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Implant placement with simultaneous bone regeneration

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Contents

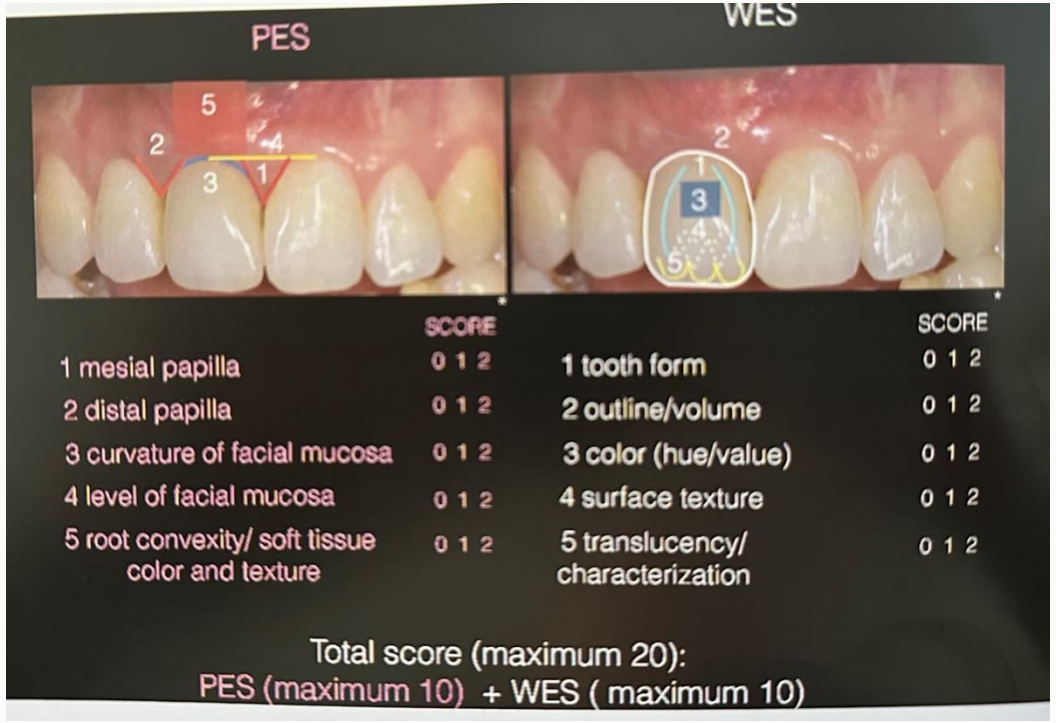
Introduction

- "The only constant in life is change"- Heraclitus

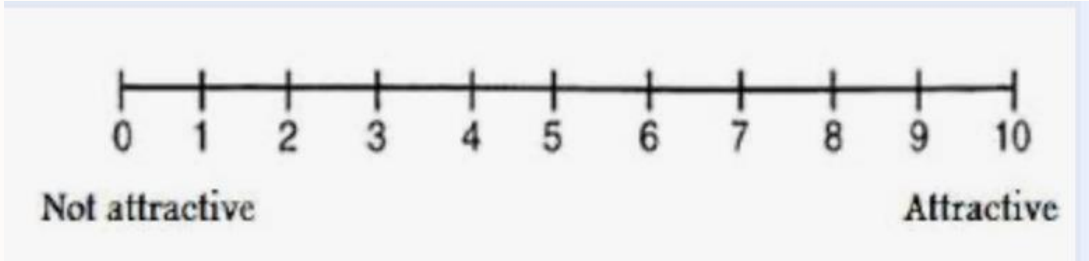
Dental implantology – constantly changing part of dentistry

10 year ago – survival rate – no mobility, no pain, no radiographic radioluscency

Today – objective rating (pink and white esthetic score), subjective rating (patient-reported outcome measures, visual analog scale)



Minimum 6 points = acceptable



Visual analog scale (subjective rating on scale 0-10)

What will happen 10 years from now?

