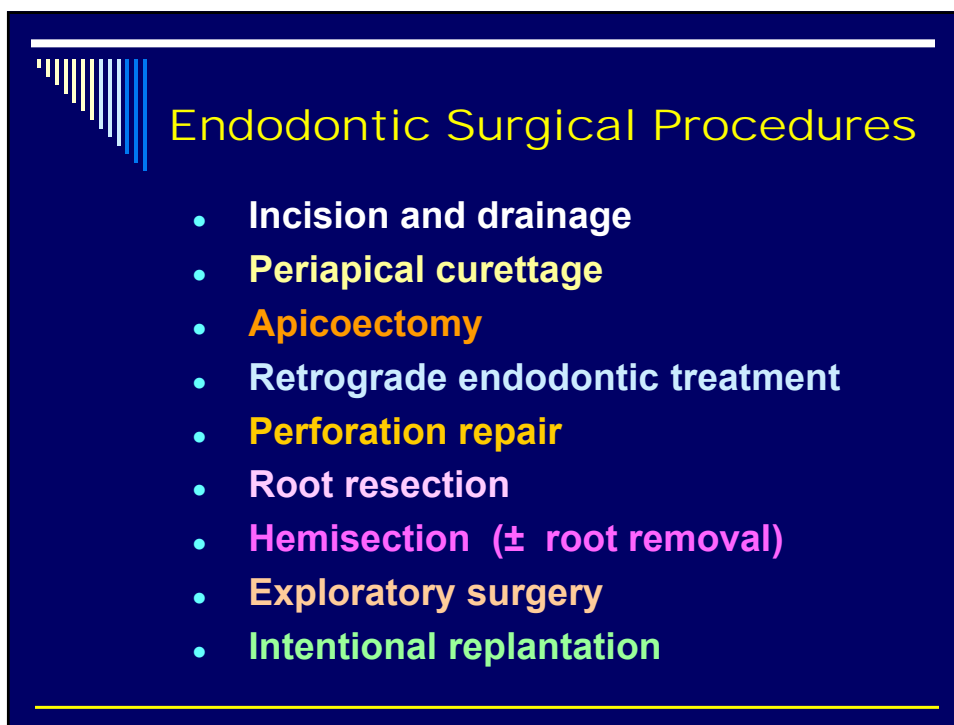
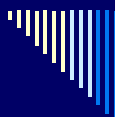


1



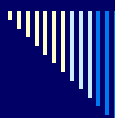
2



## Endodontic Surgical Procedures

- Incision and drainage
- **Periapical curettage**
- **Apicoectomy**
- **Retrograde endodontic treatment**
- Perforation repair
- Root resection
- Hemisection ( $\pm$  root removal)
- Exploratory surgery
- Intentional replantation

3



## Possible Indications for Periapical Surgery

- ◆ When a biopsy of the periapical lesion is required

4

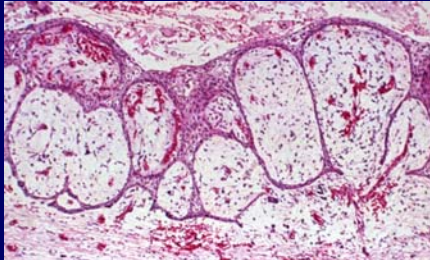
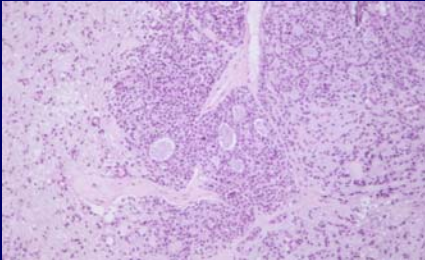

- 51 yr old male
- 8 yr history of pain and “numbness of the palate”
- Endodontic treatment - three times by three dentists



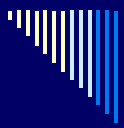
5

**Diagnosis:**  
Adeno-Cystic Carcinoma

**Treatment:**  
Hemi-maxillectomy  
and radiotherapy



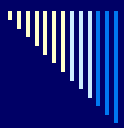
6



## Possible Indications for Periapical Surgery

- ◆ When a biopsy of the periapical lesion is required
- ◆ Foreign body reaction with extruded material
- ◆ Perforation repair (that can not be done conservatively)
- ◆ **If non-surgical treatment is not feasible - such as:**
  - Very long or wide post; Post not in line with canal
  - Canal blocked by broken file, calcifications, etc
  - Tooth is not likely to be suitable for further restoration
- ◆ **Patient factors**
  - Medical / dental condition, time, costs, recent crown, etc.

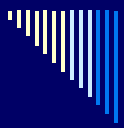
7



## Periapical Surgery Considerations

- ◆ Psychological aspects
  - Patients are reluctant to have any form of surgery
- ◆ **Non-surgical endodontics has a higher success rate**
  - Grung *et al* - 28% higher success if non-surgical re-treatment was done prior to surgery
- ◆ **Surgery is a “one visit” technique**
  - Can not disinfect the canal with irrigants and/or medicaments

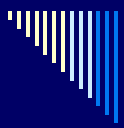
8



## Periapical Surgery Considerations

- ◆ There is no IDEAL retrograde filling material
  - Many have been tried & most do not “seal” canals well
- ◆ Surgery “entombs” bacteria rather than killing or removing them
  - And only “treats” the apical 2 - 4 mm of the canal
- ◆ Surgery does not remove the pathway of entry along which the bacteria have entered & infected the tooth
  - This is usually caries, a defective restoration, or a crack

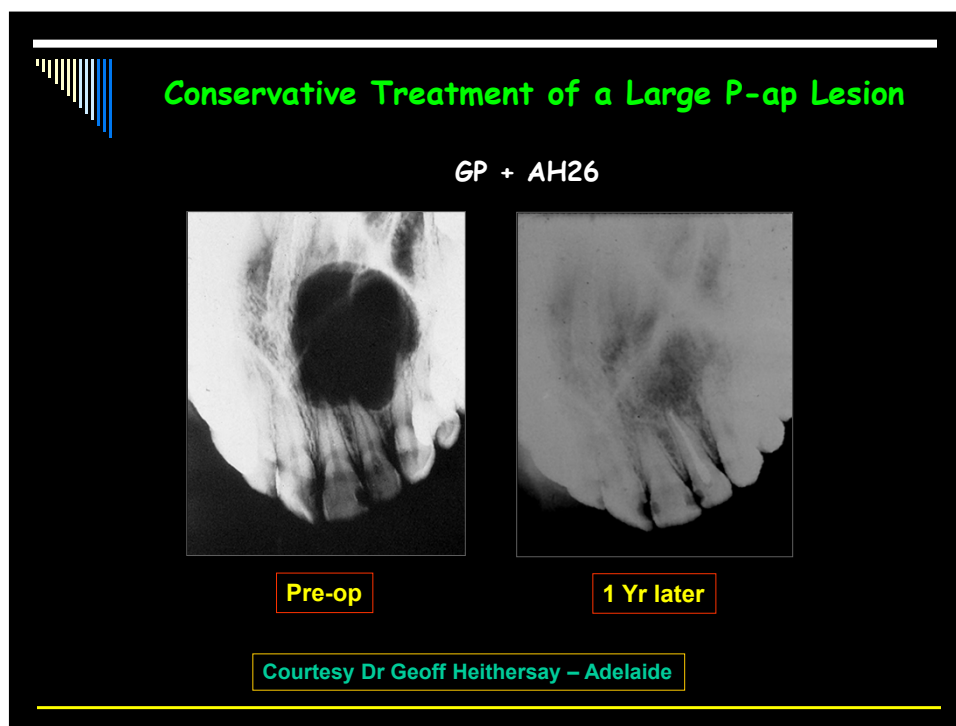
9



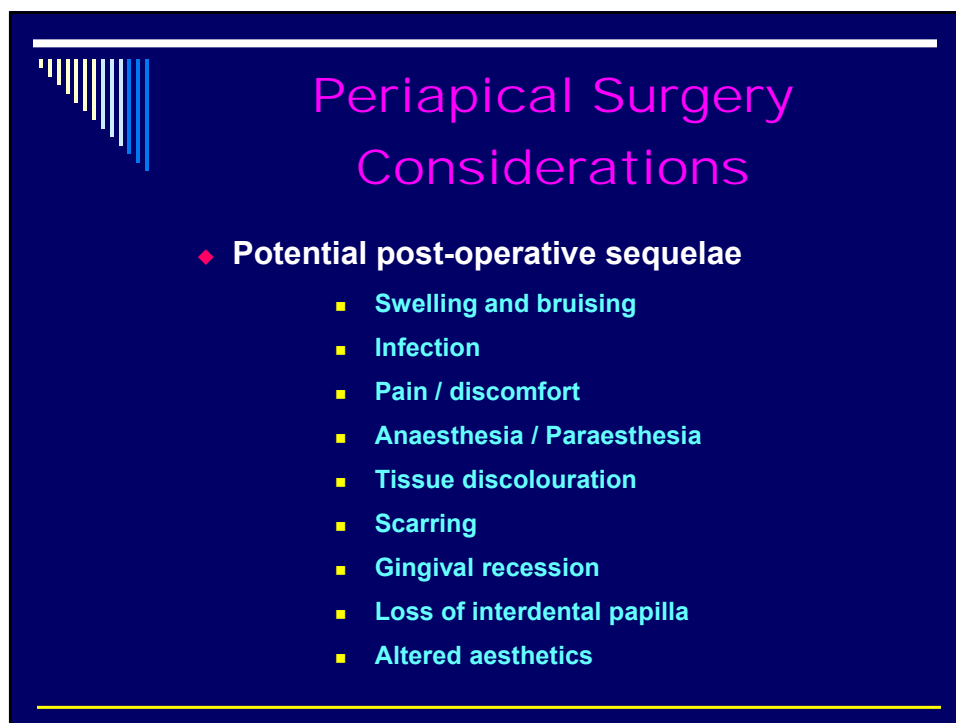
## Periapical Surgery Considerations

- ◆ Over-extended root filling materials
  - Will not always cause a foreign body reaction
  - Hence, always watch and reassess over time
- ◆ Large, well-defined radiolucencies
  - Are not always cysts as often thought by many dentists
  - Can be any form of periapical pathosis
  - Size and borders indicate time & speed of development

10



11



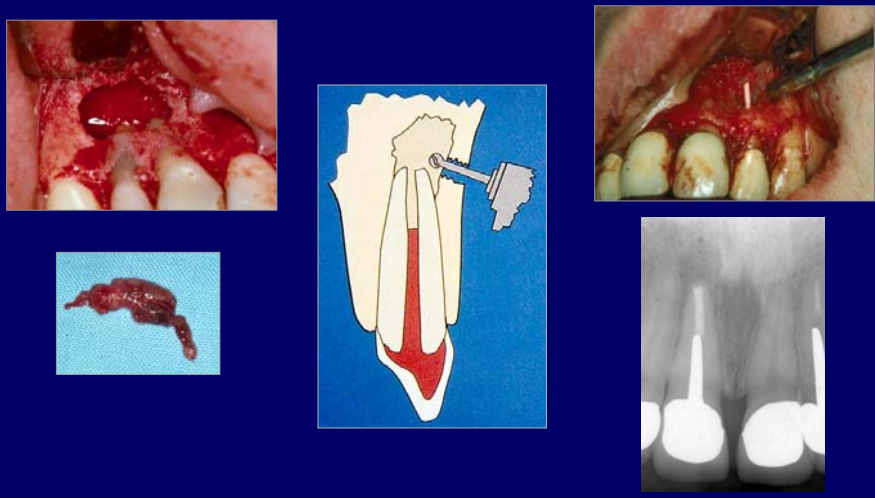
12

## Possible Indications for Periapical Surgery

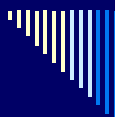
- ◆ *“It must be recognised that few true indications exist for the endodontic surgical approach”*
  - Gutman JL. *Surgical Endodontics* 1991: 50

13

## Endodontic Surgery



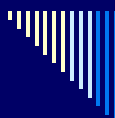
14



## Endodontic Surgery - Stages

- a) Consultation, Diagnosis, Treatment Plan
- b) **Local Anaesthesia**
- c) **Periosteal Flap**
- d) **Curettage**
- e) **Apicoectomy**
- f) **Retrograde Endodontic Treatment**
  - Apical Bevel, Canal Preparation, Root Filling
- g) **Wound Closure - sutures**
- h) **Post-operative Instructions**
- i) **Follow-up & Review**

15




## Endodontic Surgery

***But first – some general principles***

16

## Flap Designs

- ◆ Semi-Lunar
- ◆ Gingival crest
  - Triangular
  - Trapezoidal
  - Gingival
- ◆ Luebke-Oschenbein

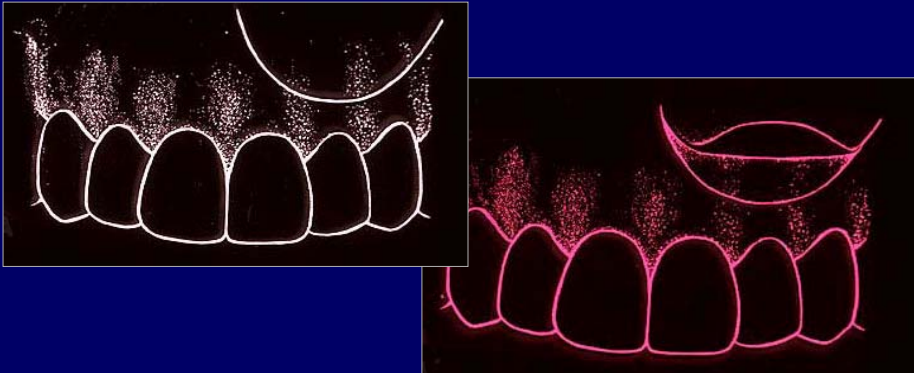


The diagram shows a dental arch with several different flap designs highlighted in various colors: orange for triangular, red for trapezoidal, green for gingival, and blue for Luebke-Oschenbein. The semi-lunar flap is also indicated by a dashed line.

