



# **Interdisciplinary Care Part I: Periodontal-Restorative Relationship**

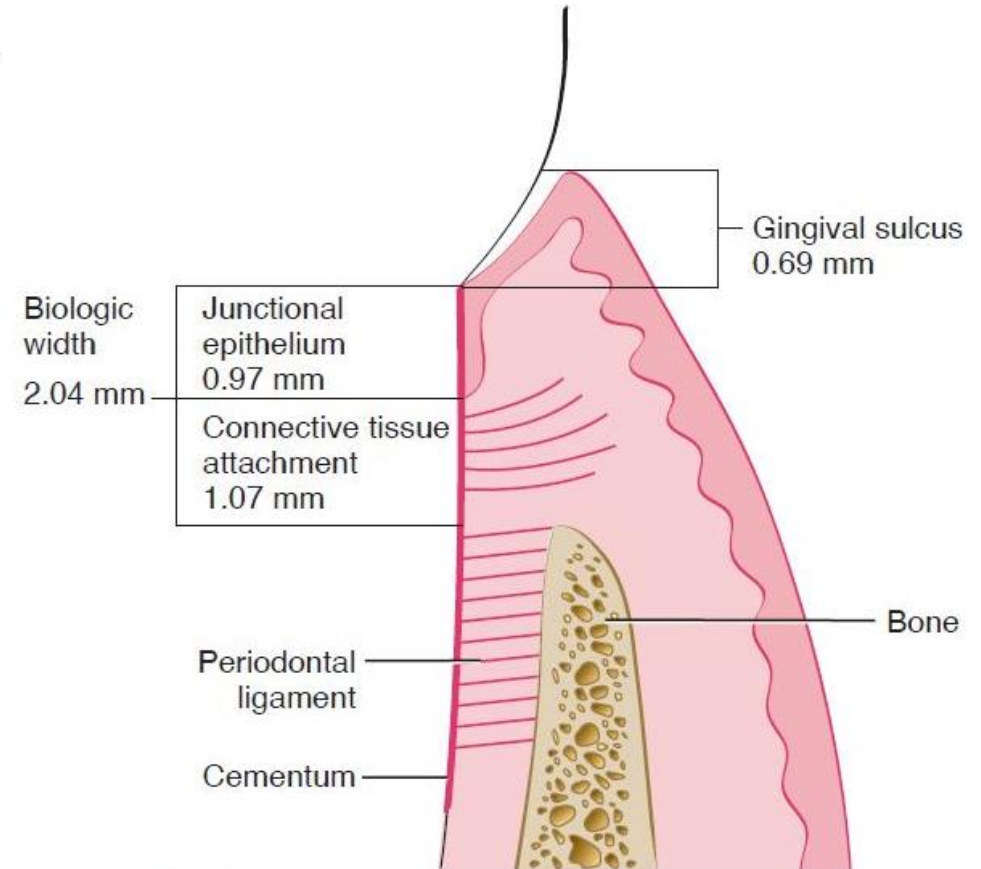
---

Silvia Amaya-Pajares DDS, MS

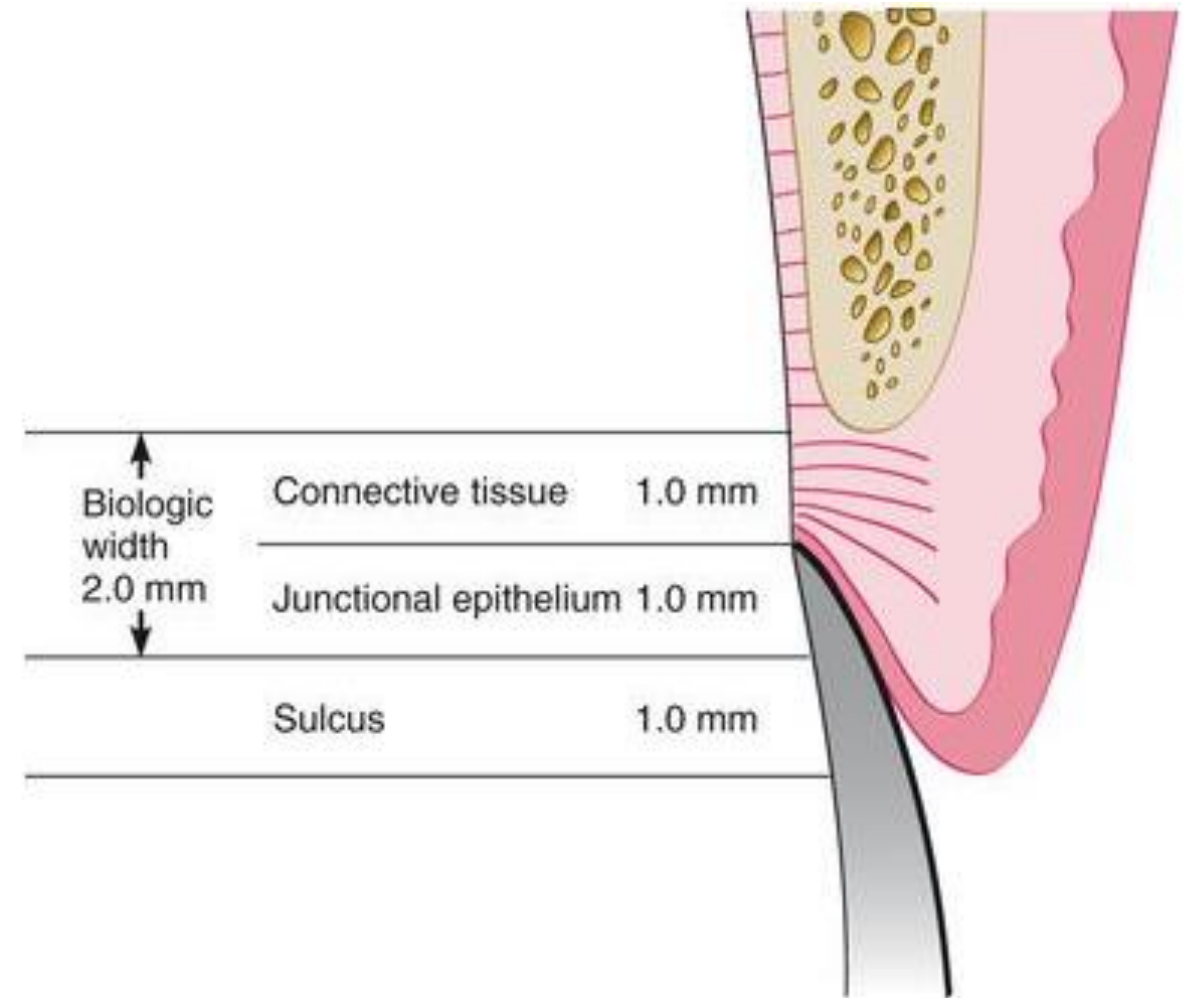


# Supracrestal Tooth Attachment or Biologic Width

- Gargiulo, Wentz & Orban (1961)
- Definition: Physiologic dimension from the alveolar crest of the bone to the base of the sulcus (2.04 mm).
- It includes:
  - Connective Tissue (CT): 1.07 mm
  - &
  - Junctional epithelium (JE): 0.97 mm



# Average Human Biologic Width



# Multidisciplinary Care

- Tooth & periodontal tissues evaluations
- Remove Caries & assess restorability
- Place buildup & provisional restoration
- Surgical procedure to recover BW
- New margin placement & place provisional
- Impression
- Cementation