Grafts vs. graft substitutes

Graft

"Any tissue or organ used for implantation or transplantation"

"A piece of living tissue placed in contact with injured tissue to repair a defect ot supply a deficiency"

Graft substitute

Exogenous material of biologic origin that do not contain native cells (allografts,xenografts) and alloplastic material of synthetic origin.

Magnesium = graft substitute

Guided bone regeneration – Regeneration, creation of bone using the method of "compartmentilization" – divison using barrier mambrane

Properties of magnesium membrane

Advantages

- Strong, but flexible

– biomechanical features

- Absorbable (biodegradable)

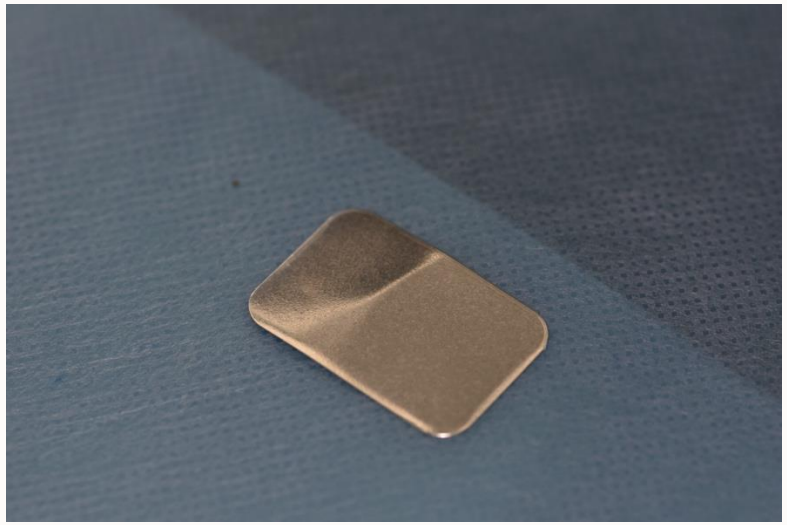
without side effects

- Can be trimmed to fit defect
- Easy to handle with special instruments

Disadvantage

- Must be fixated with pins/screws -

not with sutures to the periosteum



Elad A, Rider P, Rogge S, Witte F, Tadić D, Kačarević ŽP, Steigmann L. Application of Biodegradable Magnesium Membrane Shield Technique for Immediate Dentoalveolar Bone Regeneration. Biomedicines. 2023 Mar 1;11(3):744

Rider P, Kačarević ŽP, Elad A, Rothamel D, Sauer G, Bornert F, Windisch P, Hangyási D, Molnar B, Hesse B, Witte F. Analysis of a Pure Magnesium Membrane Degradation Process and Its Functionality When Used in a Guided Bone Regeneration Model in Beagle Dogs. Materials (Basel). 2022 Apr 25;15(9):3106.

Case presentation
Extraction and provisional

- A 42 years old healthy female patient presented to the office for solution to her problem – fracture of tooth 15
- The clinical examination and radiographic CBCT examination revealed deep cervical fracture and inability to restore tooth
- A clinical decision to extract tooth and go for delayed implant placement was made
- Tooth was carefully extracted and provisional PMMA appendix bridge was cemented to the tooth 16, which was already an abutment to an old metalceramic crown