17

## Semi-Lunar Flap

- ◆ In the mucobuccal fold and attached gingiva



The left diagram shows a dental arch with a white semi-lunar flap design. The right diagram shows a dental arch with a pink semi-lunar flap design, illustrating its placement in the mucobuccal fold and attached gingiva.

18

## Semi-Lunar Flap

- ◆ In the mucobuccal fold and attached gingiva
  - Poor access
  - Incision often over the lesion
  - Difficult moisture control (haemorrhage)
  - Difficult to reposition
  - Uncomfortable during healing
  - Leaves scars

19

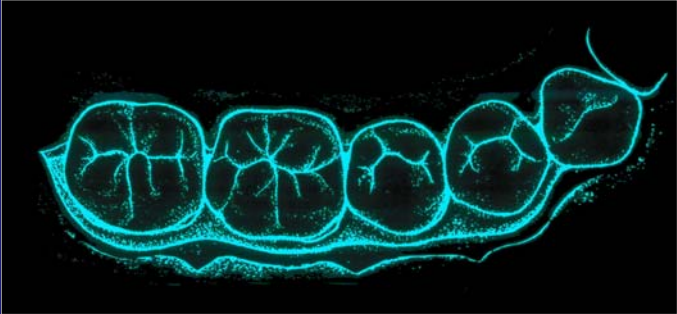
## Semi-Lunar Flap



20

## Gingival Flap

- ◆ **Gingival crest incision**
  - **Extended horizontal incision**
  - **No vertical incision**

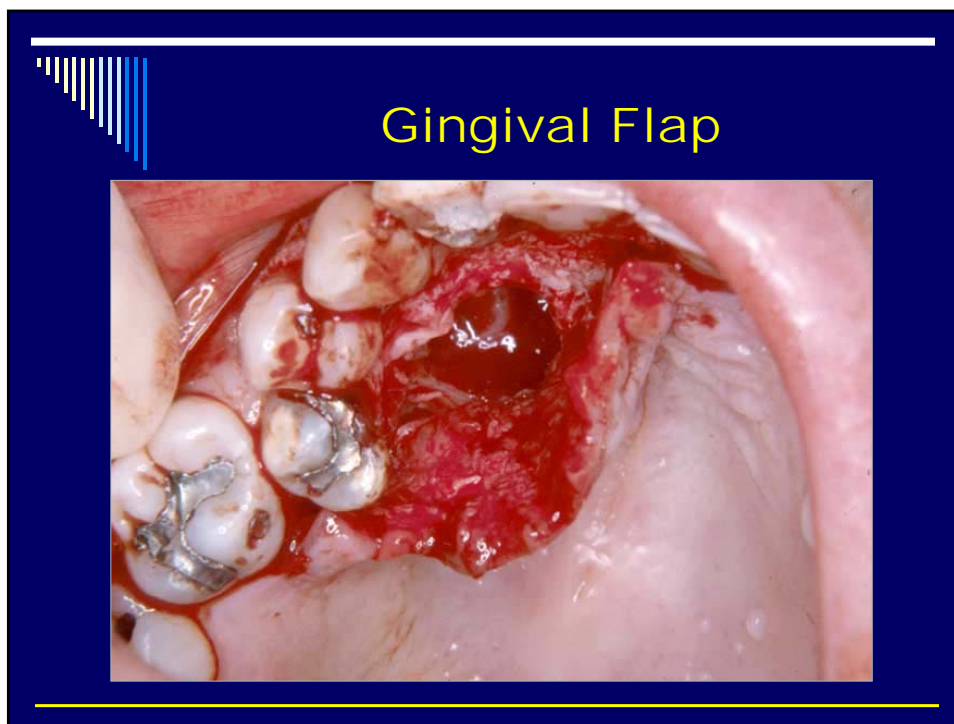


21

## Gingival Flap

- ◆ **Gingival crest incision**
  - **Extended horizontal incision**
  - **No vertical incision**
  - **No access to apex**
  - **May be useful for coronal third perforations**
  - **Used for palatal flaps**
    - ★ ***But difficult !***

22




23



24

## Triangular Flap

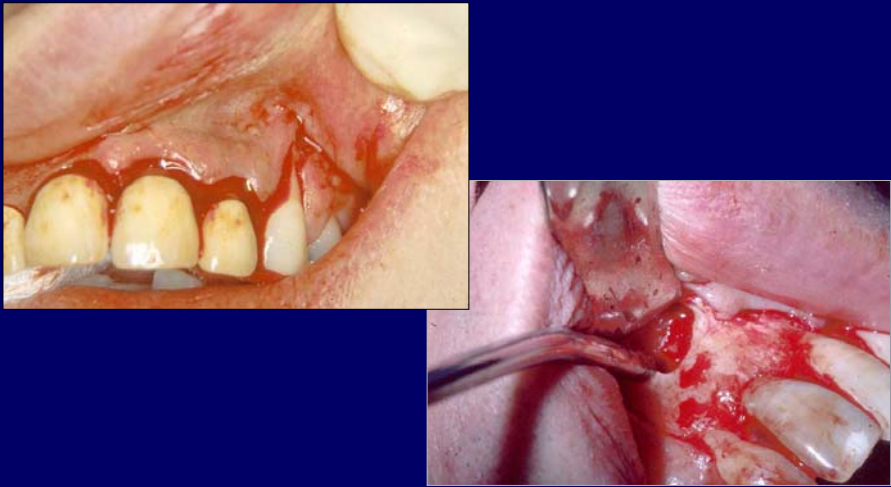
- ◆ Horizontal incision in the gingival sulcus
  - One vertical incision
- ✓ “First choice” flap for endodontic surgery
  - Good access
  - Good vision
  - Good moisture control
  - Heals without scars
  - Easy to reposition



The diagram shows a cross-section of a tooth with a horizontal incision line in the gingival sulcus. A vertical incision is made on the buccal side, and the resulting flap is shown being reflected to provide access to the root of the tooth.

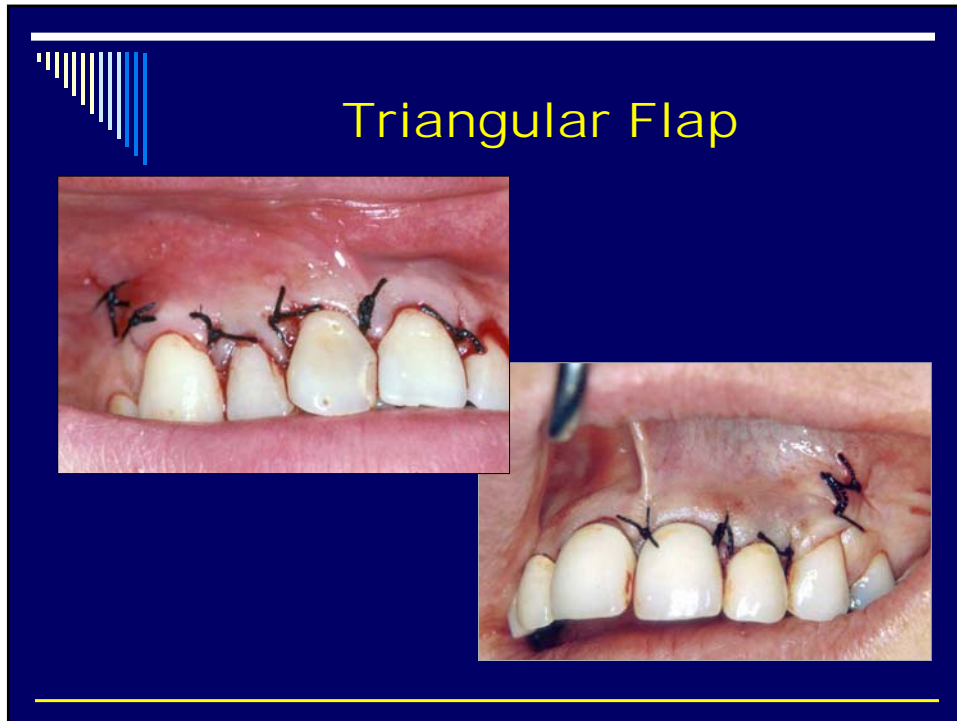
25

## Triangular Flap



The clinical photographs show the procedure in two stages. The left image shows the initial incision and flap reflection. The right image shows the flap being repositioned and sutured back into place.