# Biologic Width Evaluation

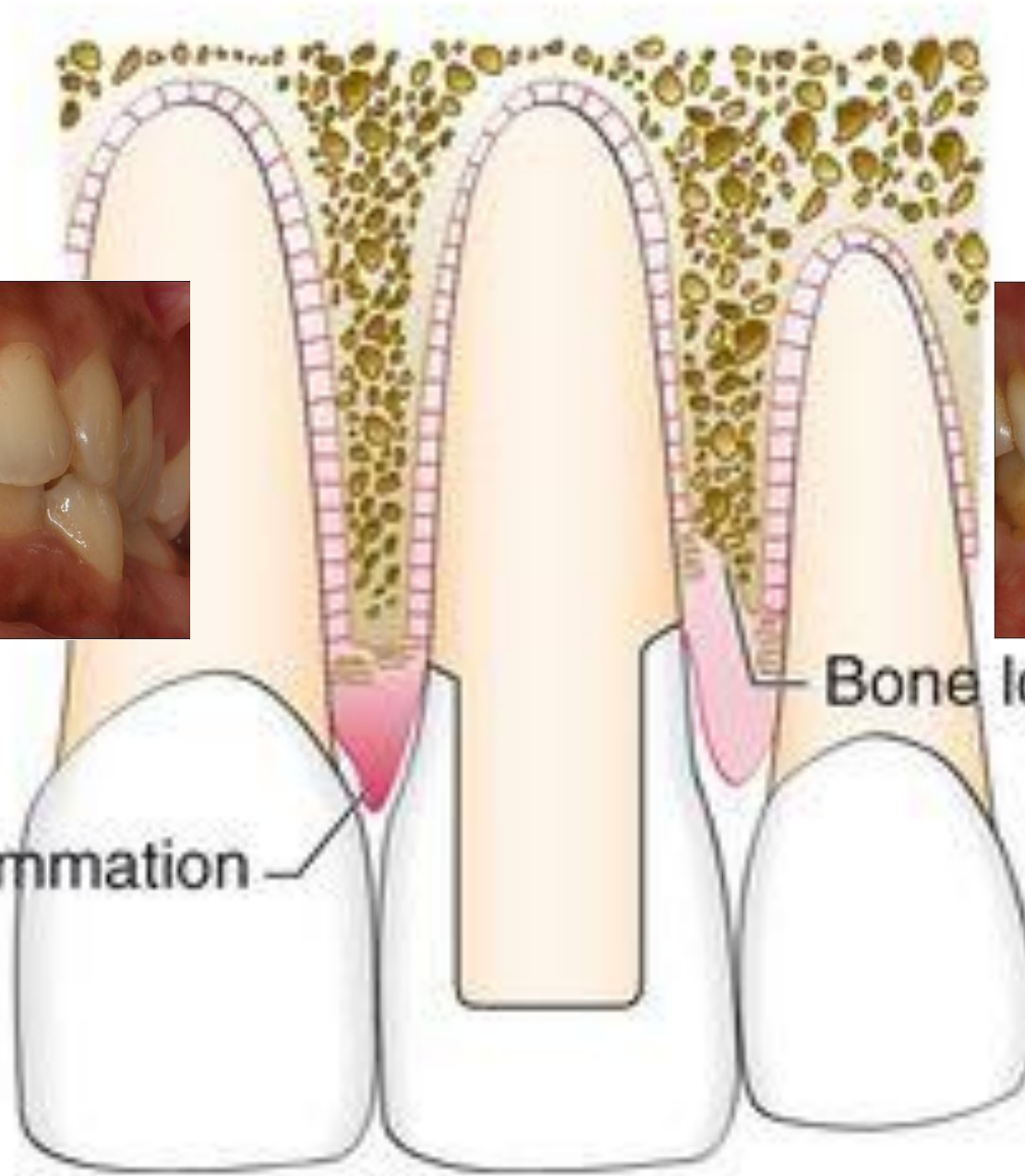
- Tissue discomfort during evaluation of restoration margins with probe.
- Evaluate the distance b/w bone & margin of restoration (sounding to bone)
- Use a radiograph.



Spear F. 2016



# Biologic Width Violation





# Periodontal Phenotype

- Combination of the gingival phenotype and the bone morphology.
- Gingival phenotype:
  - Gingival Thickness
  - Keratinized tissue width
- Bone morphotype



Thick-flat



Thin-scalloped

Kao R, et. al. J Periodontol 2020;91(3):289-298

Malpartida-Carrillo V. et al. J Esthet Rest Dent. 2020; 1-14



# Periodontal Phenotypes

- Thin phenotype: increased risk for pathosis (recession, inflammation, periodontitis/peri-implantitis).
- Lack of Keratinized tissue.
- They can change over time depending on environmental factors & can be modified by phenotype modification therapy (PhMT)



Kao R, et. al. J Periodontol 2020;91(3):289-298

Malpartida-Carrillo V. et al. J Esthet Rest Dent. 2020; 1-14

Lin GH, et. al. J Periodontol 2020;91:339-351





# Periodontal Phenotypes



- Pts with thin gingiva (<1mm) are more prone to future gingival recession
- Pts with a thin gingival phenotype, PhMT may contribute to the maintenance of periodontal tissue health and stability.



# Periodontal Phenotypes



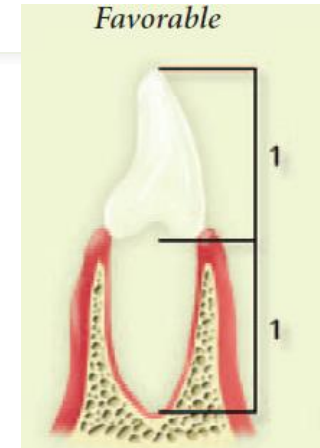
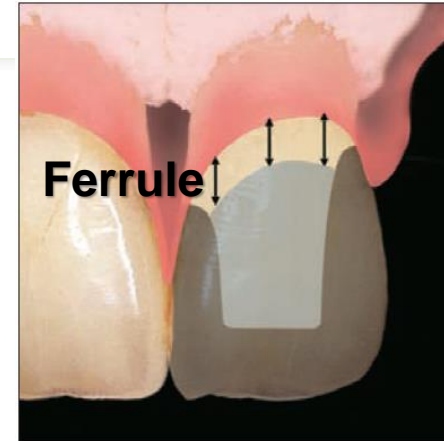
- Sites with mucogingival defects and soft tissue thickness  $<1\text{mm}$  would benefit from PhMT.
- Sites with soft tissue thickness  $\geq 1\text{mm}$  are associated with more predictable mucogingival surgery outcomes.