Tooth pre-op and provisonal bridge images

PMMA provisional

Follow up visit

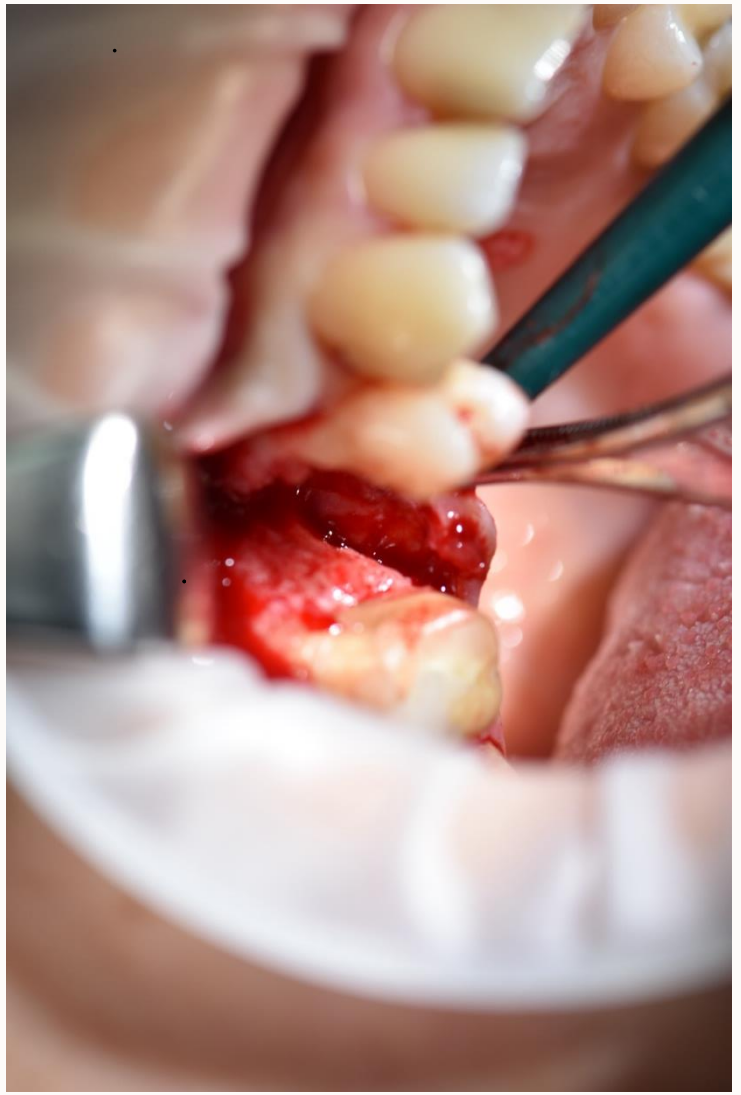
- Five months later, a CBCT examination was done in order to evaluate the implant site condition
- The healing was not good: combined (vertical plus horizontal defect was detected and decision to place implant with simultaneous guided bone regeneration was made
- Intraoral examination revealed horizontal defect with a vertical component of 5 mm
- Sightly inflamed gingiva due to inadequate hygiene

Intaoral clinical images

Surgical procedure

After administration of local anestehia (Septanest,Saint-Maur-des-Fosses,France), full-thickness flap was raised and defect was exposed

