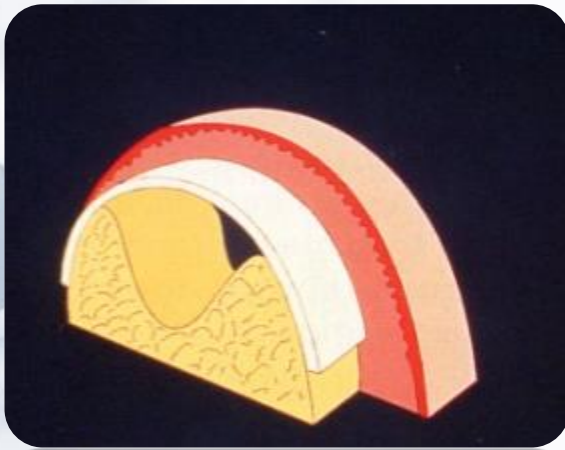
osteoinduktiv - osteokonduktiv

biokompatibel - biodegradierbar

angiogen - stabil - handhabbar - sicher



Woraus besteht die Membran ?



resorbierbar
nicht resorbierbar

Autolog	eigenes Gewebe „APC“
Homolog	allogen - Mensch
Heterolog	xenogen - Tier
Alloplastisch	synthetisch

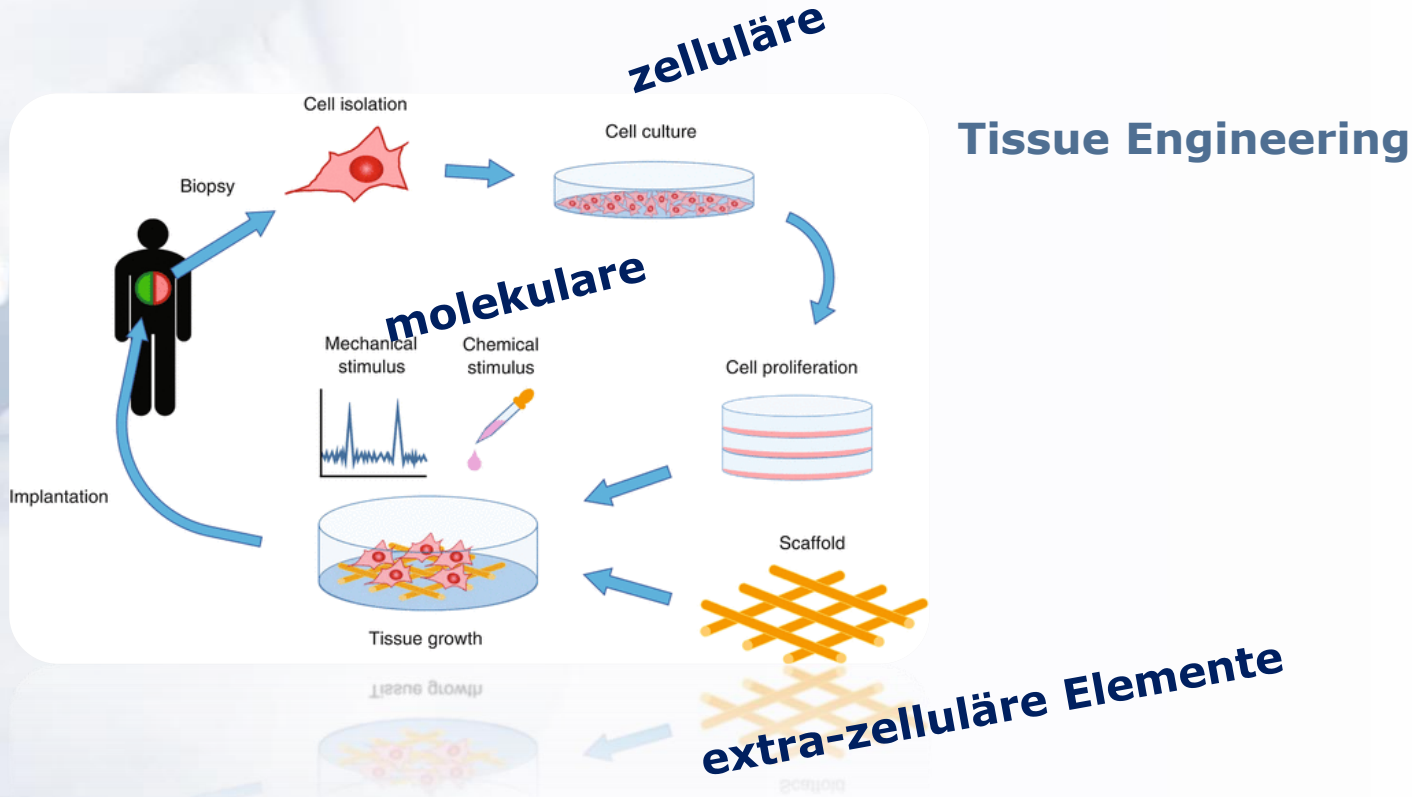
osteinduktiv - osteokonduktiv

biokompatibel - biodegradierbar

angiogen - stabil - handhabbar - sicher



Woraus besteht die Membran & das Augmentat der Zukunft ?



Bioaktive Substanzen heute schon ?

91% Water
7% Proteine (**fibrinogen** u.a.)
2% nutrients/hormones/electrolytes



PLASMA 55%

BUFFY COAT <1%
(WHITE BLOOD CELLS AND PLATELETS)

RED BLOOD CELLS 45%

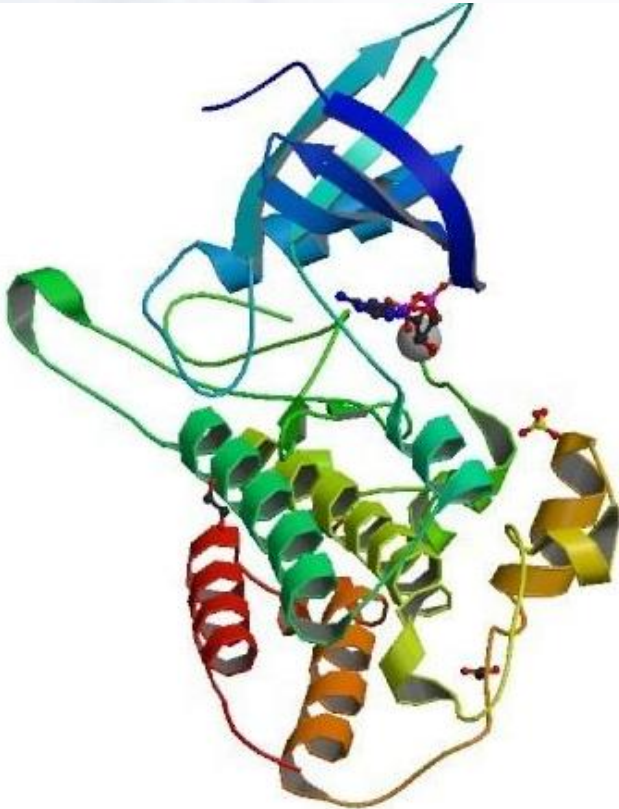
APC's

Autologous **platelet concentration**

PRPlasma = **PRGF** = **P-PRP**



Bioaktive Substanzen heute schon ?



BMP´s

rhPDGF-BB

FGF / VEGF / IGF-1 / TGF- β 1

Wnt3a & NGF

EMD



Bioaktive Substanzen heute schon ?