Kao R, et. al. J Periodontol 2020;91(3):289-298  
Frost N. J Periodontol 2015;86:1141-1149

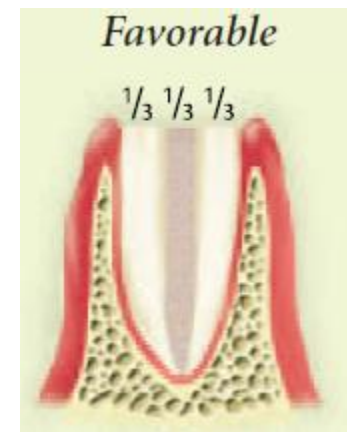


# Restorability Considerations

- 1.5-2.0mm ferrule
- Minimum 1.0mm ferrule wall thickness
- Crown-root ratio at least 1:1
- The canal or canal preparation should not be any wider than one third of the MD root diameter

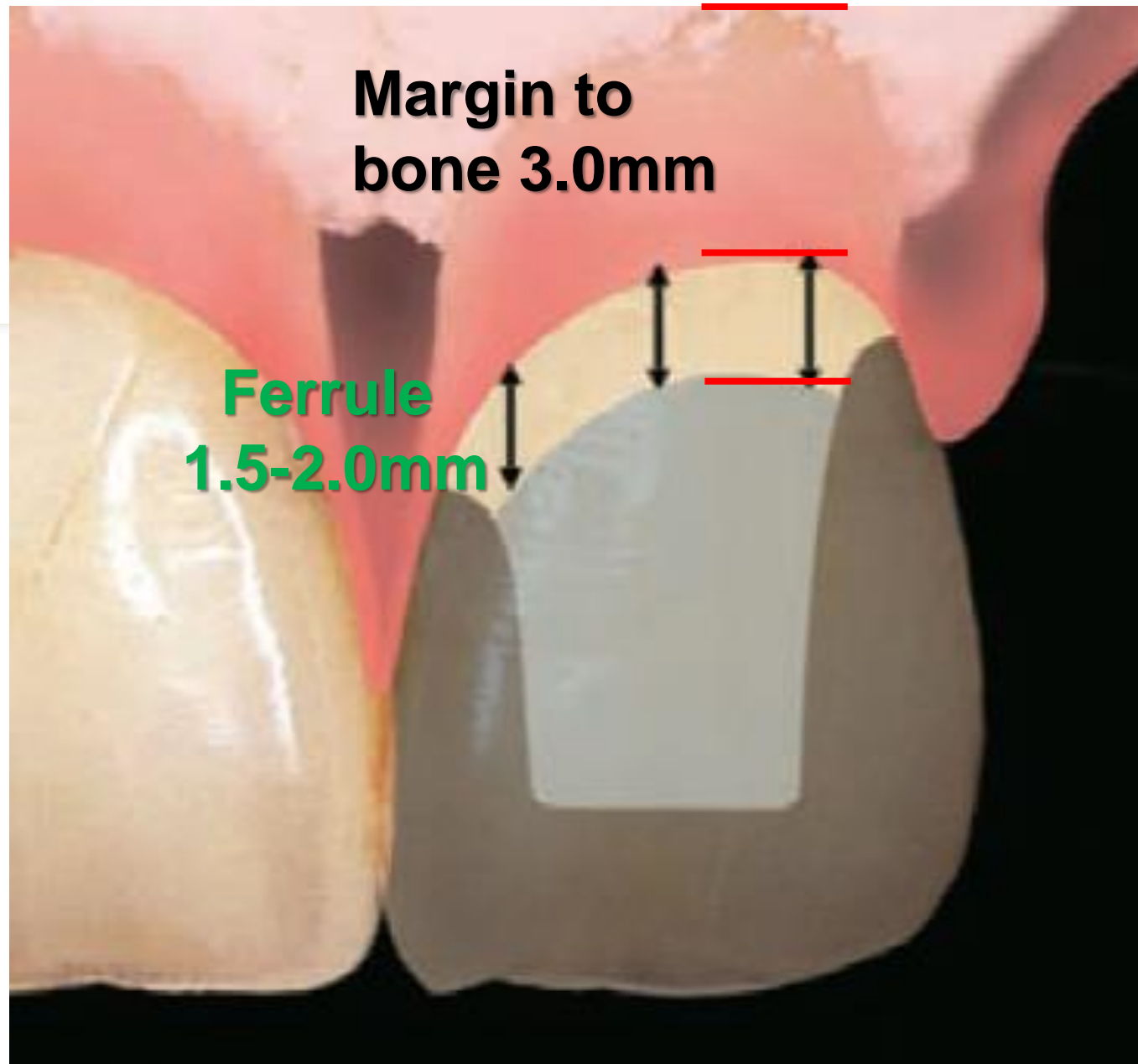


Crown– to–root ratio



Canal preparation





Spear F. 2016



# Biologic Considerations – Margin Placement & Biologic Width

- Supragingival
- Equigingival
- Subgingival





# Restorative Material & Periodontal Response

- 26-year longitudinal study for Scandinavian middle-class male with moderate to good oral hygiene and attend regular dental visit.
- Subgingival margin (1mm below) is detrimental to the periodontal health
- Gradual increased loss of attachment detected clinically 1-3 years following the restoration: 0.27 mm (restored) vs. 0.18 mm (pristine).
- Loss of periodontal attachment following the placement of subgingival restoration: 1-3 yrs