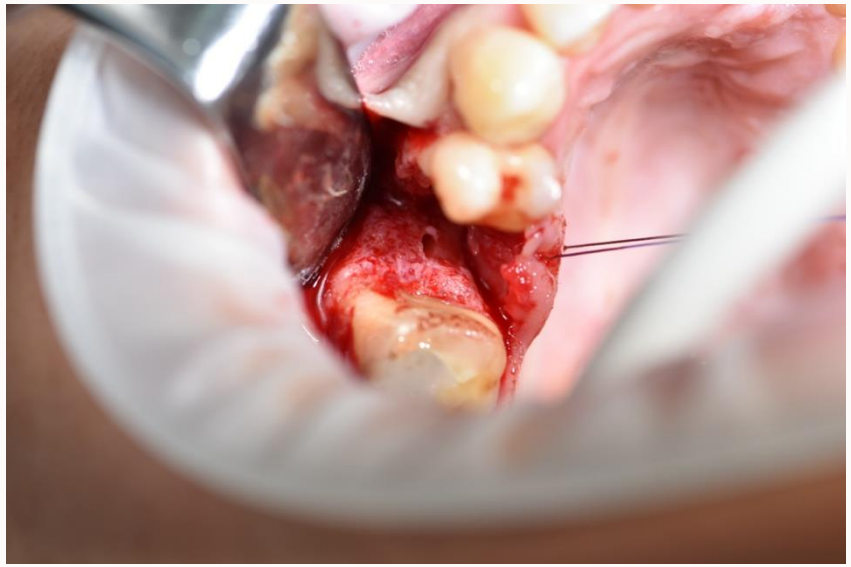
Intra-operative occlusal view



Intra-operative lateral view

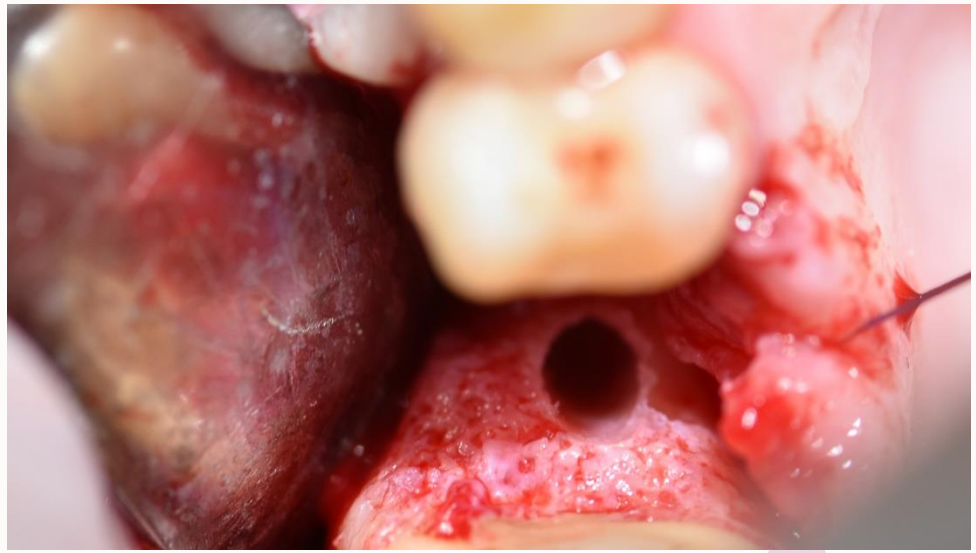
Surgical procedure

- Osteotomy started with Lindemann drill and continued with Densah burs (Versah,Jackson,MI,USA) for osseodensification