TABLE 1 Summary of the available clinical evidence on the use of bioactive agents for different bone regeneration applications. Green was used when RCTs and prospective controlled studies have overall shown positive outcomes; yellow was used when contrasting results have been reported or when <3 RCTs/prospective studies are available; red was used when no effect was reported or no RCT/prospective controlled study investigated the specific application. TCP, tricalcium phosphate; HA, hydroxyapatite; AB, autologous bone; DBBM, deproteinized bovine bone mineral

	Ridge preservation	Ridge augmentation	Peri-implant bone defects	Sinus augmentation
BMP-2	3 RCTs reported that BMP-2/ACS or BMP-2+TCP/HA enhance histologically/radiographically ridge preservation compared to the carrier/graft alone.	3 RCTs suggest that rhBMP-2/ACS combined with osteoconductive grafts and/or a titanium mesh is a viable option for ridge augmentation with comparable radiographic/histological outcomes to AB+mesh or DBBM	1 RCT reported no advantage on adding rhBMP-2 to DBBM+membrane for lateral augmentation concomitant to implant placement	RCTs and prospective controlled studies showed contrasting results on the benefit of BMP-2 (combined with ACS or bone grafts) for sinus augmentation before implant placement
PDGF-BB	5 RCTs/prospective controlled studies with heterogeneous results on the benefit of rhPDGF-BB-loaded bone grafts	1 prospective study documenting ridge augmentation with PDGF-BB combined with different grafts	No clinical studies	1 RCT showed that adding PDGF-BB to DBBM could accelerate the healing period
FGF-2	No clinical studies	No clinical studies	No clinical studies	No clinical studies
VEGF	No clinical studies	No clinical studies	No clinical studies	No clinical studies
EMD	1 prospective study that did not report a significant effect of adding EMD to different bone grafts	No prospective controlled studies	No clinical studies	2 prospective controlled studies showed no significant effect of adding EMD to different bone grafts
PRP	>10 RCTs/prospective controlled studies reported heterogeneous results with no clear benefit, particularly when PRP was associated with bone grafts and/or compared to positive controls	4 RCTs reported heterogeneous results when adding PRP to GBR or different grafts	1 RCT showing increased bone height and density when adding PRP to DBBM	>10 RCTs/prospective controlled studies reporting conflicting outcomes when PRP was added to different grafts before or in concomitance to implant placement
PRF	>10 RCTs/prospective controlled studies reported heterogeneous results with no clear benefit, particularly when PRF was associated with bone grafts and/or compared to positive controls	1 RCT reported that PRF reduced the resorption of autologous bone grafts in horizontal alveolar ridge augmentation	No controlled clinical studies on the regeneration of peri-implant defects	9 RCTs/prospective controlled studies reporting conflicting outcomes when PRF was added to different grafts or used alone before implant placement
PRGF	2 RCTs with contrasting results when comparing the use of PRGF to unassisted socket healing	No available RCTs/prospective controlled studies	1 controlled prospective study showed reduced radiographic peri-implant bone loss when PRGF was applied together with immediate post-extraction implants	Only 1 split-mouth study in 5 patients with histology only in 2 patients



Bioaktive Substanzen heute schon ?

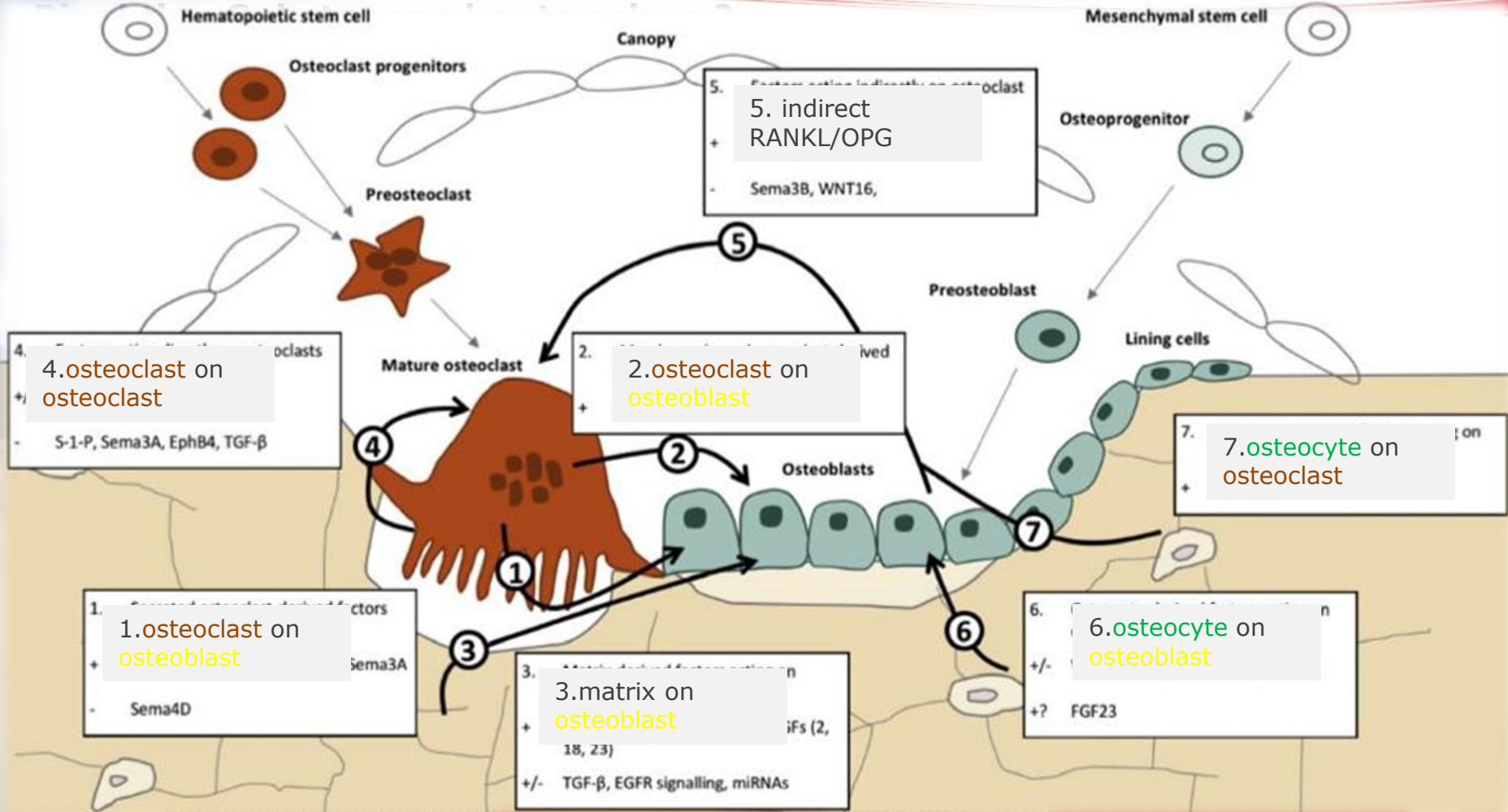
TABLE 1 Summary of the available clinical evidence on the use of bioactive agents for different bone regeneration applications. Green was used when RCTs and prospective controlled studies have overall shown positive outcomes; yellow was used when contrasting results have been reported or when <3 RCTs/prospective studies are available; red was used when no effect was reported or no RCT/prospective controlled study investigated the specific application. TCP: tricalcium phosphate; HA: hydroxapatite; AB: autologous bone; DRBM: demineralized bovine bone mineral

	Ridge preservation	augmentation	peri-implant defects	sinus lift
BMP's	Green	Green	Red	Yellow
PDGF	Yellow	Yellow	Red	Yellow
FGF	Red	Red	Red	Red
VEGF	Red	Red	Red	Red
EMD	Red	Red	Red	Red
RPR	Yellow	Yellow	Yellow	Yellow
PRF	Yellow	Yellow	Red	Yellow
PRGF	Yellow	Red	Yellow	Red

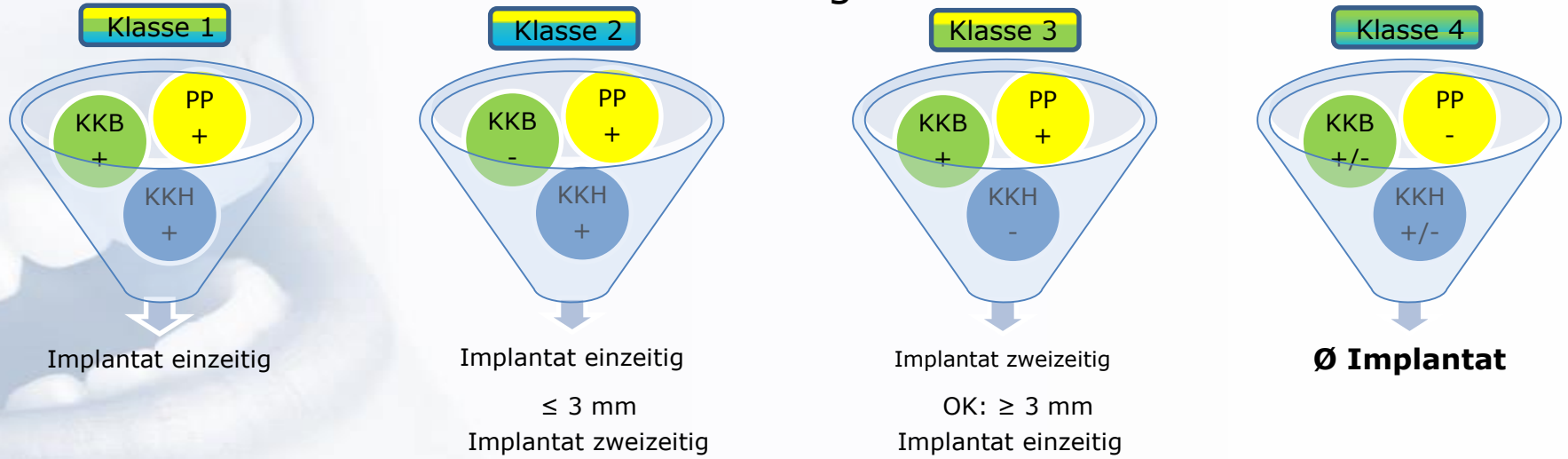
Fazit: keine Evidenz



Augmentation



Entscheidungsbaum



Legende:

Prothetische Position



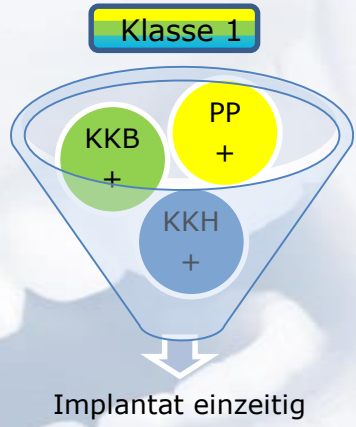
Kieferkambbreite. 5



Kieferkammhöhe. 6



Entscheidungsbaum



Legende:

Prothetische Position



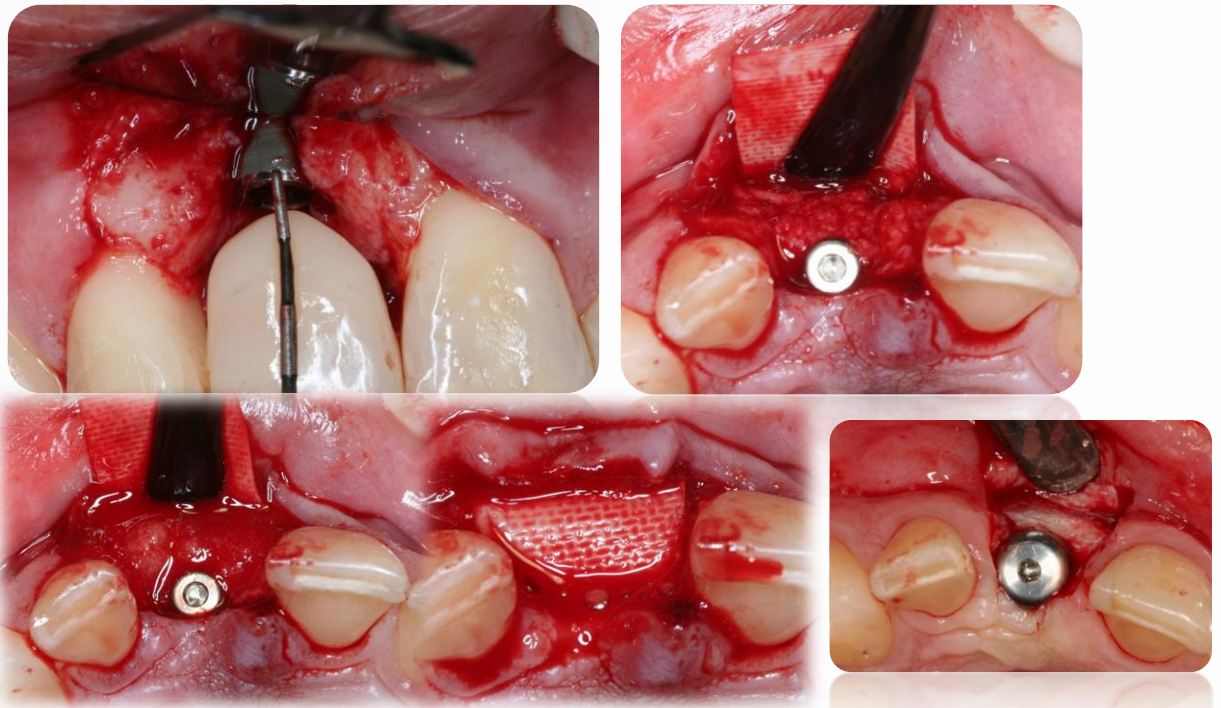
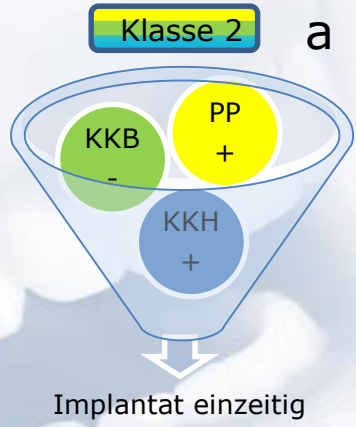
Kieferkambbreite. 5



Kieferkammhöhe. 6



Entscheidungsbaum

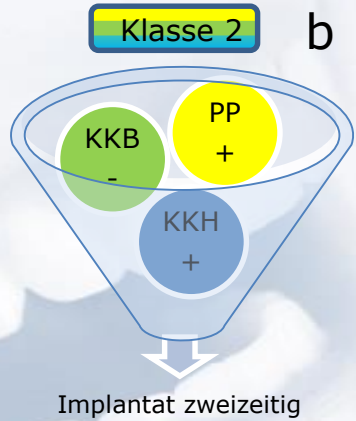


Legende:

- Prothetische Position
- Kieferkambbreite. 5
- Kieferkammhöhe. 6



Entscheidungsbaum



Legende:

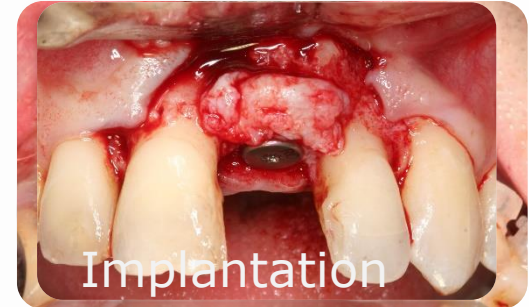
Prothetische Position



Kieferkambbreite. 5



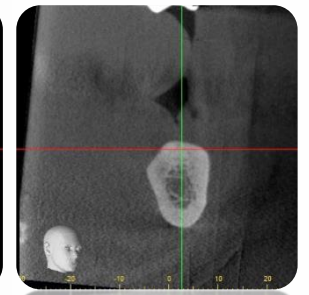
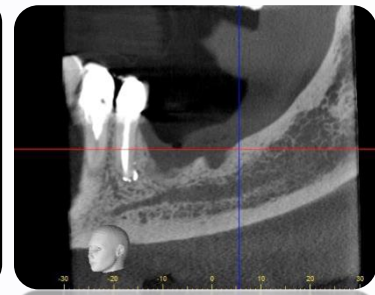
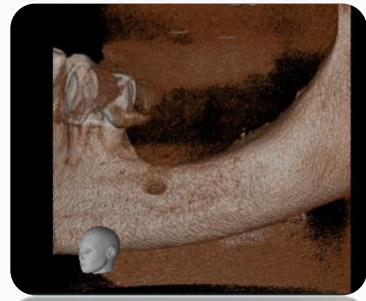
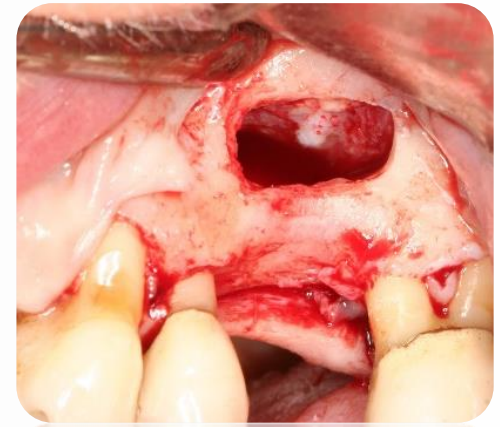
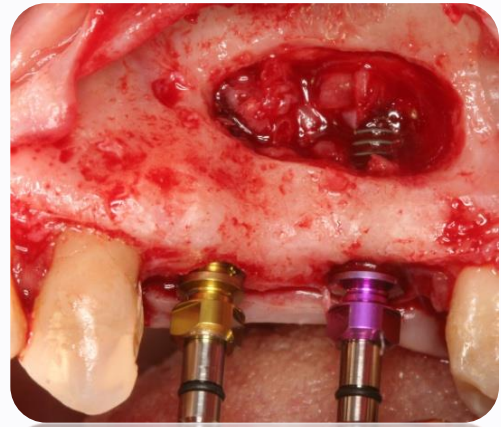
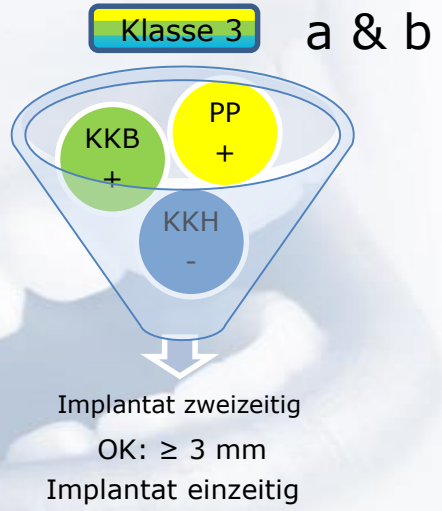
Kieferkammhöhe. 6