# Does crown or proximal restoration correlate to furcation involvement molar teeth?

- N = 134 pt (771 molars w/ and w/o furcation involvement and w/ and w/o restorations)
- 373 molars had furcation involvement and 362 had restoration
- Molars with crown or proximal restoration had a significantly higher presence of furcation involvement compare to the molars without restorations





# Disease Control

- Periodontal surgery might be required
- Some periodontal procedures can help to prepare the mouth for restorative or prosthetic care.





# Crown Lengthening

- Functional
- Esthetic



# Functional Crown Lengthening

- Cohen (1962)
- Resective procedure to expose tooth structure to support a restoration and re-establish biologic width.





# Functional Crown Lengthening - Indications

- Subgingival fracture/caries



# Functional Crown Lengthening - Indications

- Subgingival fracture/caries



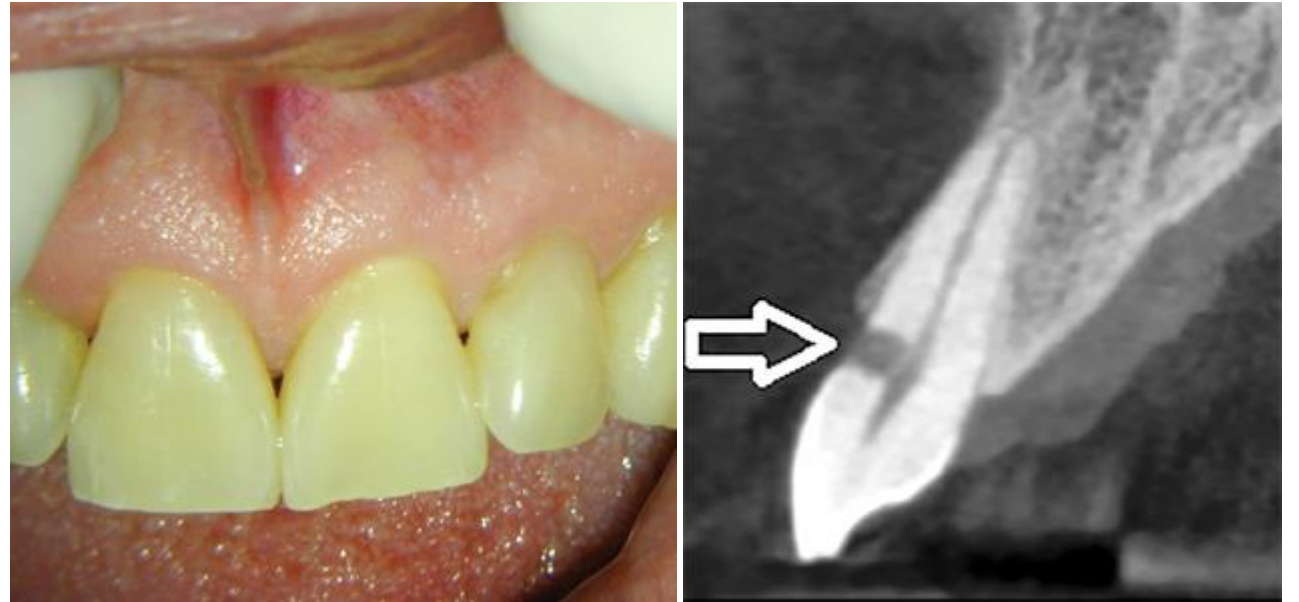
# Functional Crown Lengthening - Indications