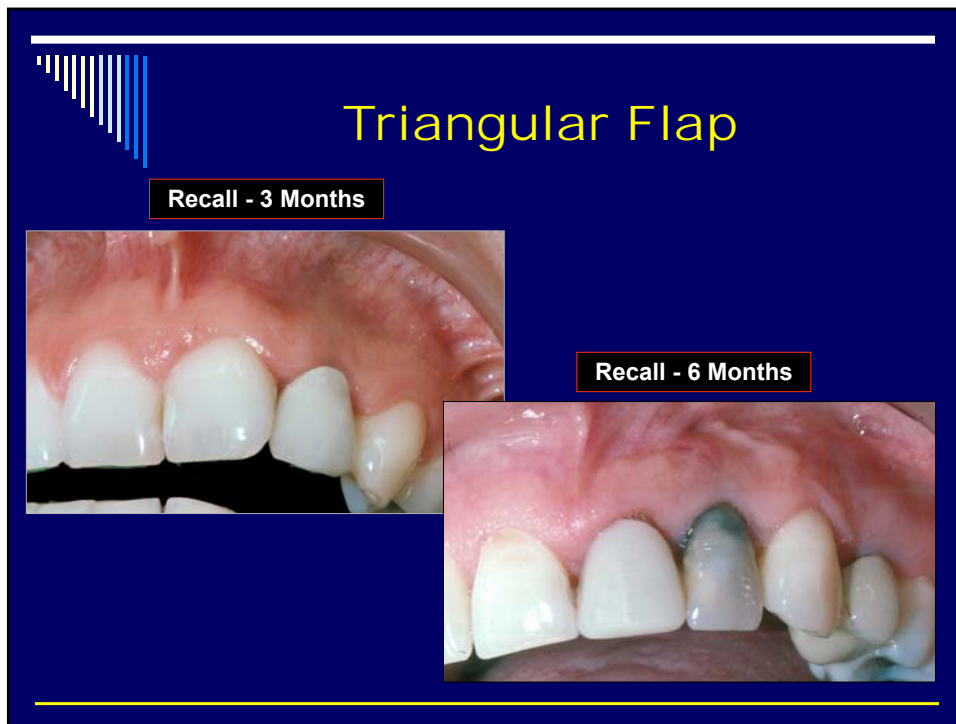
26



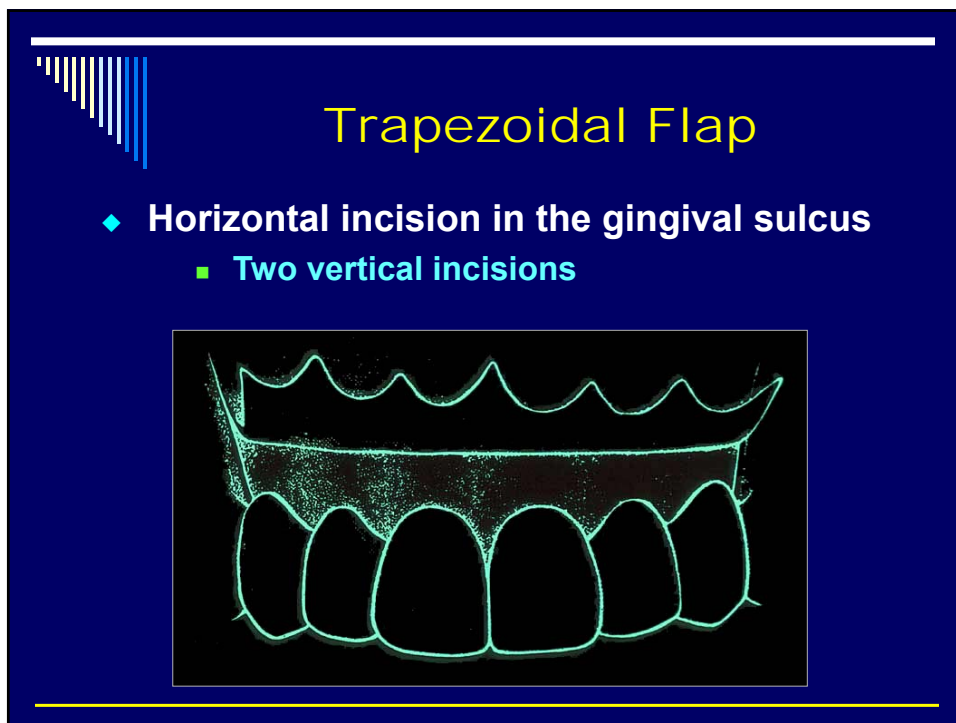
27



28



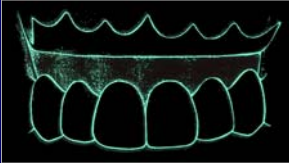
29



30

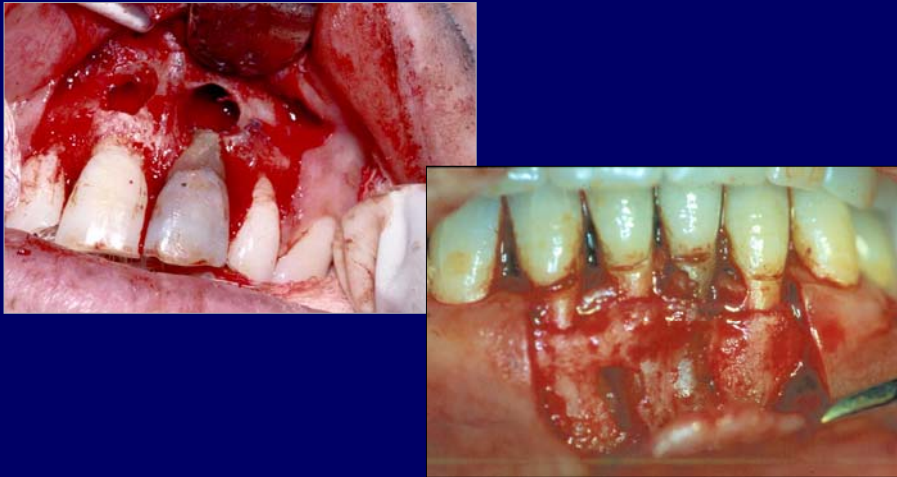
## Trapezoidal Flap

- ◆ Horizontal incision in the gingival sulcus
  - Two vertical incisions
- ✓ “Second choice” for endodontic surgery
- ★ Begin as a triangular flap and then do 2<sup>nd</sup> vertical incision if extra access required
  - Good access & vision
  - Good moisture control
  - Heals without scars
  - Easy to reposition



31

## Trapezoidal Flap



32



33

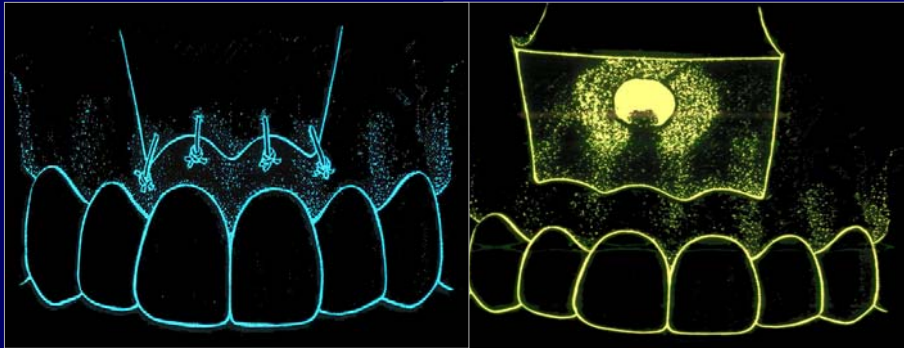
**Luebke-Oschenbein Flap**

- ◆ Scalloped horizontal incision in attached gingiva
  - 3 - 5 mm short of the gingival margin
  - Follows contours of the gingival margin
- ◆ Vertical incisions
  - 1 or 2
  - Depends on how much access is required
- ◆ Little, if any, scarring