REX Piezoimplants, Mectron



Entscheidungsbaum



Legende:

Prothetische Position



Kieferkammbreite. 5



Kieferkammhöhe. 6



Überweisung zum Kieferchirurgen



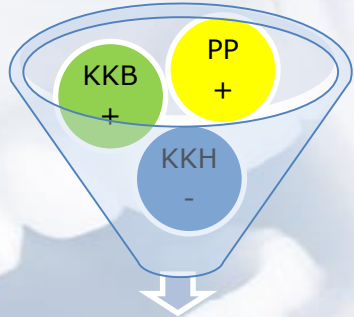
Risiken und Komplikationen

Vergleich von Symptomen und Genesungszeit

Procedure Symptoms	Sinus Augmentation	Surgical Extraction of Wisdom Tooth ⁷
Average pain	5	7
Swelling	5	4
Mouth opening	3	5
Work attendance	4	4
Inability to eat	4	6

Klasse 3

a & b



Implantat zweizeitig

OK: ≥ 3 mm

Implantat einzeitig

Legende:

Prothetische Position



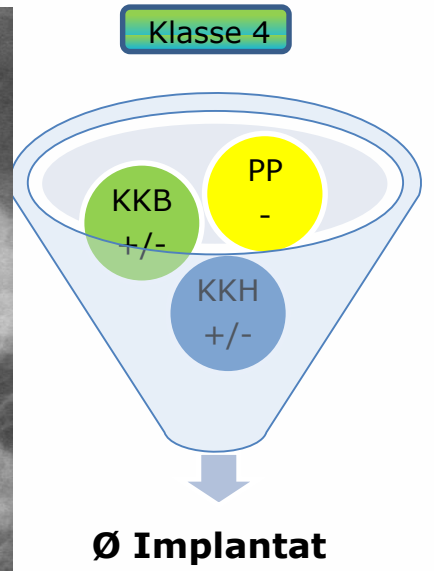
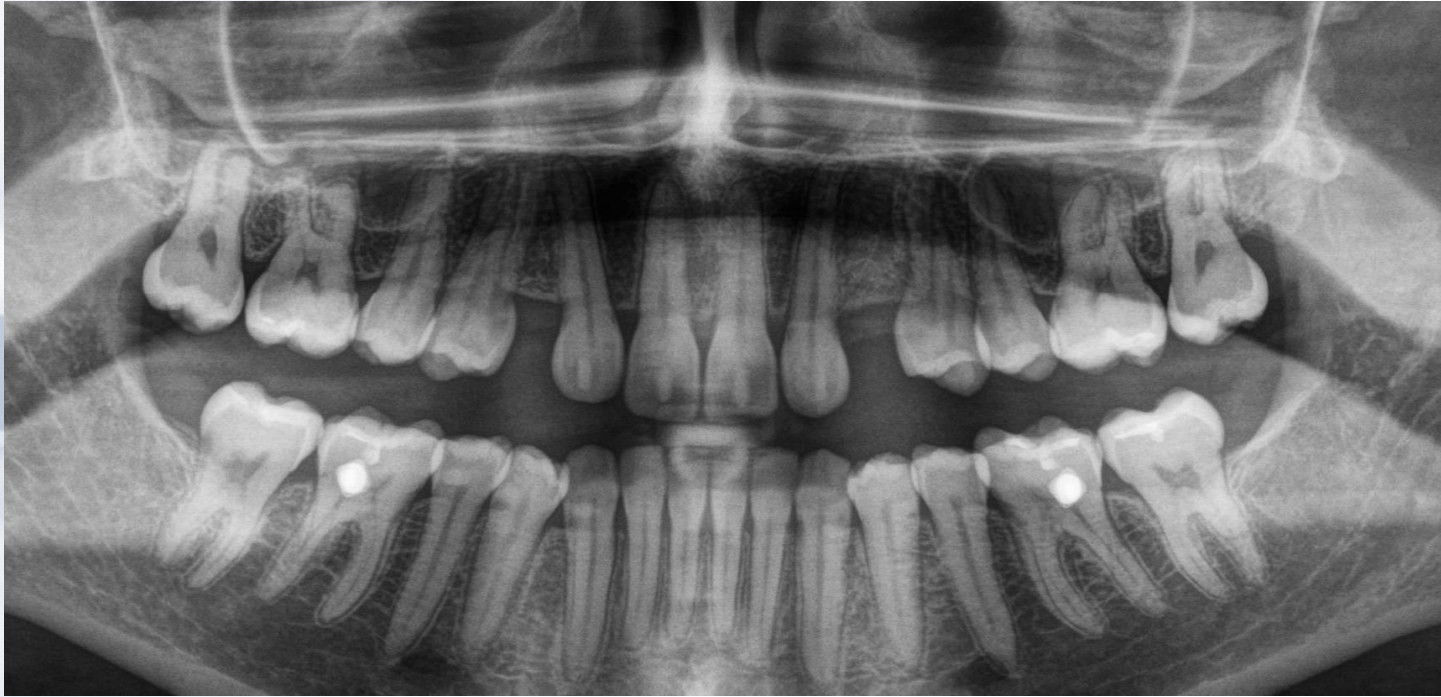
Kieferkambbreite. 5



Kieferkammhöhe. 6



Entscheidungsbaum



Legende:



Prothetische Position



Kieferkammbreite. 5



Kieferkammhöhe. 6



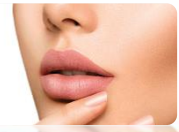
1. Zahn fehlt: Zusammenfassung



Welche Frage interessieren Chirurgen & Überweiser ?

- 1. Wie lange dauert es ?** *3-6-9-12 m*
- 2. Wie lange hält das ?** *88 -100% survival auf 5-10 y*
- 3. Wie schmerzhaft ist das ?** *0-5*
- 4. Was kostet das ?** *1200 – 4000 € / Implantat*
- 5. Wie funktioniert das eigentlich ?**





TMC – nein, Danke !