- Subgingival fracture/caries
- Endodontic pin/post perforation



# Functional Crown Lengthening - Indications

- Subgingival fracture/caries
- Endodontic pin/post perforation
- Root resorption



# Functional Crown Lengthening - Indications

- Subgingival fracture/caries
- Endodontic pin/post perforation
- Root resorption
- Inadequate clinical crown length for restoration





# Functional Crown Lengthening - Indications

- Subgingival fracture/caries
- Endodontic pin/post perforation
- Root resorption
- Inadequate clinical crown length for restoration
- Supracrestal attachment violated by restorative tx/  
procedure



# Functional Crown Lengthening - Indications

- Subgingival fracture/caries
- Endodontic pin/post perforation
- Root resorption
- Inadequate clinical crown length for restoration
- Supracrestal attachment violated by restorative tx/  
procedure
- Excessive wear & crown lengthening required for full coverage restorations



# Functional Crown Lengthening - Contraindications

- Caries or dental fx. extending significantly apical that requires excessive bone removal
- Surgery would create an unesthetic outcome
- Surgery will result in an unfavorable crow-to-root ratio
- Non-restorable dentition
- Short root trunk (furcation close to connective tissue attachment)
- Compromise periodontal support of adjacent dentition



# Protocol for Functional Crown Lengthening

1. Provisional placement prior surgery
2. Presurgical plaque control
3. Periodontal evaluation (presurgical bone sounding)
4. Surgical procedure
5. Removal of sutures 10-14 days



# Crown Lengthening & Restorations related to Biologic Width Violation

- **Aim:** to assess periodontal tissue changes following immediate and 6-mo post-surgery crown lengthening, and the time needed before a final restoration could be placed.
- Frequency analysis for location of free gingival margin (FGM): post-op, 6 wk, 6 mo (N = 25 pts, 85 teeth)- Control (n = 42): contralateral site, Test (n = 43): crown lengthening
- Between 6 wk and 6 mo:





# Crown Lengthening & Restorations related to Biologic Width Violation

- 85% of the crown lengthening group: no change over +/- 1mm (FGM is apically or coronally placed) between 6wk-6mo post-op.
- But 12% of the sites showed 2-4mm apically displaced FGM
- Creating distance of 3 mm from the alveolar crestal bone level to the future reconstruction margin leads to stable periodontal tissue levels over 6 months.
- 6 months healing period is favorable in esthetic areas, while in non-esthetic areas, is possible to start with the restorative treatment as early as 6 weeks post-surgery.



# Esthetic Crown Lengthening

- Procedure aimed to increase the clinical crown and improve gingival contours in order to preserve the dentogingival complex (short crowns, passive eruption).
- Perio chart, rx, diagnostic wax-ups & mock-up.



Newman and Carranza's Clinical, 13<sup>th</sup> Edition  
Termeie D. Periodontal Review Q & A. Second Edition  
Advanced in Periodontal Surgery.