34

## Luebke-Oschenbein Flap

- ◆ Use for anterior teeth with crowns
  - To avoid gingival recession



35

## Luebke-Oschenbein Flap



36



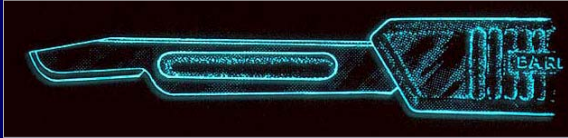
37



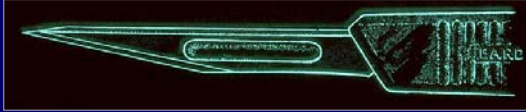
38

### Scalpel Blades

- ◆ No. 15 - for periosteal flaps

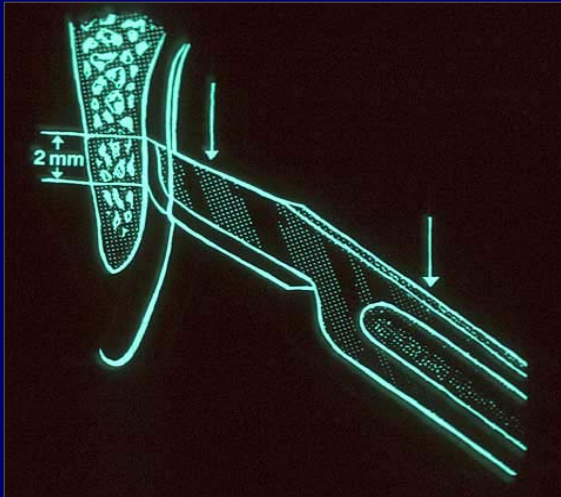


- ◆ No. 11 - for incision and drainage
  - Stabbing action

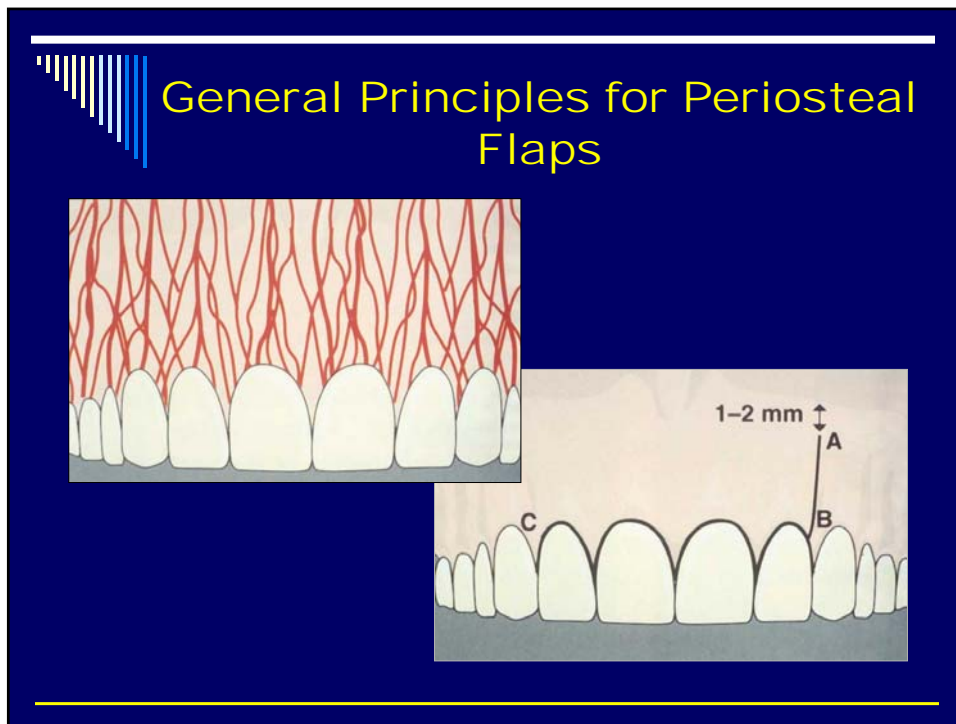


39

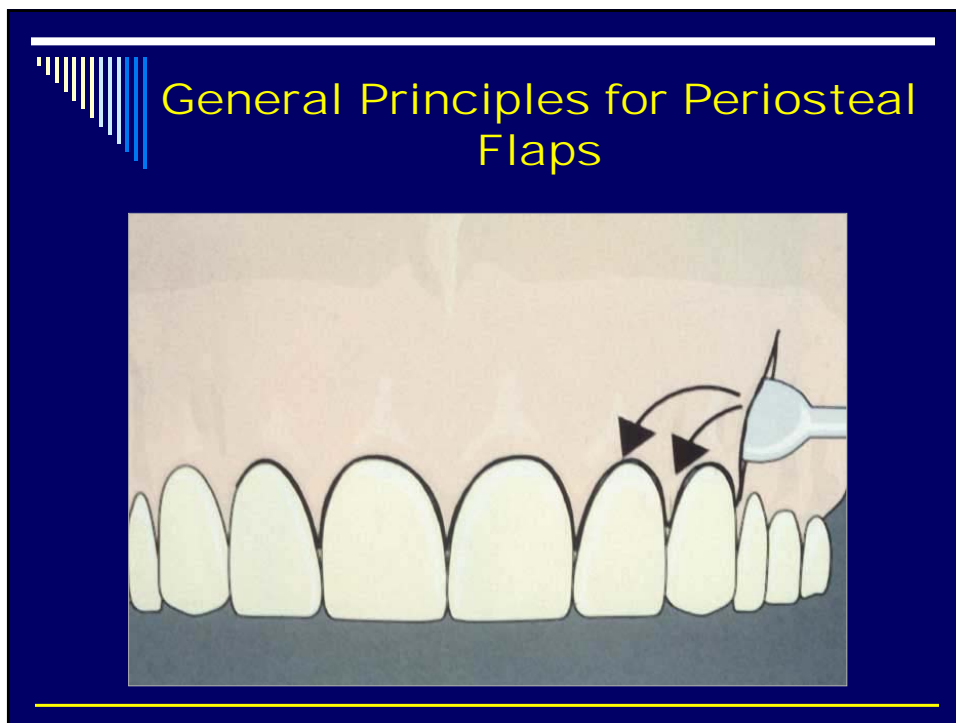
### Scalpel Blades



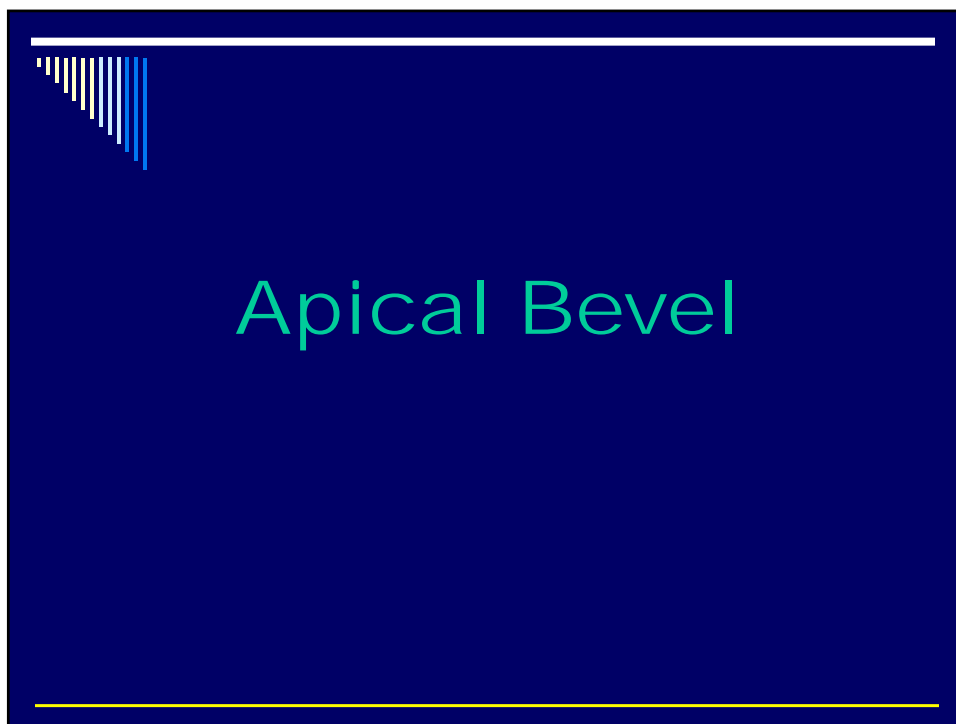
40



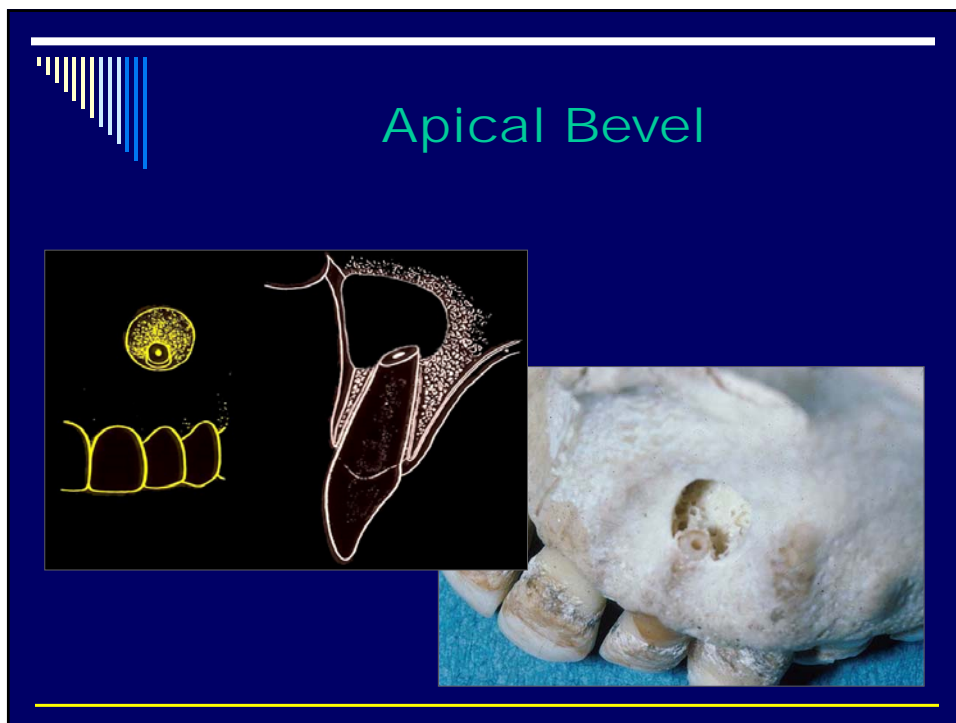
41



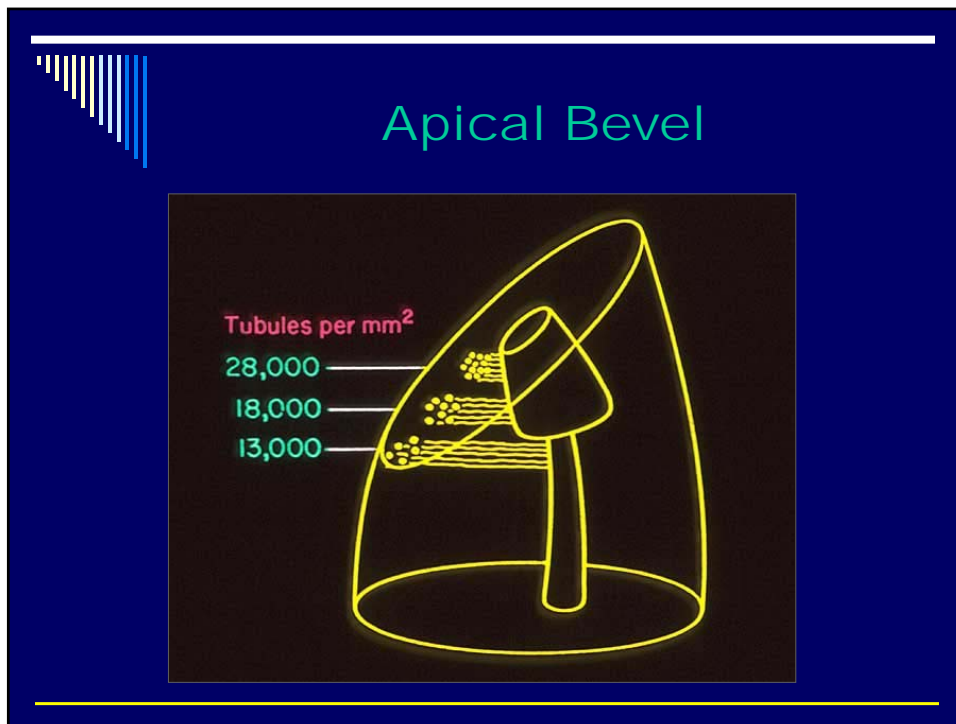
42