1. Zahn fehlt



3. Zahn ankylosiert



2. Bukkale Lamelle fehlt



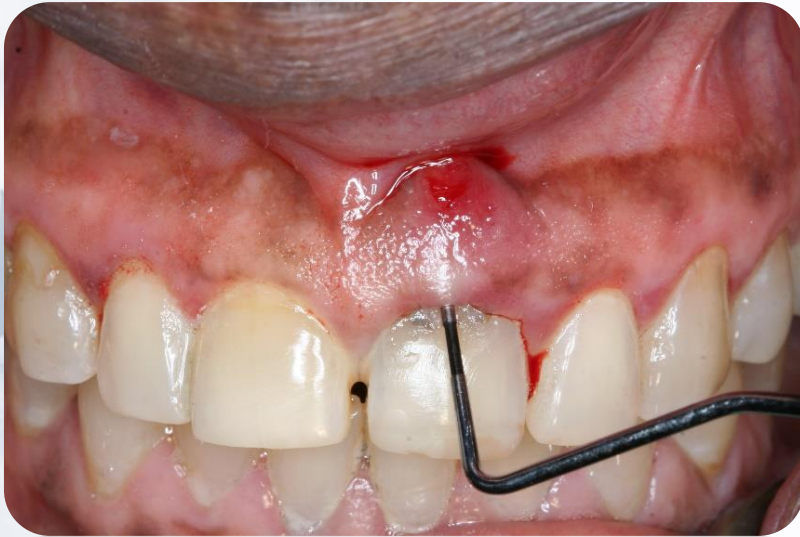
5. TMC nicht nötig



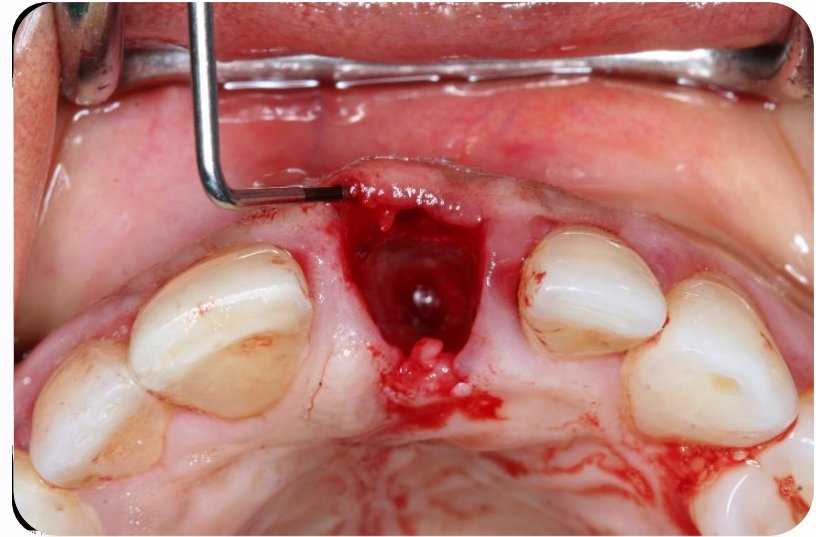
4. Pt will nicht



2. Zahn ohne bukkale Lamelle



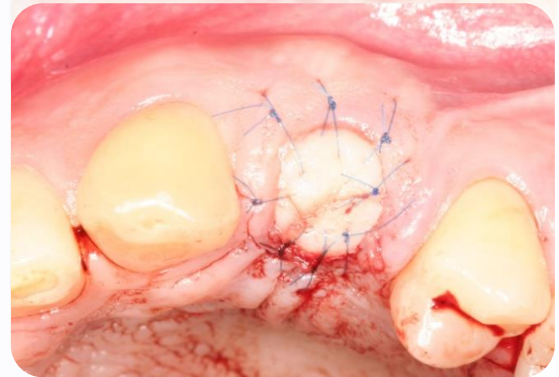
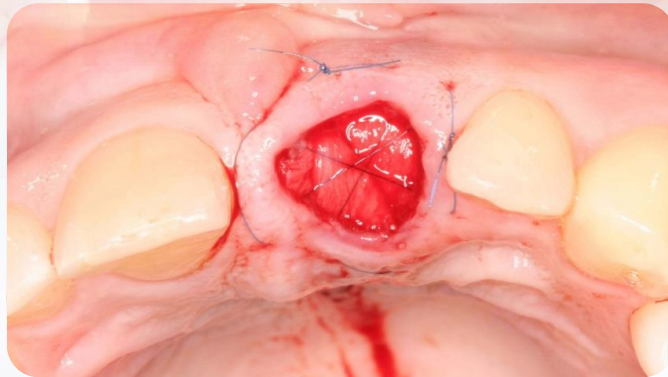
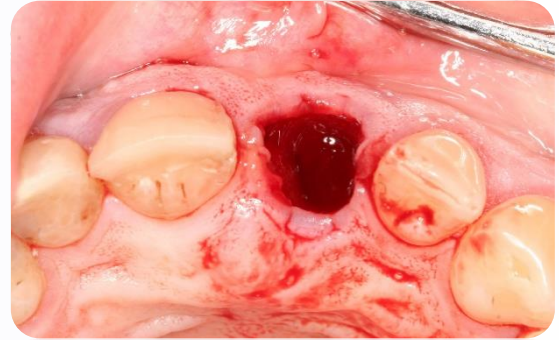
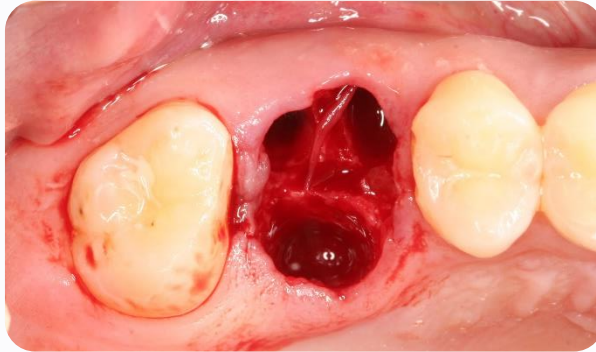
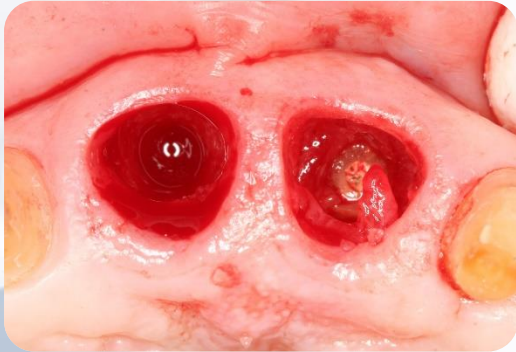
Was wollen wir erreichen?



Erhalt der Kieferkammdimension - bei wenig Beschwerden für Pt



ARP: alveolar ridge preservation



ARP: alveolar ridge preservation

systematic review on ARP:

JCP, 2018

Gustavo Avila-Ortiz & Fabio Vignoletti

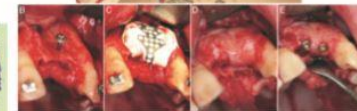
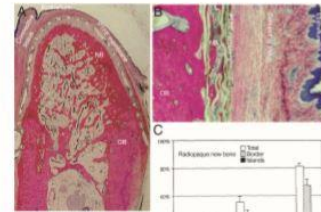
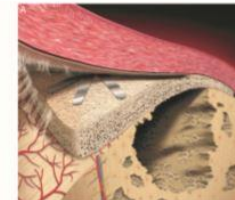
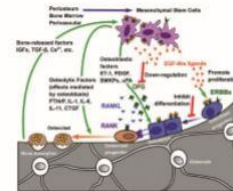
search term: alveolar ridge preservation

Article selection
Data extraction
Assessment of bias
Results

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Journal of Clinical Periodontology



Options available for implant placement after tooth extraction



Bone Regeneration, Proceedings of the European Workshop of Periodontology jointly Held by the Osteology Foundation and European Federation of Periodontology



ARP: alveolar ridge preservation

Results:
Auswertung im Bezug auf...

- Follow up time
- Age
- Smoker
- History of PAR
- Single vs multi rooted
- Flap
- Socket intact
- Buccal plate
- Graft material
- Socket seal
- Primary closure