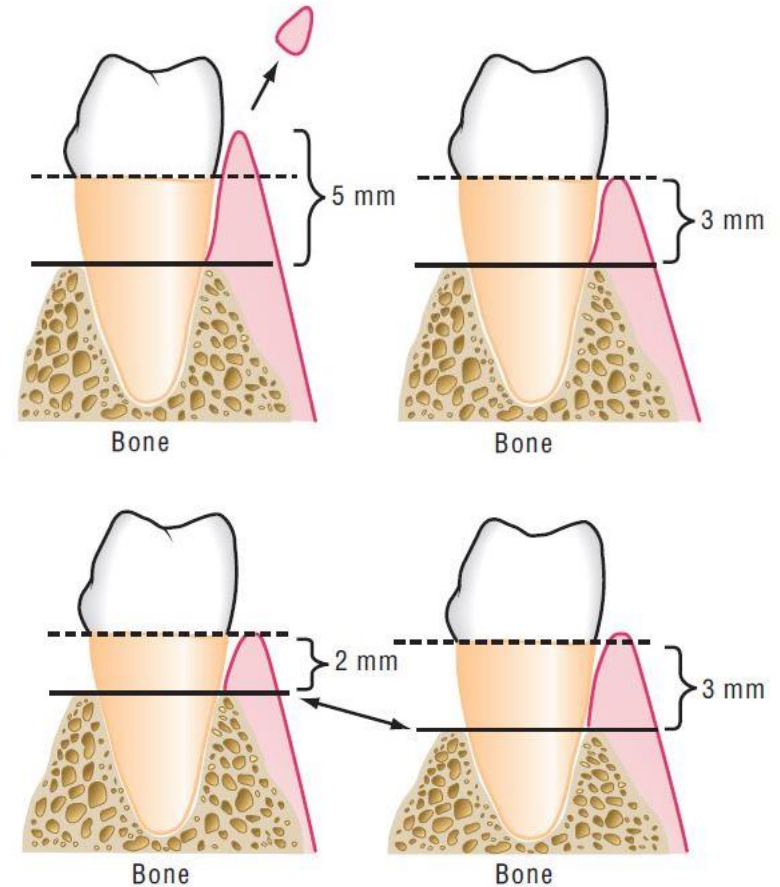
# Crown Lengthening - Considerations

## Gingivectomy:

- adequate attached gingiva
- >3mm of soft tissue b/w bone & GM

## Flap + osseous recontouring:

- less than adequate attached gingiva
- <3mm of soft tissue b/w bone & GM



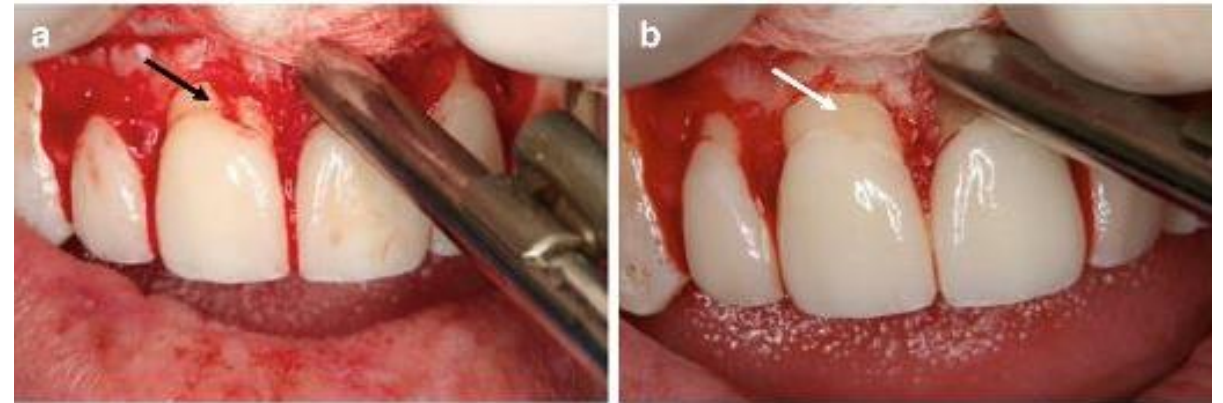
# Root Shaping or Biologic Shaping

- Melker & Richardson (2001)
- Combines perio & restorative phases



# Reasons for Root Shaping or Biologic Shaping

- It replaces or supplements the current indications for clinical crown lengthening (CCL)
- It minimizes osteotomy.
- It facilitates supragingival or just slightly intrasulcular margins to preserve the biologic width.
- It helps to eliminate developmental grooves, enamel projections and concavities.



# Reasons for Root Shaping or Biologic Shaping

- It helps to remove previous subgingival restorative margins
- It reduces or eliminates furcation anatomy, thus facilitating margin placement
- It allows supragingival or intrasulcular impression techniques
- It removes all CEJs
- Roots in close proximity can be altered for more hygienic contour





# Benefits of Adhesive Core Buildup

- Seals dentin tubules prior to definitive restoration
- Provides ideal prep form
- Eliminates undercuts in preparation
- Increases retention of provisional
- Allows a uniform thickness of definitive restorative material