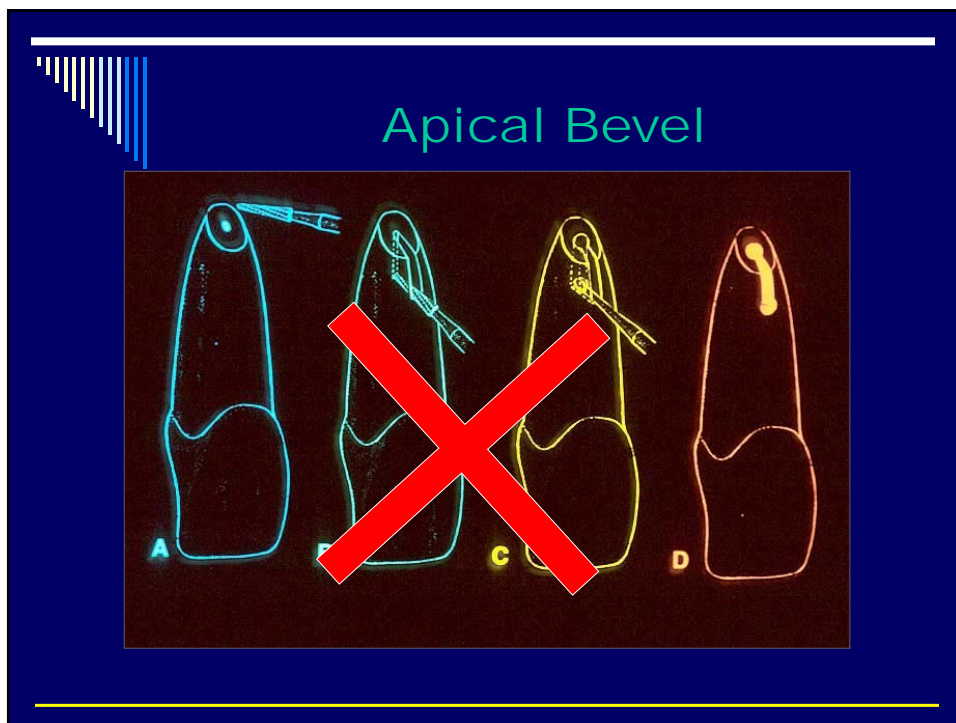
43



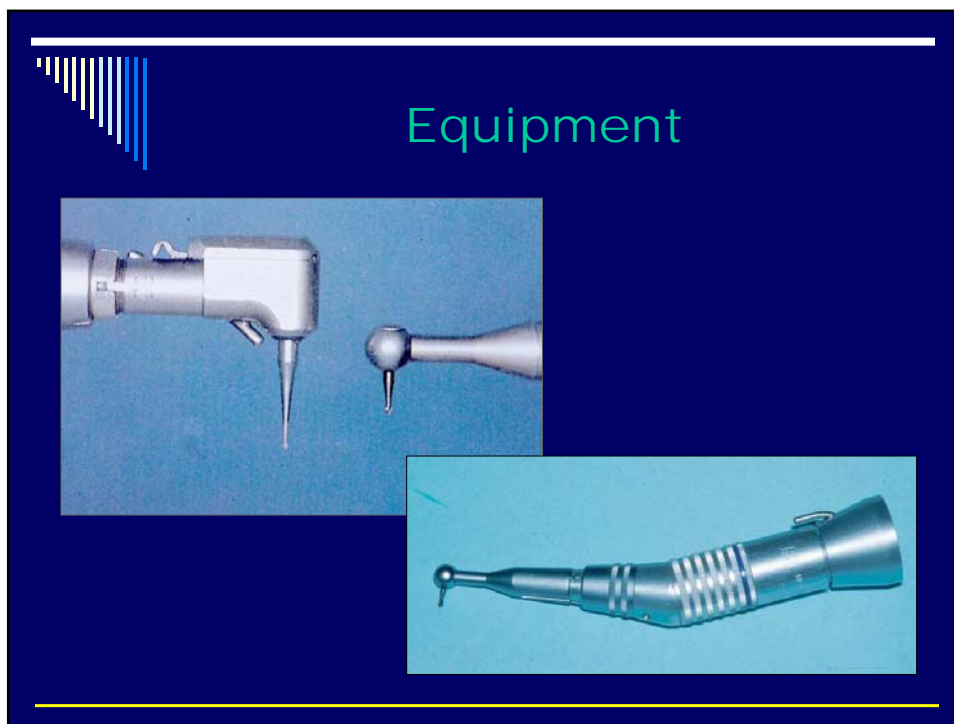
44



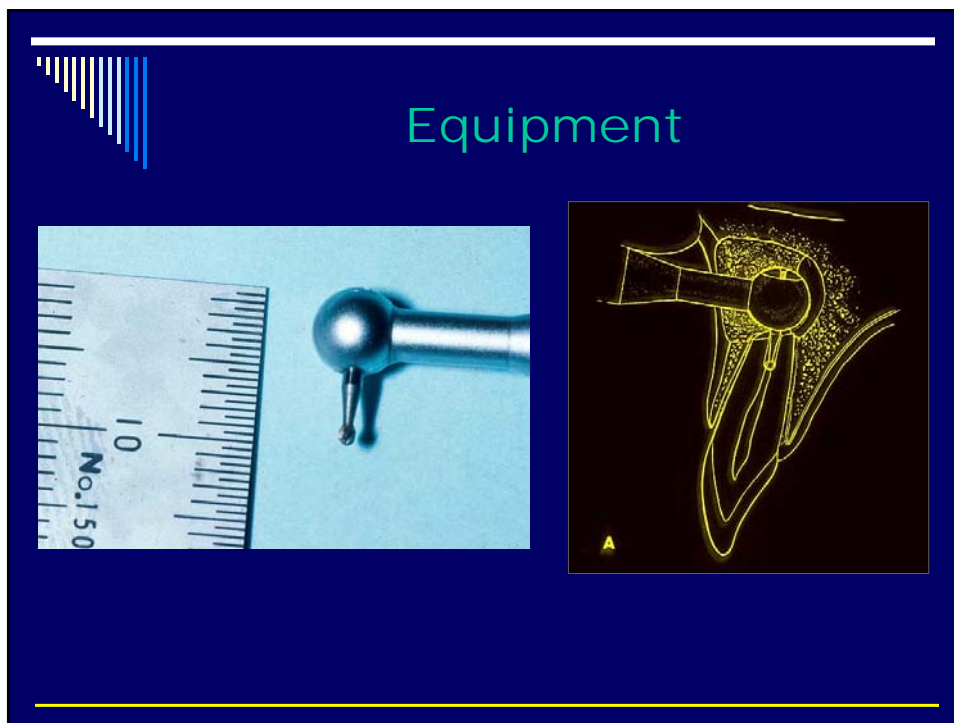
45



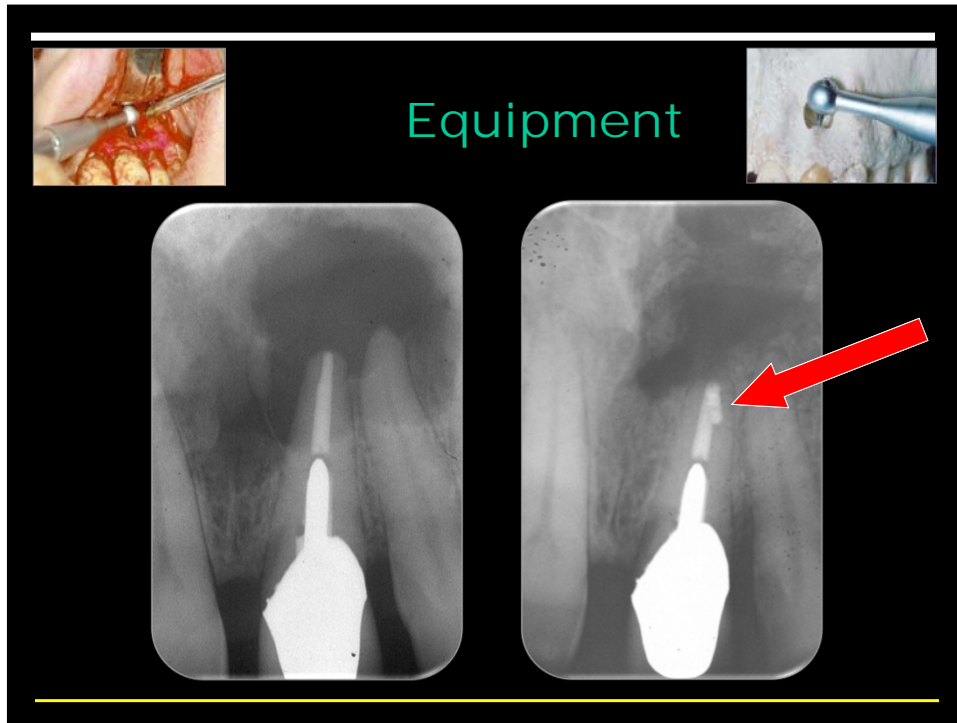
46



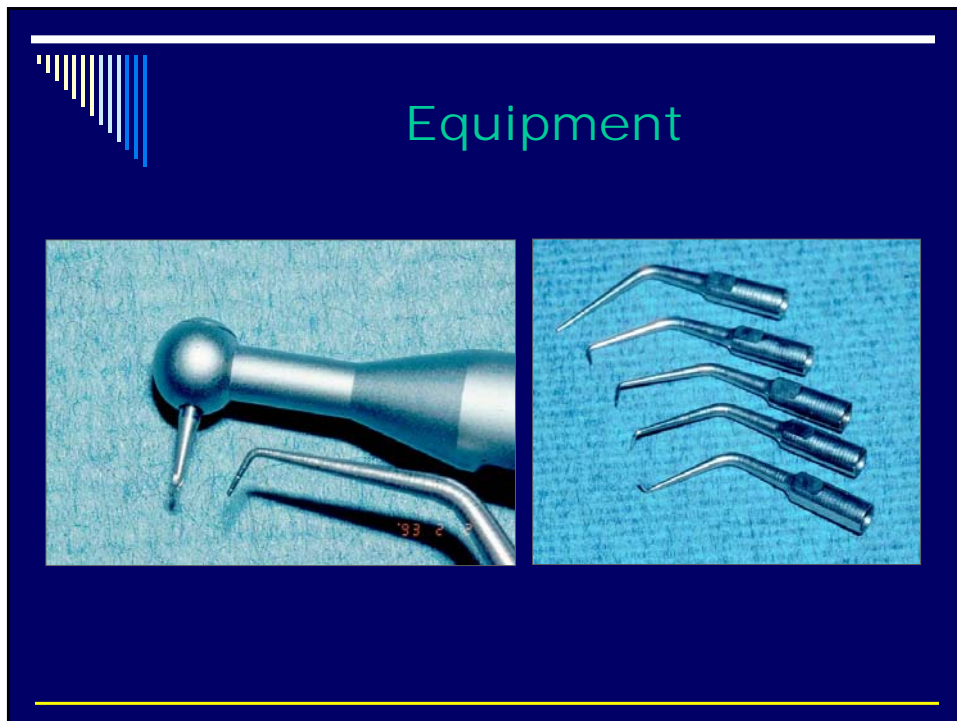
47



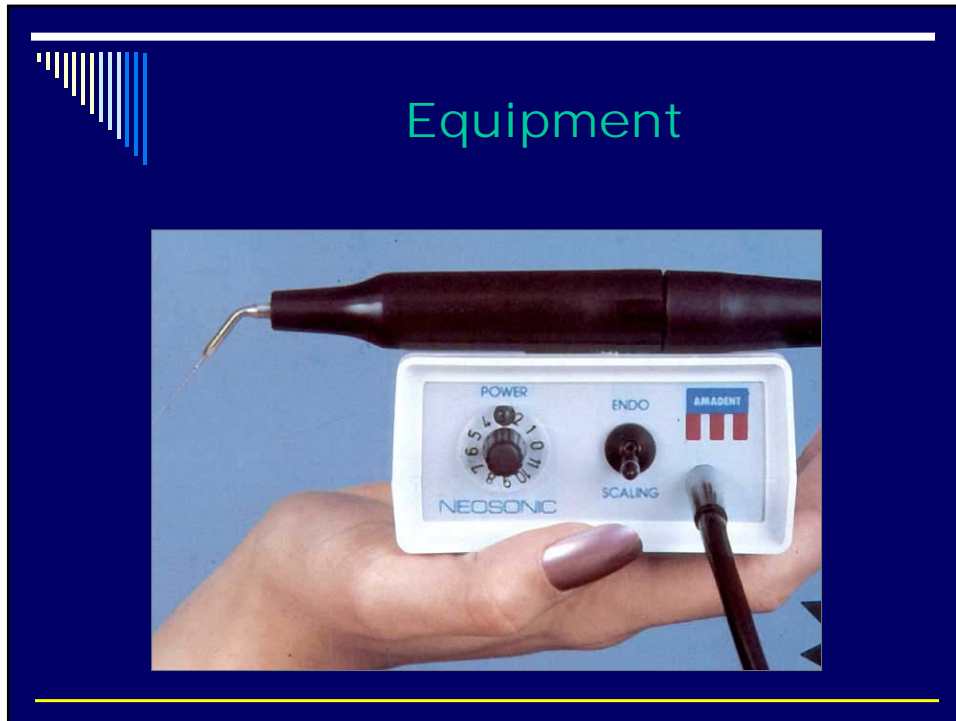
48



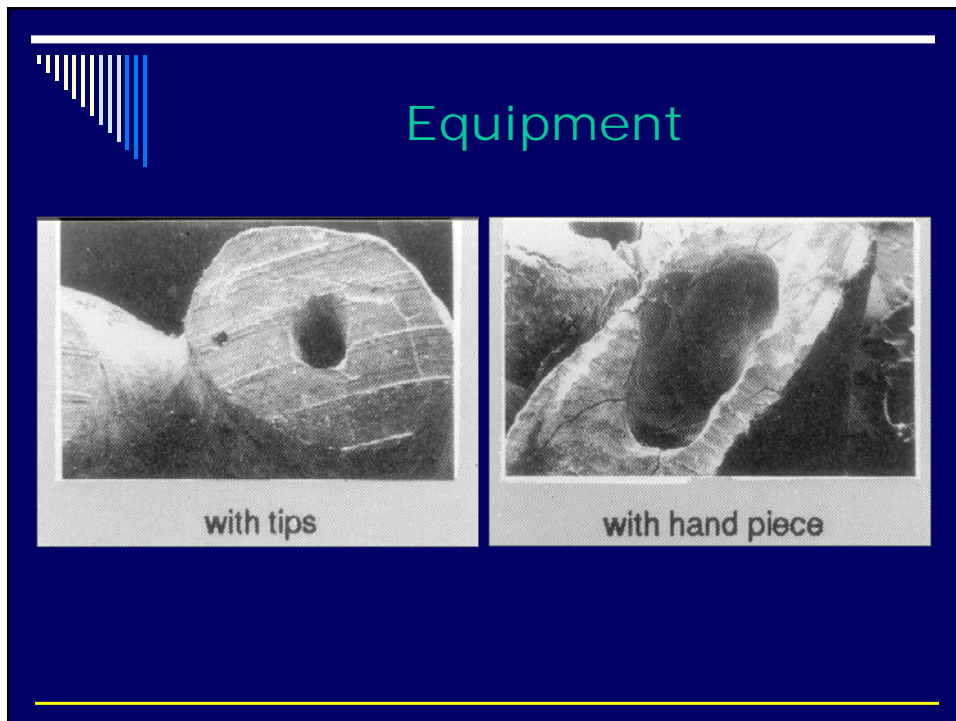
49



50



51



52



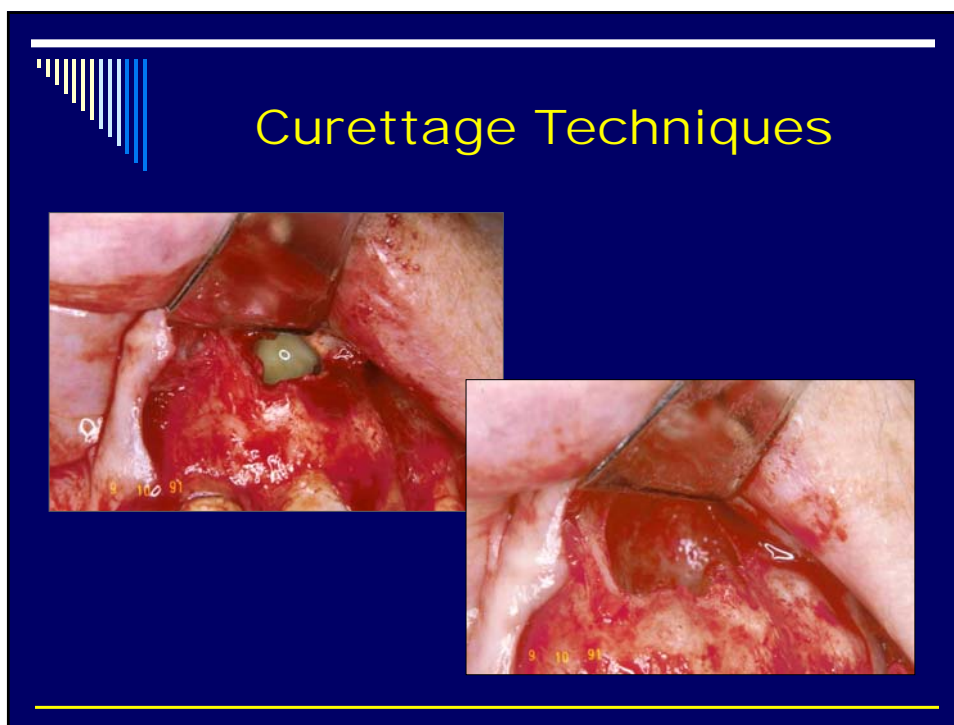
53



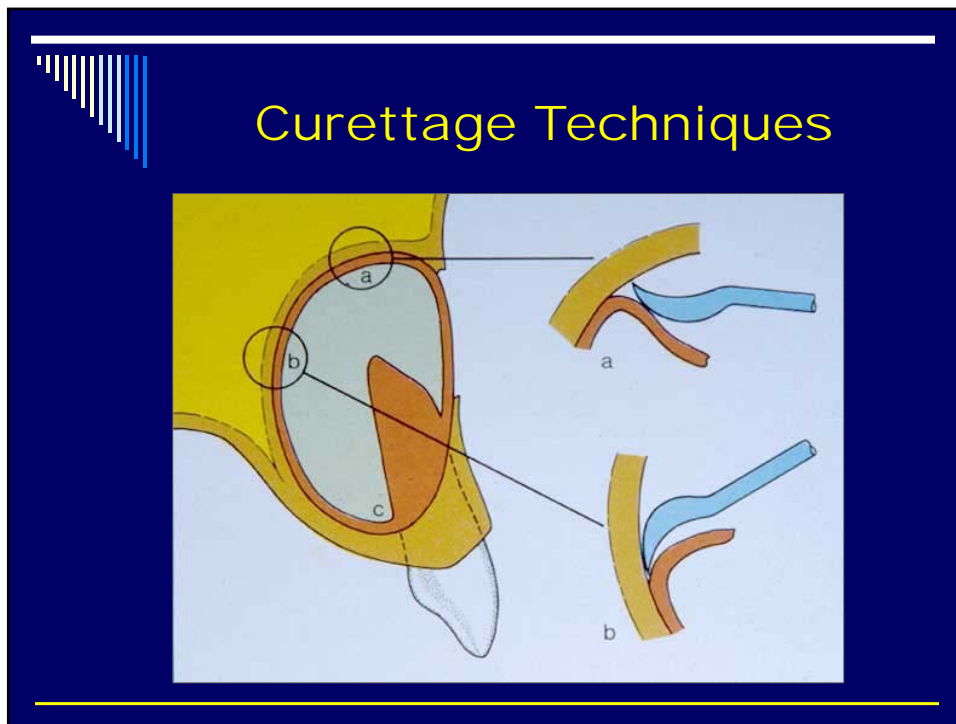
54

# Curettage Techniques

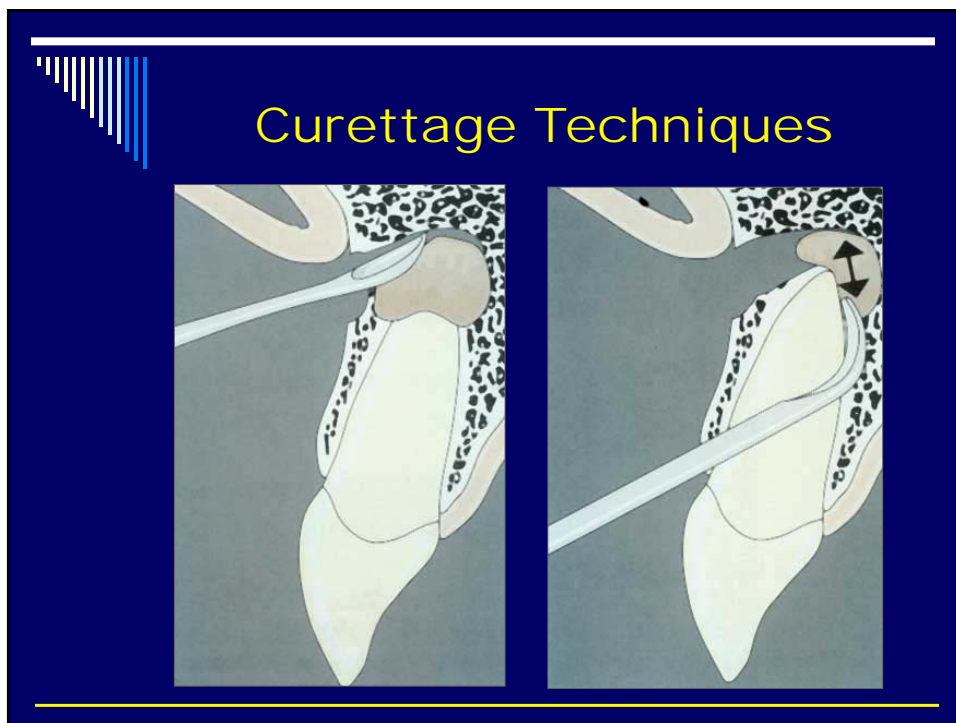
55



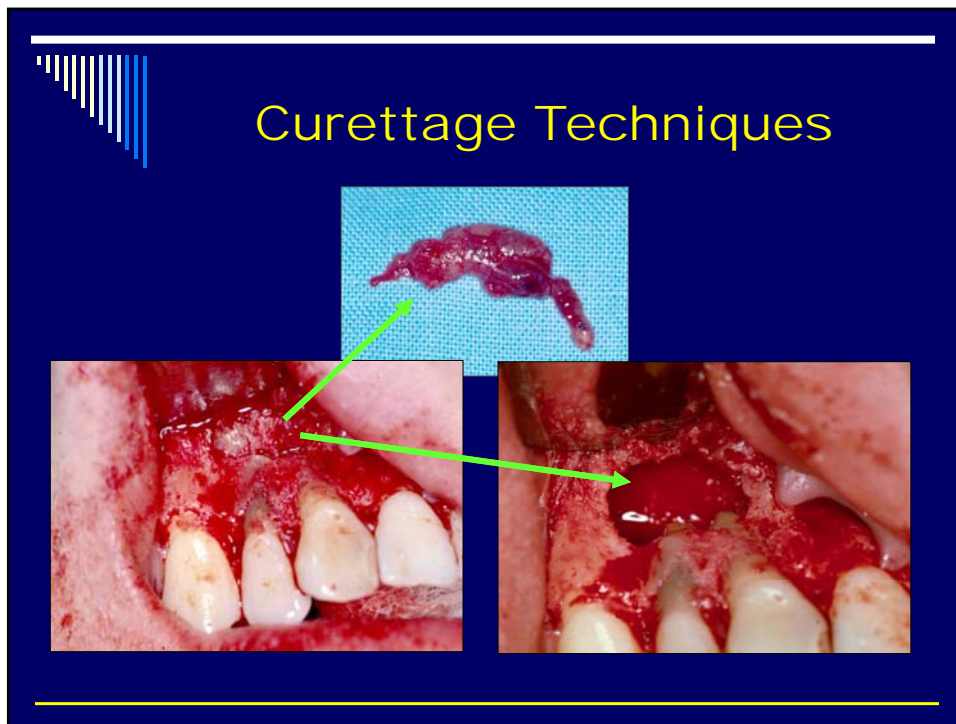
56



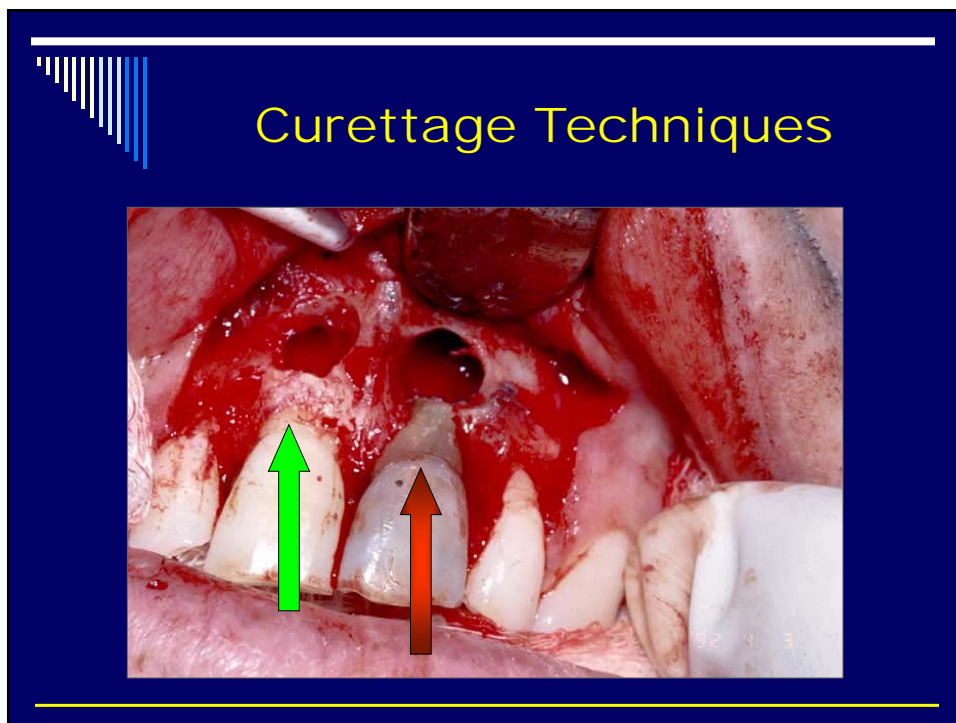
57



58



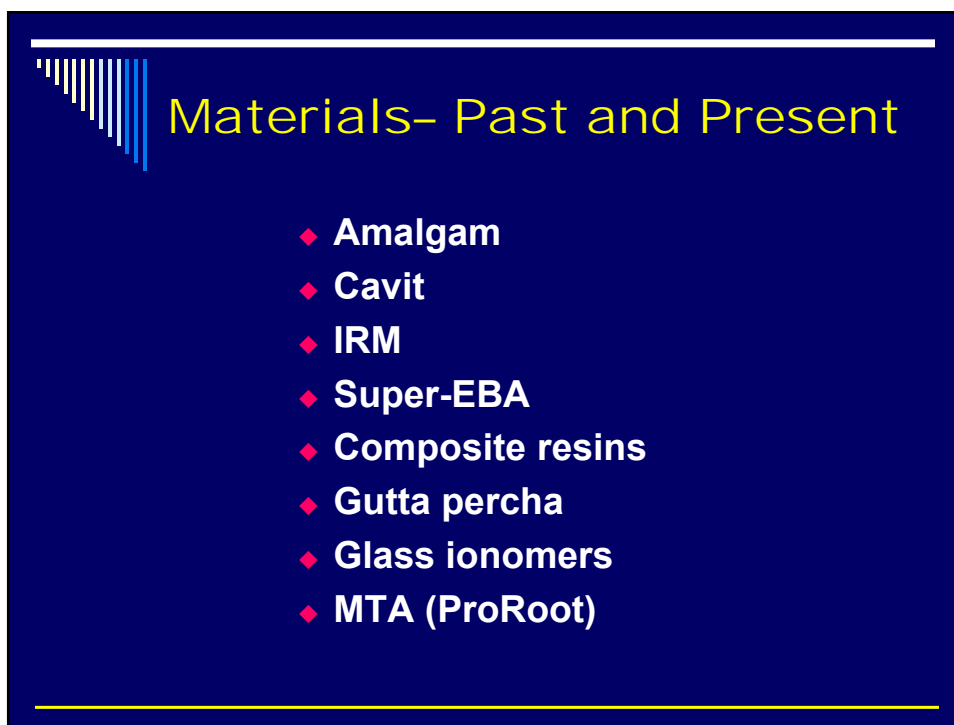
59



60



61



62


## Amalgam

**Disadvantages & Problems**

<ul style="list-style-type: none"><li>◆ Corrosion</li><li>◆ Galvanism (with posts)</li><li>◆ Tattoo on mucosa</li><li>◆ Expansion</li><li>◆ Dimensional changes</li><li>◆ Marginal breakdown</li><li>◆ Excess not absorbable</li><li>◆ Mercury release</li></ul>	<ul style="list-style-type: none"><li>◆ Difficult to condense</li><li>◆ Condensation scatter</li><li>◆ Cavity large</li><li>◆ Undercuts needed</li><li>◆ Poor adaptation to walls</li><li>◆ No anti-bacterial action</li><li>◆ Difficult to remove for re-treatment</li></ul>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