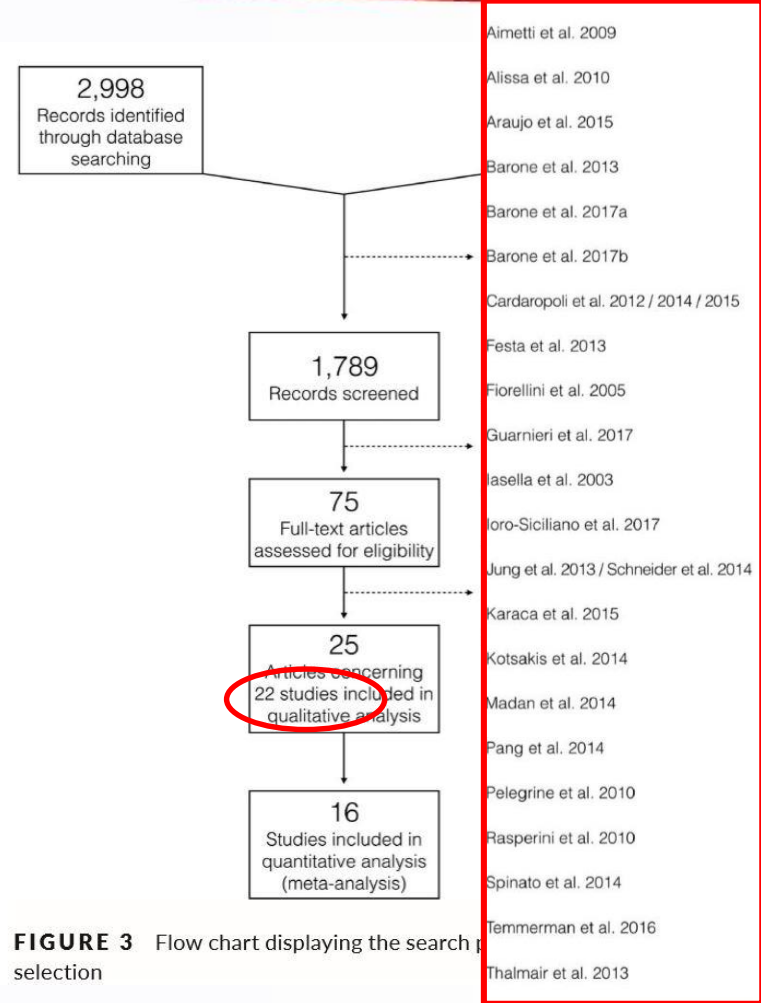
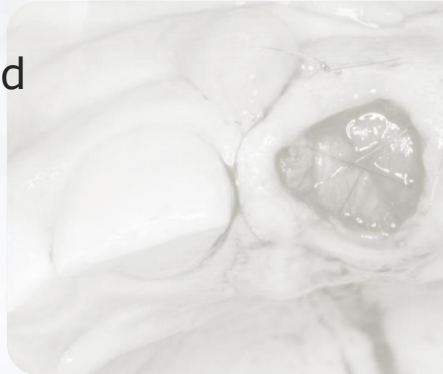
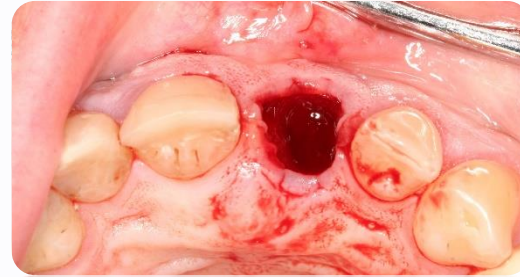
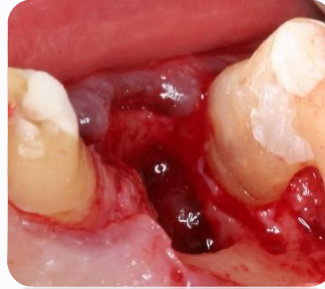


FIGURE 3 Flow chart displaying the search and selection process.

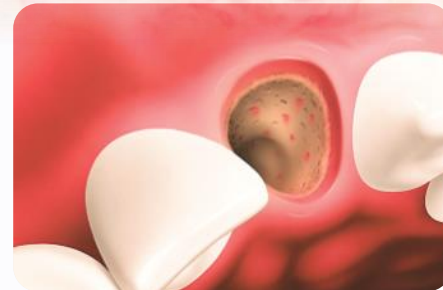


Faktoren, die Erfolg beeinflussen:

Chirurgisches Vorgehen



Alveolenanatomie



Patient

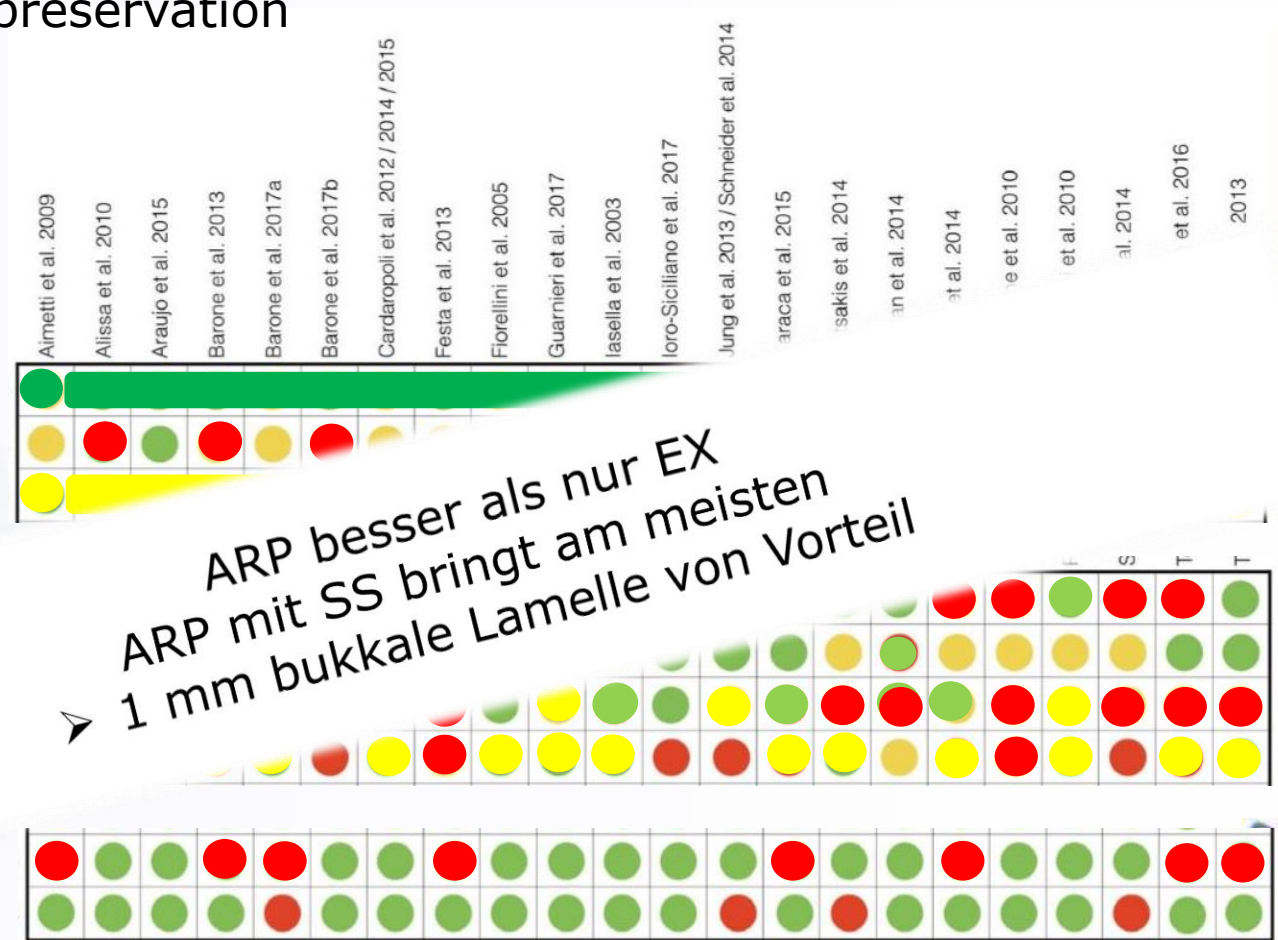


ARP: alveolar ridge preservation

Age
Smoker
PAR

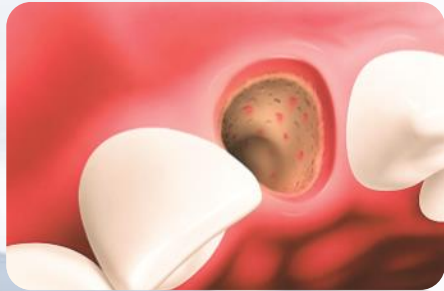
Socket seal
Socket
Socket
Buccal

Flap ele
Primary closure

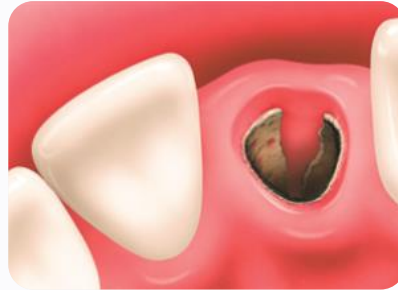


ARP besser als nur EX
 ARP mit SS bringt am meisten
 1 mm bukkale Lamelle von Vorteil

ARP: alveolar ridge preservation:



Alveole > 50%



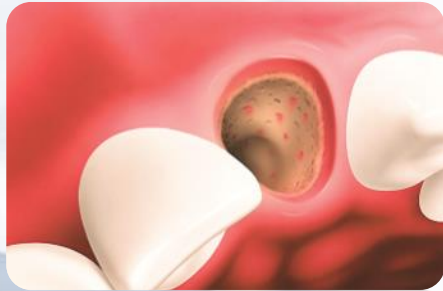
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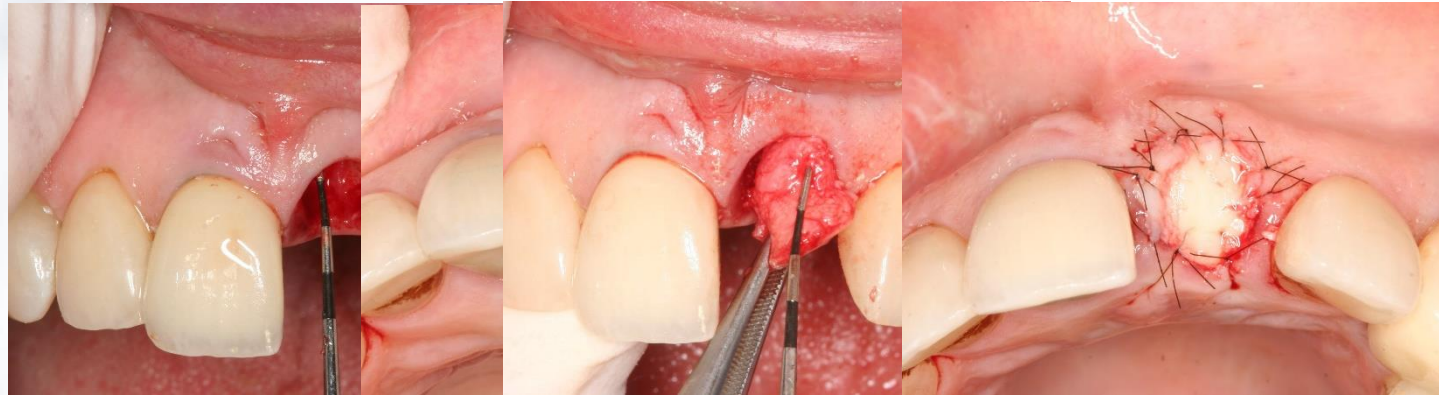
Alveole < 50% +/- Infektion



ARP: alveolar ridge preservation:



Alveole > 50%



ARP: alveolar ridge preservation



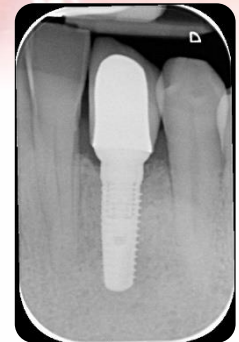
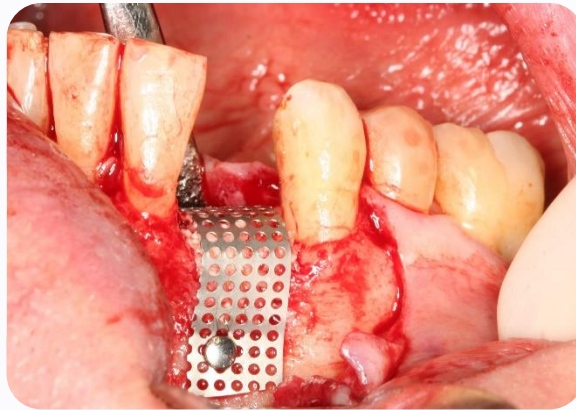
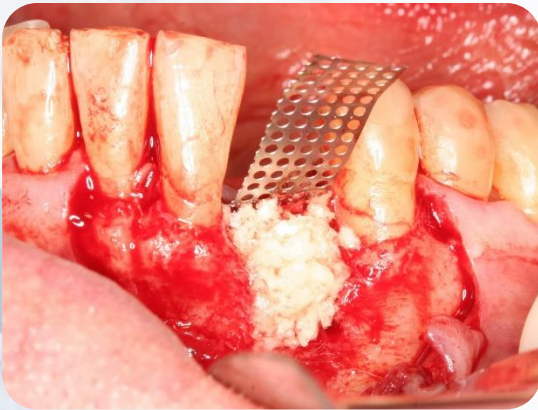
ARP: alveolar ridge preservation:

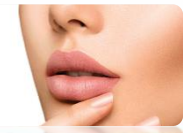


Alveole < 50% +/-Infektion



2. Zahn ohne bukkale Lamelle





TMC – nein, Danke !