# Steps for Root Shaping or Biologic Shaping

---



# Steps for Root Shaping or Biologic Shaping

1. Previous restorative materials and caries should be removed



# Steps for Root Shaping or Biologic Shaping

2. A core buildup of composite-bonded resin should be placed where necessary to add volume to the teeth.



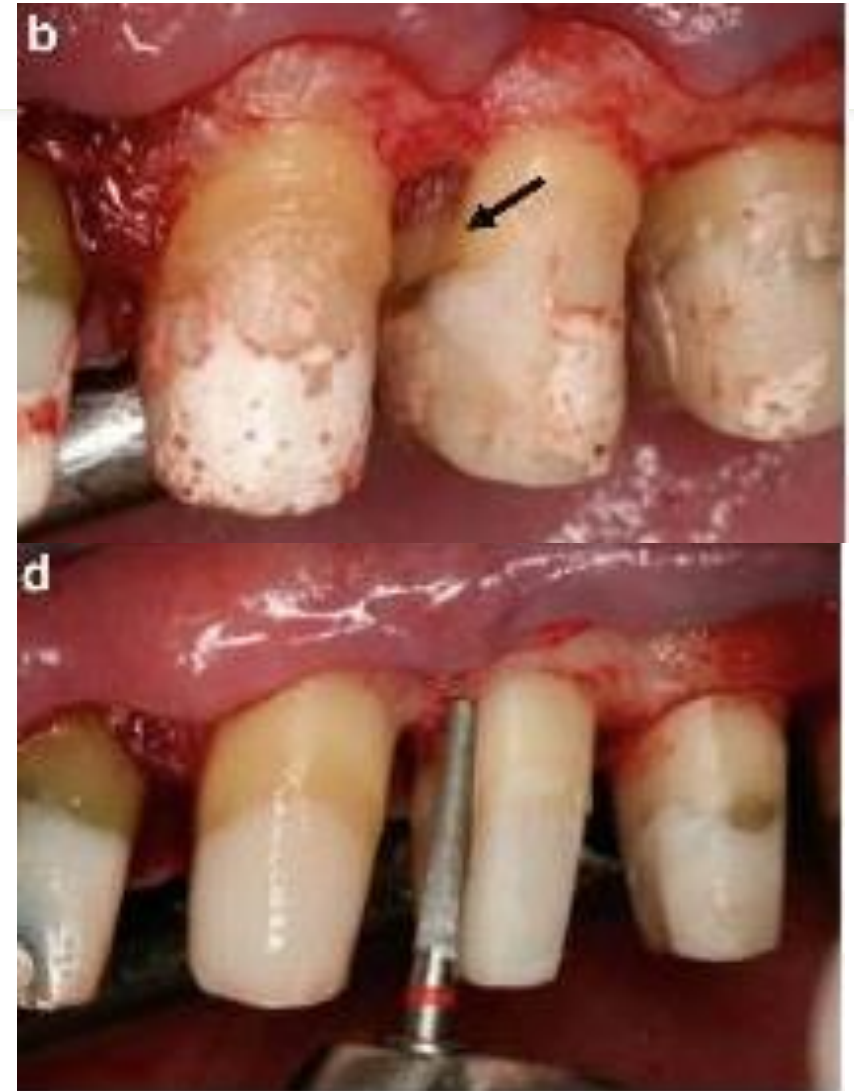
# Steps for Root Shaping or Biologic Shaping

3. Place provisional



# Steps for Root Shaping or Biologic Shaping

4. Remove provisional at time of surgery
5. Incision & flap.
6. Shape root & remove margins as well as 360° of CEJs. Reduce or eliminate cervical enamel projections, concavities, developmental grooves, etc.





# Steps for Root Shaping or Biologic Shaping

7. Removal of bone where there is violation of BW
8. Soft tissue augmentation in areas of insufficient KT
9. Close flap
10. Cement provisional



# Steps for Root Shaping or Biologic Shaping

- 11. Home care (use CHX 2/d)
- 12. Remake or reline provisional (s) at 4 wks



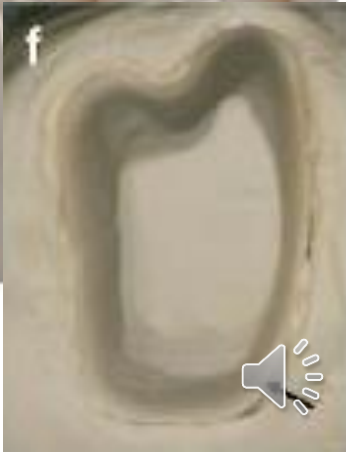


# Steps for Root Shaping or Biologic Shaping

13. At 14 weeks, chamfer margins placed & impression taken.

14. Good hygiene





# Conclusions

- Healthy periodontium and predictable long-term success will depend on the close communication of the restorative dentist and periodontist.
- Crown lengthening could be either functional or esthetic.
- Functional crown lengthening helps to expose tooth structure to receive restorations.
- Esthetic crown lengthening exposes the clinical crown for esthetic purposes.



# Conclusions

- Creating distance of 3 mm from the alveolar crestal bone level to the margin of a restoration leads to stable periodontal tissue levels.
- Six-month healing period is favorable in esthetic areas, while in non-esthetic areas, is possible to start with the restorative treatment as early as 6 weeks post-surgery.
- Biologic shaping conserves bone while establishing biologic width necessary for the restoration of teeth.