Initial osteotomy

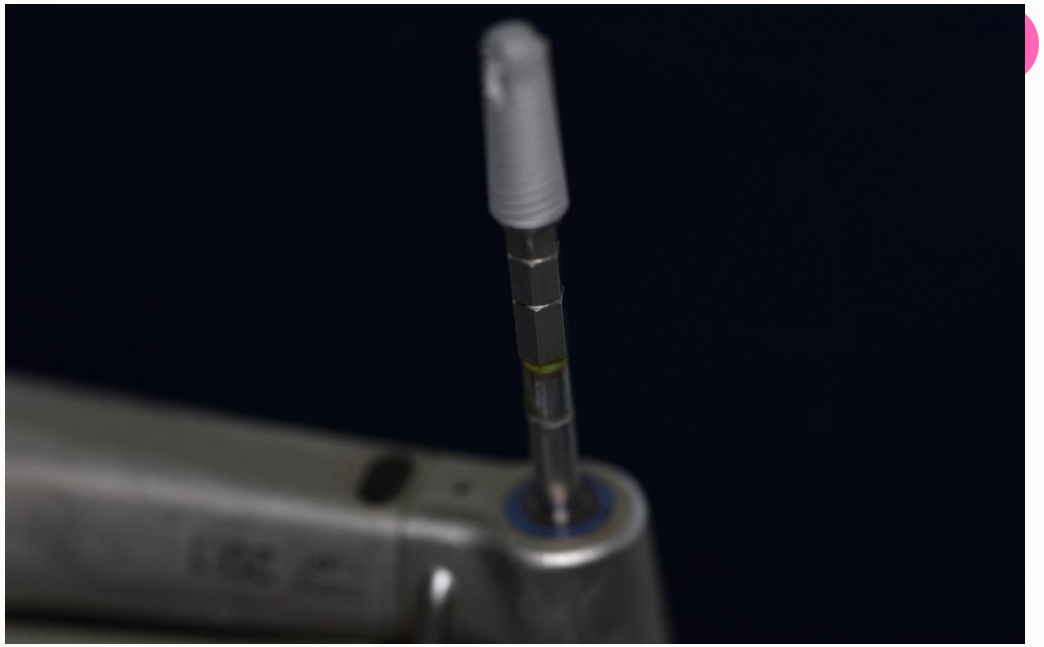
Drilling sequence



Final osteotomy

Surgical procedure

TRI Vent implant (Hunenberg, Swiss) was placed with torque >40 Ncm but sumberged healing was chosen due to planned guided bone regeneration



Implant placement

Surgical procedure

Implant placement

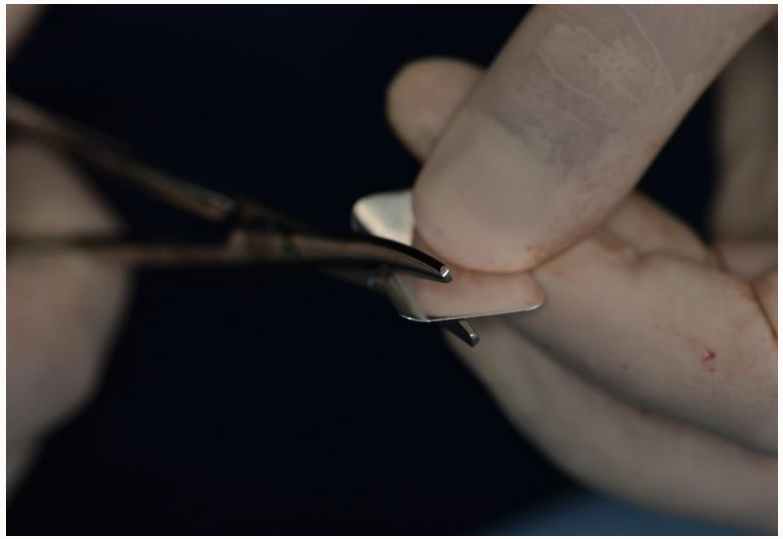
4 mm below the gingival margin with exposed threads bucco-mesially