1. Zahn fehlt



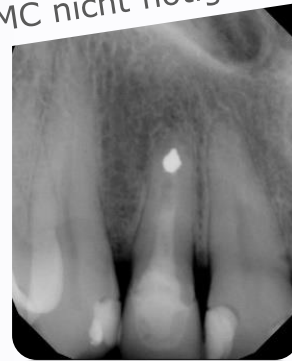
3. Zahn ankylosiert



2. Bukkale Lamelle fehlt



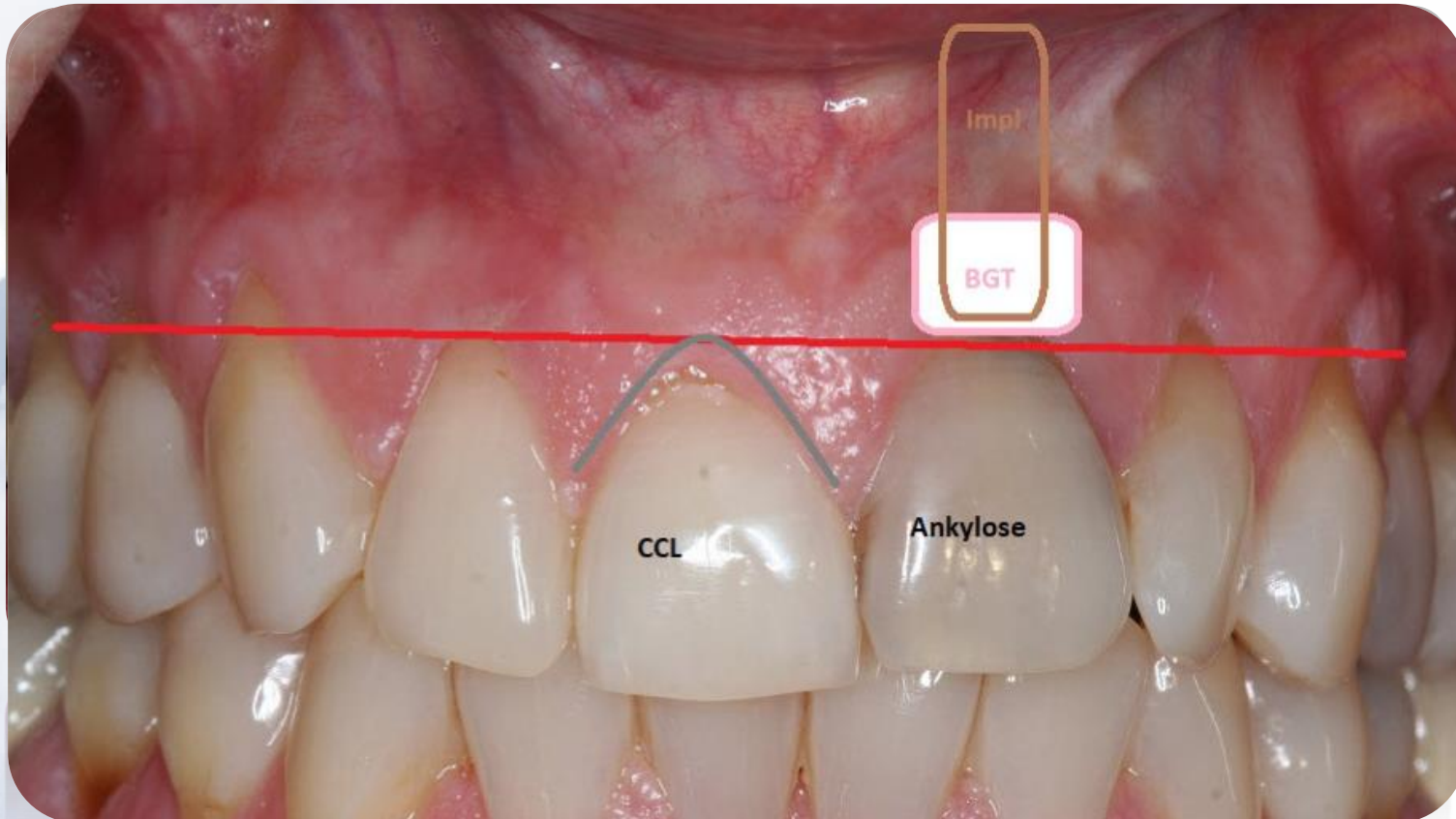
5. TMC nicht nötig



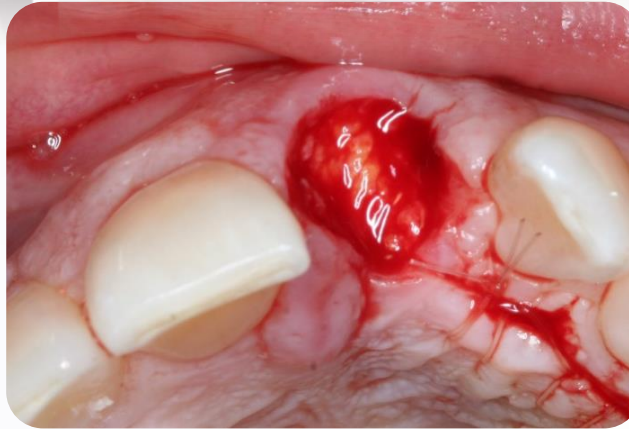
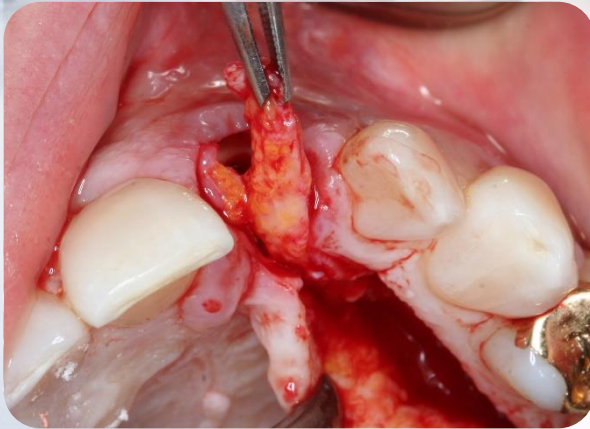
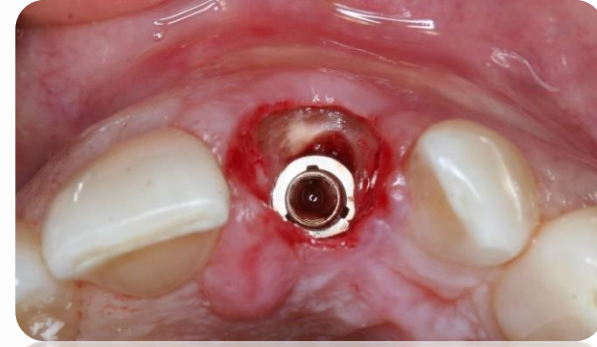
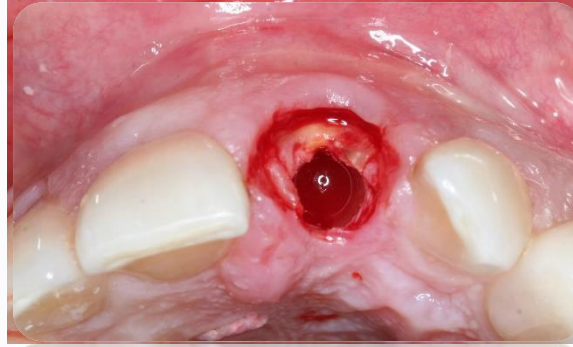
4. Pt will nicht



3. Zahn ankylosiert



3. Zahn ankylosiert

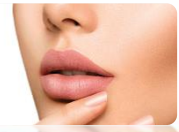


Freilegung

3. Zahn ankylosiert

Augmentation





TMC – nein, Danke !

1. Zahn fehlt



3. Zahn ankylosiert



2. Bukkale Lamelle fehlt



5. TMC nicht nötig



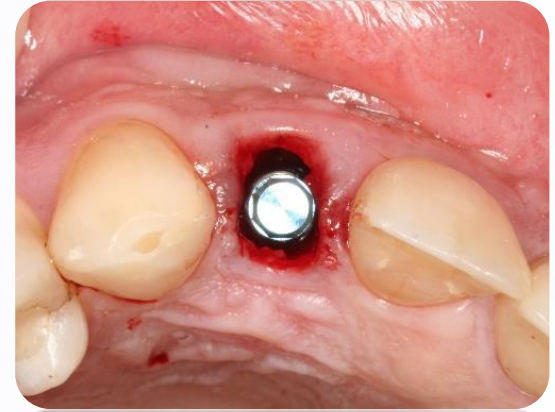
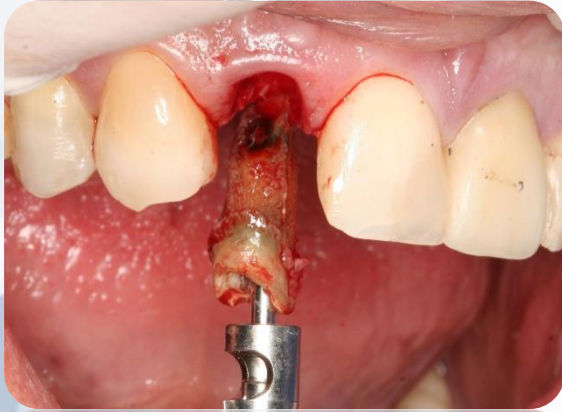
4. Pt will nicht



5.TMC nicht nötig: Sofortimplantation

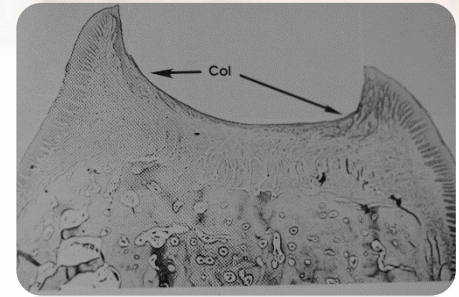


5.TMC nicht nötig:

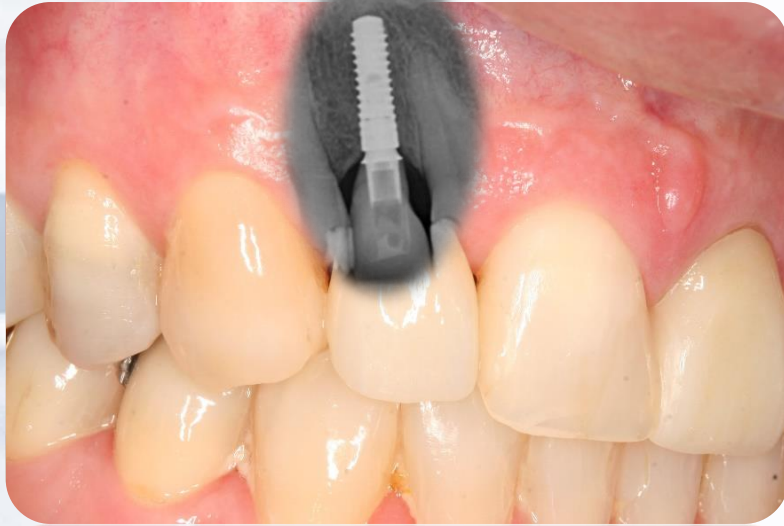


Benex® II

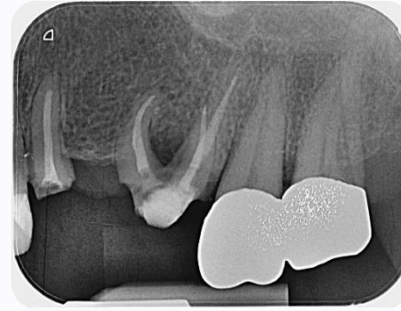
Benex® II



5.TMC nicht nötig:

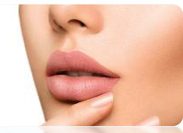


5.TMC nicht nötig:



5.TMC nicht nötig:





TMC – nein, Danke !

1. Zahn fehlt



3. Zahn ankylosiert



2. Bukkale Lamelle fehlt



5. TMC nicht nötig



4. Pt will nicht