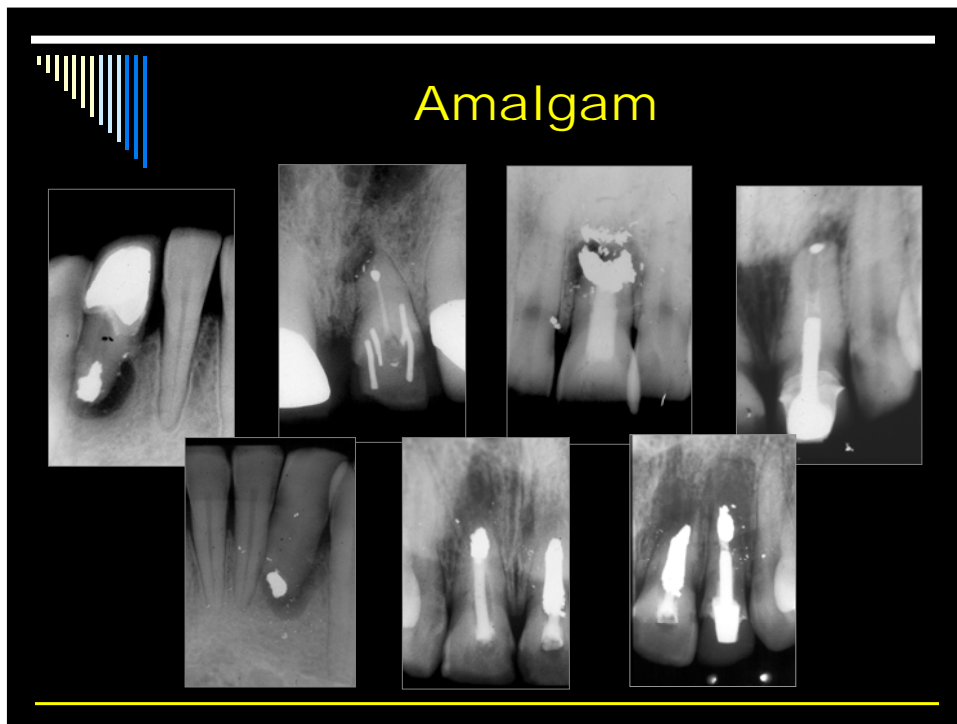
63

## Amalgam

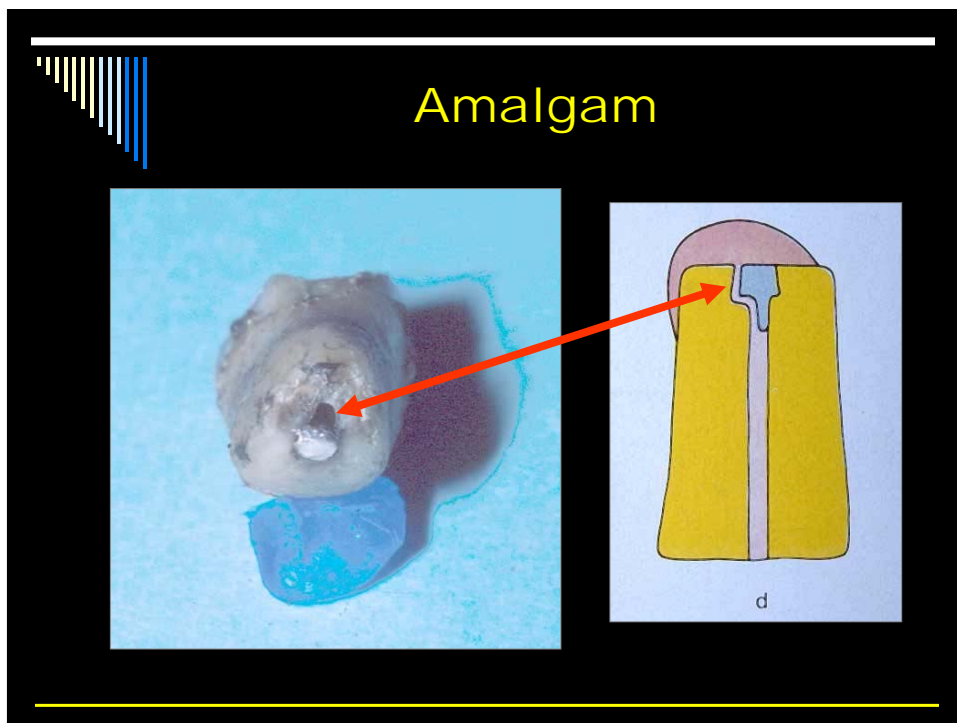


The image block contains three photographs. On the left is a radiograph showing a tooth with a post and a large amalgam filling. In the center is a clinical photograph of a tooth with a post and a black arrow pointing to a dark, irregular stain on the gingival tissue, which is a mucosal tattoo. On the right is another radiograph showing a tooth with a post and a large amalgam filling.

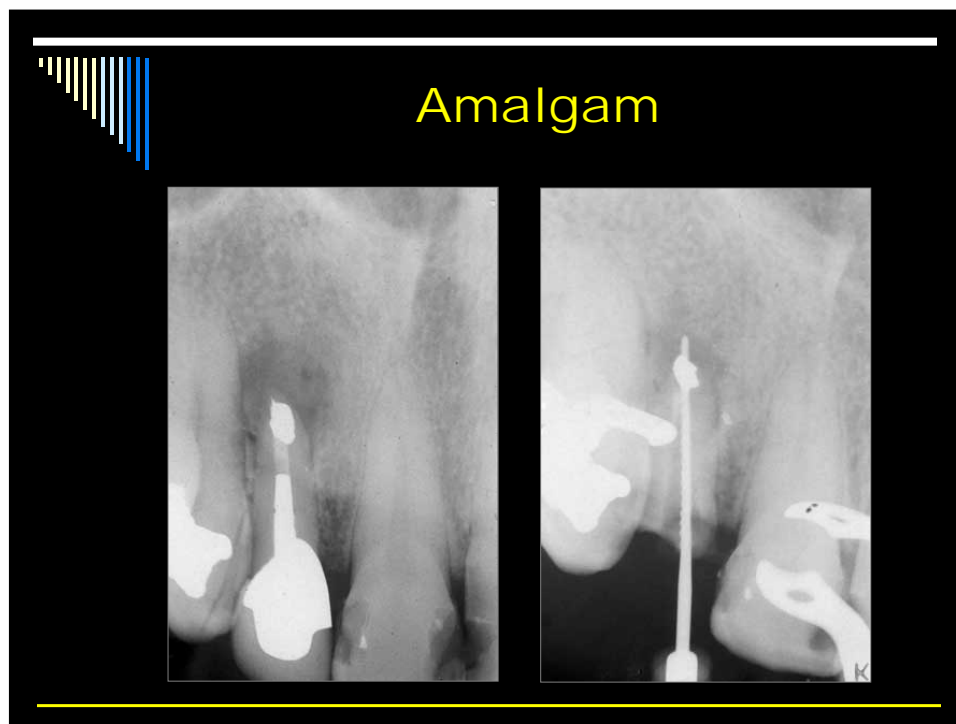
64



65



66



67

## IRM + Super-EBA

**Disadvantages & Problems**

- ◆ **Poor tissue compatibility**
  - Due to continuous release of eugenol
  - Fibrosis of adjacent tissue
- ◆ Soluble
- ◆ Large cavity required
- ◆ Difficult to handle material
  - Esp. Super-EBA

68

## Glass Ionomer

### Advantages

- ◆ Low tissue toxicity
  - Bone apposition
- ◆ Good sealing ability
- ◆ Chemical bond to dentine
- ◆ Radiopaque
- ◆ Easy to mix & place
- ◆ Colour contrast to tooth
- ◆ Short setting time

### Disadvantages

- ◆ Moisture control
  - Haemorrhage
- ◆ Relatively large cavity required

69

## Mineral Trioxide Aggregate



- Now Tooth-Colored Formula
- One Visit Pulp Capping
- 5x1 gram 

REF A 0405 000 001 00

Distributed by  
**DENTSPLY**  
MAILLEFED

70

## Mineral Trioxide Aggregate

**Clinical applications for ProRoot™ MTA**

Because of its unique features and benefits, ProRoot™ MTA offers distinct advantages over other materials for these root canal repair procedures:

- Repair of root perforations during root canal therapy**  
Perforations are the result of procedural error in which a communication between the pulp canal and the periradicular tissue occurs. ProRoot™ MTA can be used to seal perforations.
- Pulp capping**  
Vital pulp therapy may be indicated in certain clinical situations. Placing ProRoot™ MTA over the exposed root surface allows healing and preservation of the vital pulp without further treatment. Because of its unique features and benefits, ProRoot™ MTA offers distinct advantages over other materials for these root canal repair procedures.
- Repair of root resorption**  
Internal root resorption is an idiopathic condition resulting in the breakdown or destruction of root structure. ProRoot™ MTA can seal the resorptive defect.
- Repair of root perforations during root canal therapy**  
Perforations are the result of procedural error in which a communication exists between the pulp canal and the periradicular tissue occurs. ProRoot™ MTA can be used to seal perforations.
- Root-end filling**  
Root-end filling is required when an endodontic case can best be treated or repaired with a surgical (extra-radicular) rather than an intra-radicular approach. ProRoot™ MTA has excellent sealing ability and allows periradicular healing when used as a root-end filling material during periradicular surgery.
- Apicalification**  
ProRoot™ MTA is an excellent material for apicalification because ProRoot™ MTA creates a permanent apical plug at the outset of treatment.

71

## Mineral Trioxide Aggregate

Advantages

Disadvantages

- ◆ Low tissue toxicity
  - Bone apposition
  - PDL repair
- ◆ Good sealing ability
- ◆ Radiopaque
- ◆ Colour contrast to tooth
  - Grey version

- ◆ Moisture control
  - Haemorrhage
- ◆ Relatively large cavity required
- ◆ Difficult to handle
- ◆ Difficult to place
- ◆ Long setting time
  - Various times / forms
- ◆ Expensive

72

## Gutta Percha + Cement

**Advantages**

- ◆ Low tissue toxicity
- ◆ Good sealing ability
- ◆ Radiopaque
- ◆ Colour contrast to tooth
- ◆ Conservative cavity only
- ◆ Anti-bacterial (cement)

- ◆ Easy to mix & place
- ◆ Good physical properties
- ◆ Satisfies requirements of root filling materials
- ◆ Proven and acceptable material for RCF's for over 120 years

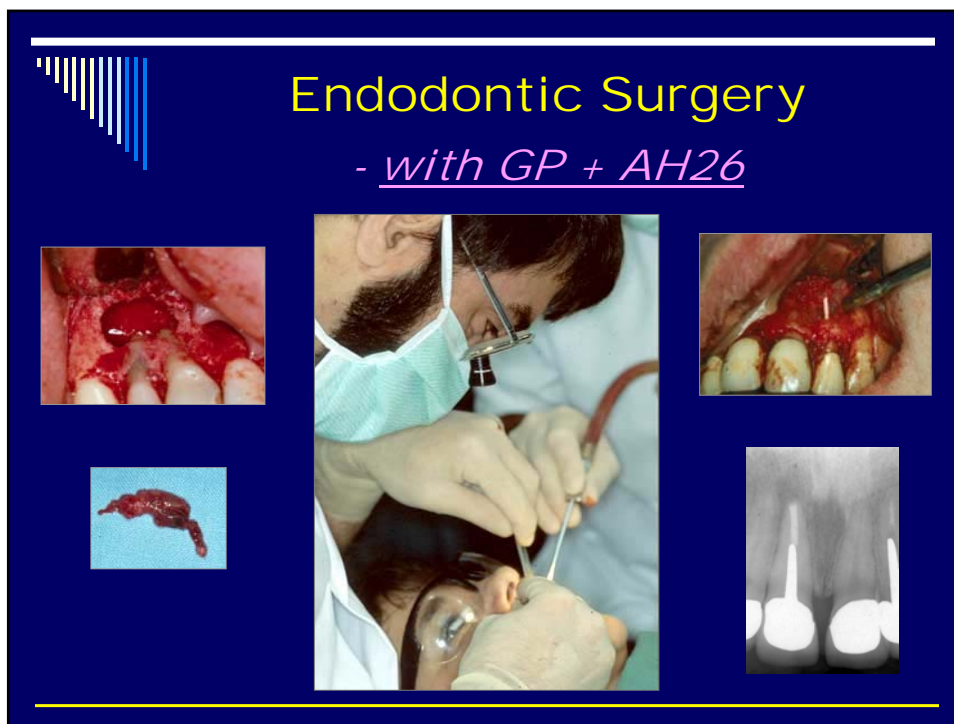
73

## Treatment Outcome Studies

Reference	Favourable	Uncertain	Unfavourable
Nordenram <i>et al</i> 1970	56 %	36 %	8 %
Harty <i>et al</i> 1970	90	-	10
Rud <i>et al</i> 1972	83	14	3
Malmström <i>et al</i> 1982	74		9
Forsell <i>et al</i> 1988	68		11
Amagasa <i>et al</i> 1989	95	-	5
Grung <i>et al</i> 1990	85	14	1
Friedman <i>et al</i> 1991	70	30	-
Rapp <i>et al</i> 1991	56	33	11
<b>Abbott 1999</b>	<b>92.3</b>	<b>4.2</b>	<b>3.5</b>