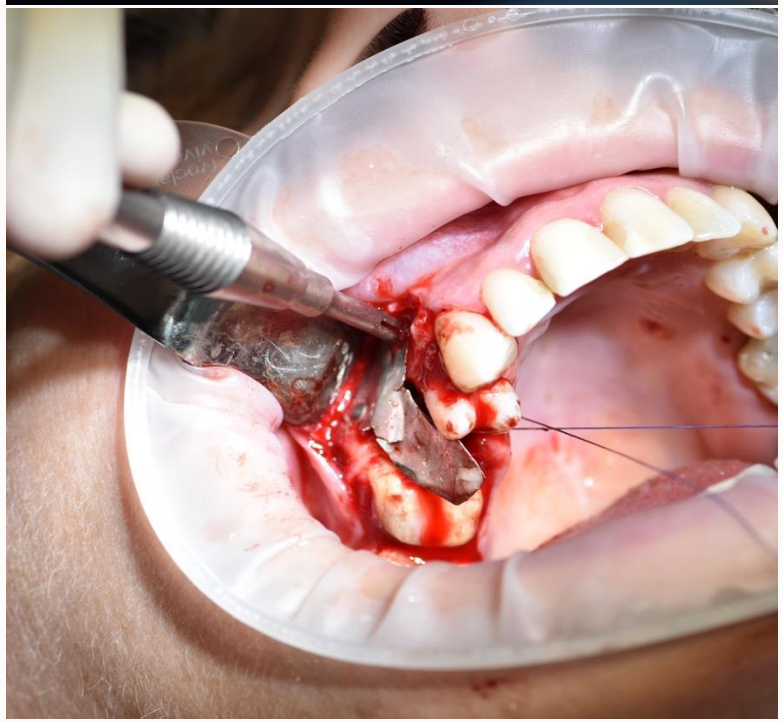
Final implant position- lateral view

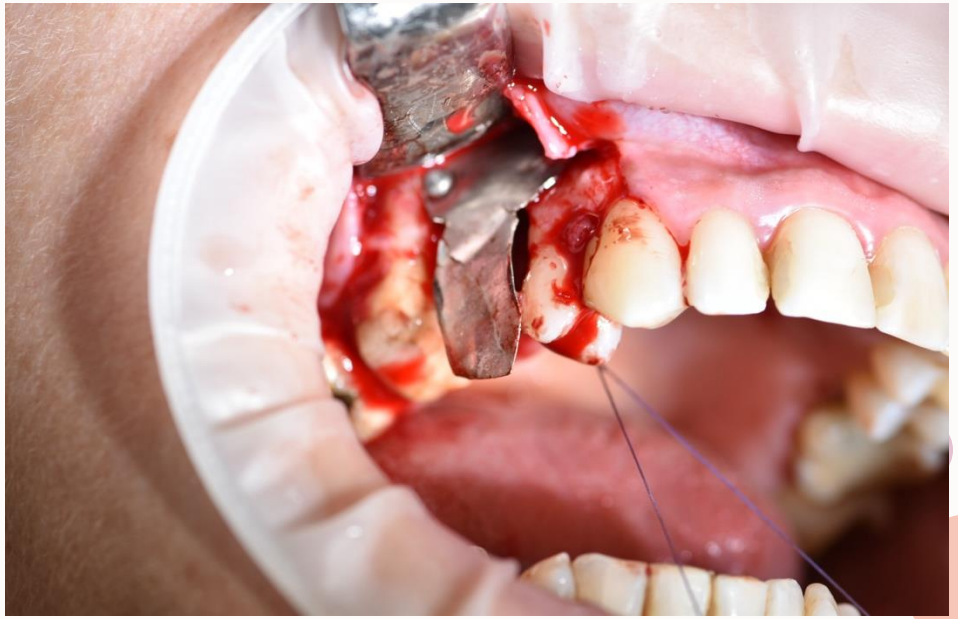
Occlusal view

Surgical procedure

- The absorbable magnesium membrane (Novamag, Botiss, Zossen Germany) was trimed to fit the defect morphology and fixed to the bony walls utilizing biodegradable titanium pins (Botiss, Zossen, Germany)
- No need to remove the membrane or pins postoperatively







Surgical workflow images

Surgical procedure

Cerabone plus (Botiss, Zossen, Germany - xenograft with hyaluronic acid material was used to fill the space but only within the bony envelope – no overfilling

Surgical workflow images

Surgical procedure

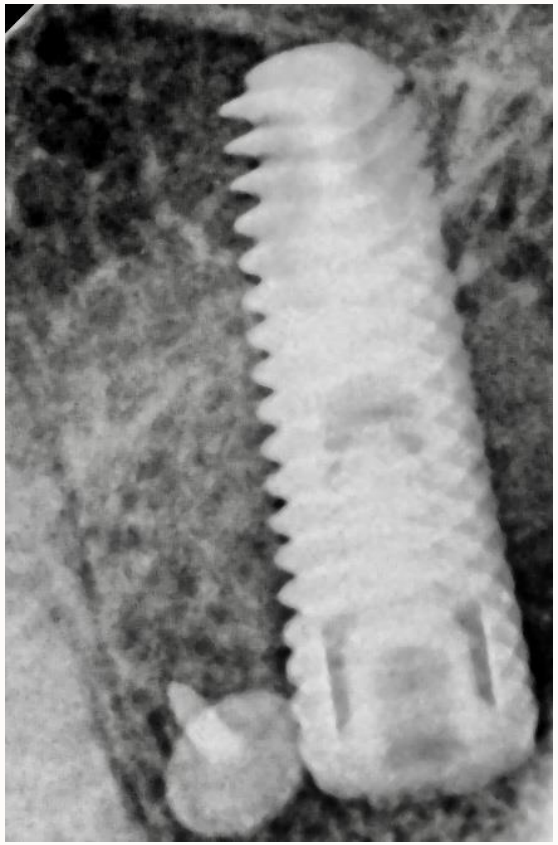
Defect was primarily closed with utlizing horizontal mattress and interrupted absorbable sutures
Same provisonal was modified at the gingival aspect to release contact with grafted site

Occlusal view

Lateral view

Prosthodontics

- Five months later, CBCT was done for explorative reasons only – to check the result of GBR therapy
- Radiographically stable bone volume with gain of quantity
- Soft tissue surgery was needed, but no patient consent, therefore
- Implant was incovered with apically posotioned flap and three weeks later tissue was ready for impression



Five months post-op images

Prosthodontics

The impresiion was taken digitally –with intraoral scanner and two single zirconia crowns were made by the dental laboratory

3D printed models with final restorations

by: Dentlab studio

The implant was loaded with screw retained full contour zirconia crown was fabricated respecting the correct emergence profile (concave below gingiva-convex paragingivally to support gingival margin)
Polished subgingivally, glazed paragingivally and supragingivally

Prosthodontist : Dr. Bojana Stefanovikj

Prosthodontics

Occlussal view

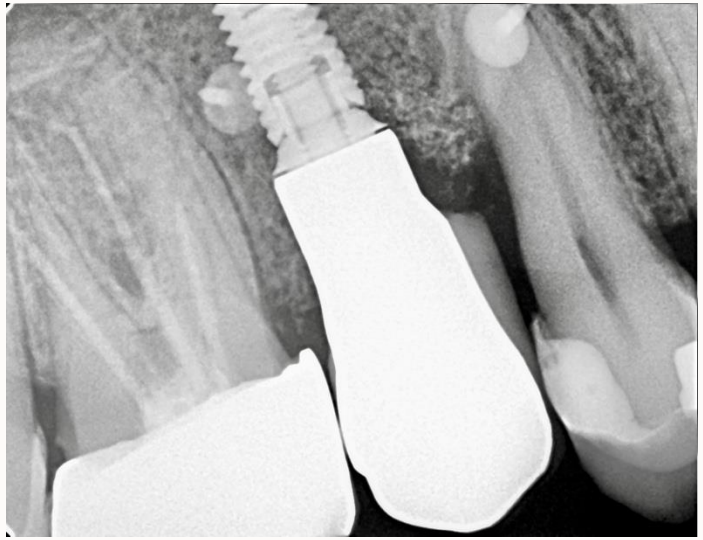
Lateral view

Immediate postoperative images

Prosthodontics

Clinical compromise:

👉Longer clinical crown than neighnouring teeth?
👉 keratinized gingiva enough for oral hygiene maintenance?
👉Expecting to improve in time due to zirconia’s biocompatibility to soft tissue



Post final restoration delivery image

Immediate post final restoration delivery

Immediate post-op frontal smile view

Conclusion

1.GBR with absorbable magnesium membrane may be a viable treatment solution, because of:

- Avoiding risk of exposure problems
- Avoiding discomfort of memrane – removal surgery
- The process od bio-degradation is pain-free
- It has same quality as non-resorbable memranes even with vertical bony components

2. GBR is never enough - always think od soft tissue surgery first to achieve function and esthetics, because bone does not replace soft tissue!

Thank you for your attention