All re-treats after retro. amalgam

74

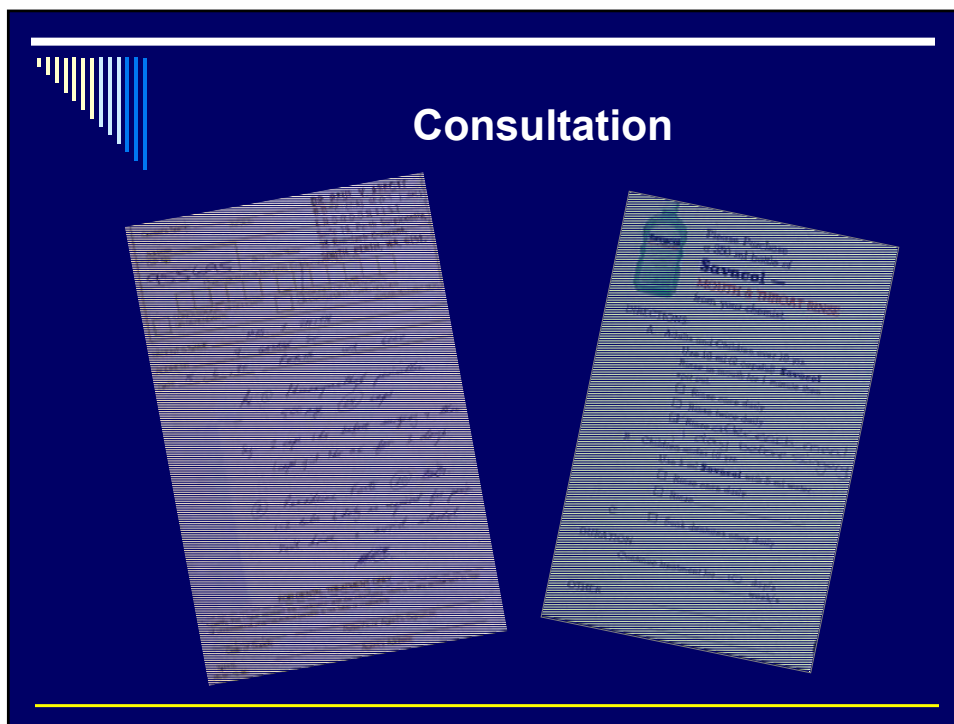


75

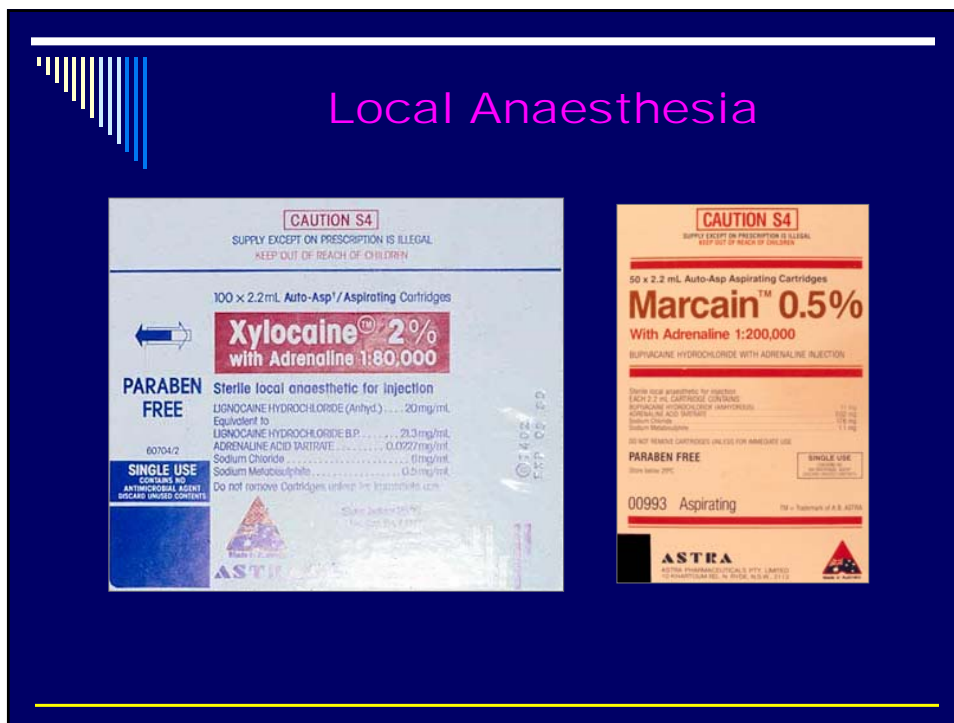
## Endodontic Surgery - Stages

- a) Consultation, Diagnosis, Treatment Plan
- b) Local Anaesthesia
- c) Periosteal Flap
- d) Curettage
- e) Apicoectomy
- f) Retrograde Endodontic Treatment
  - Apical Bevel, Canal Preparation, Root Filling
- g) Wound Closure - sutures
- h) Post-operative Instructions
- i) Follow-up & Review

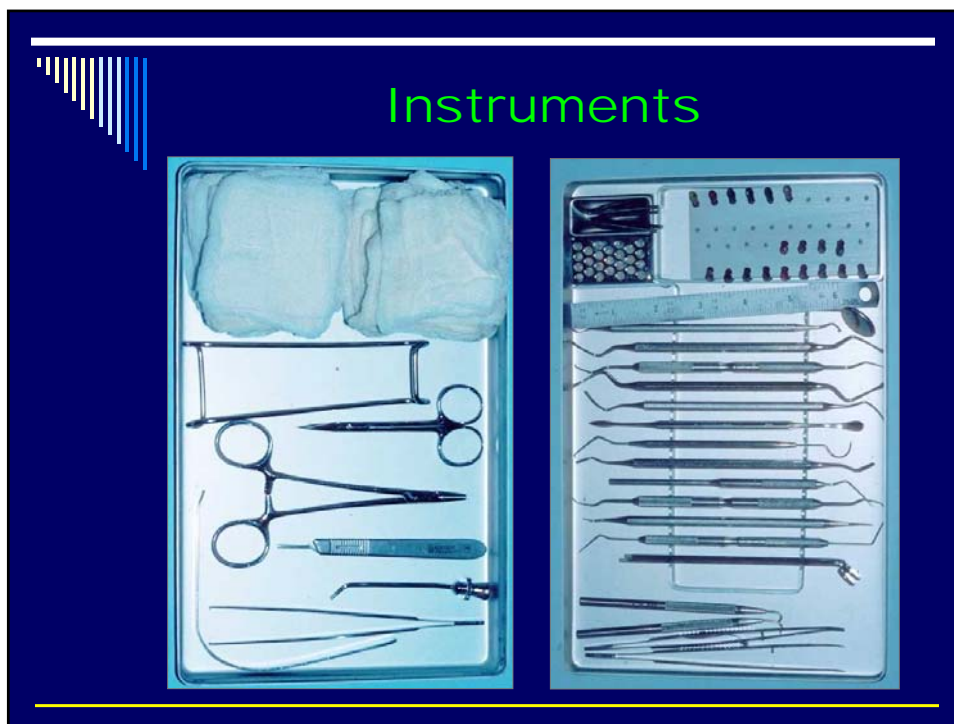
76



77



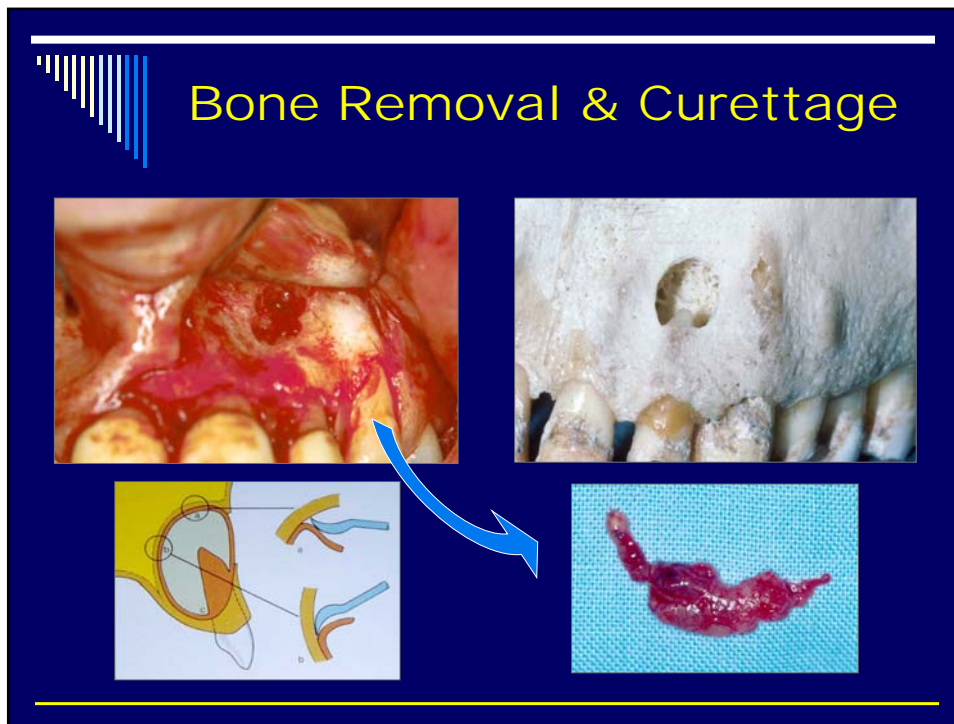
78



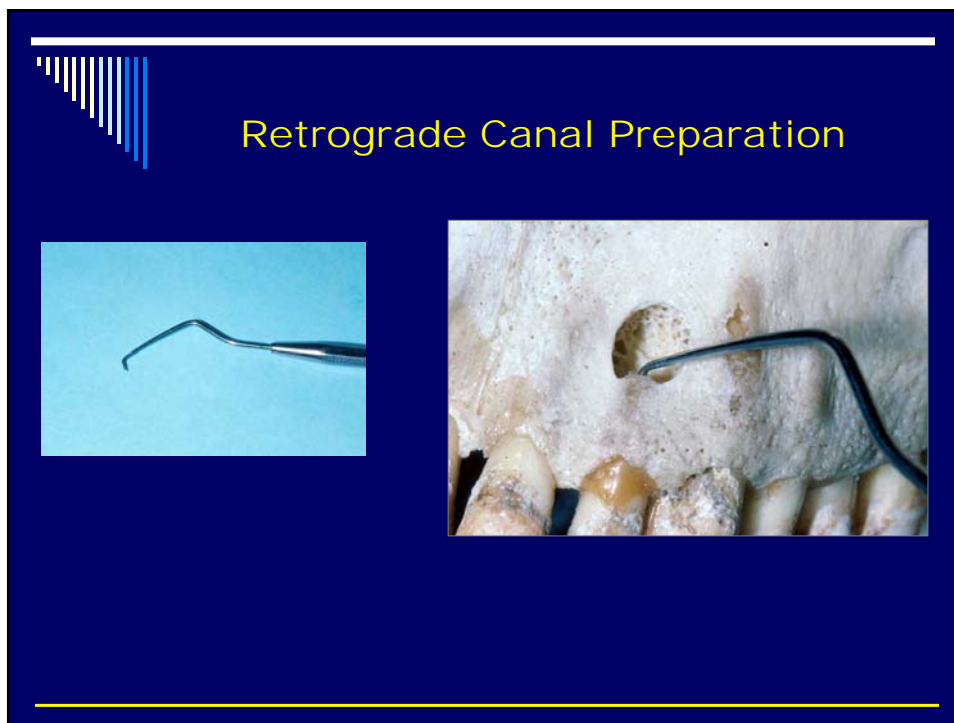
79



80



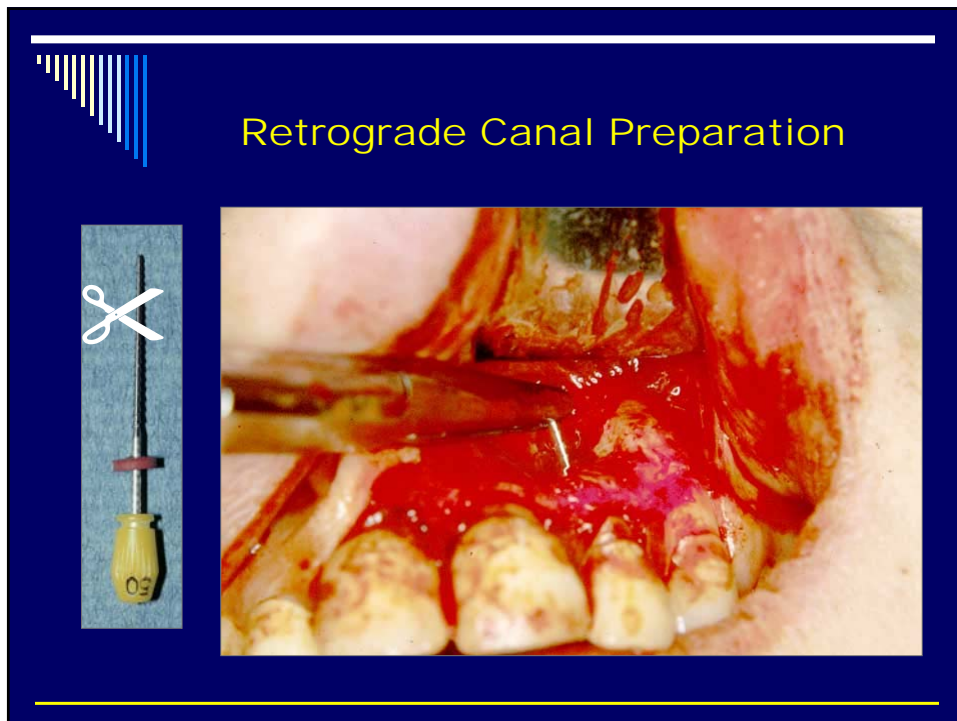
81



82



83



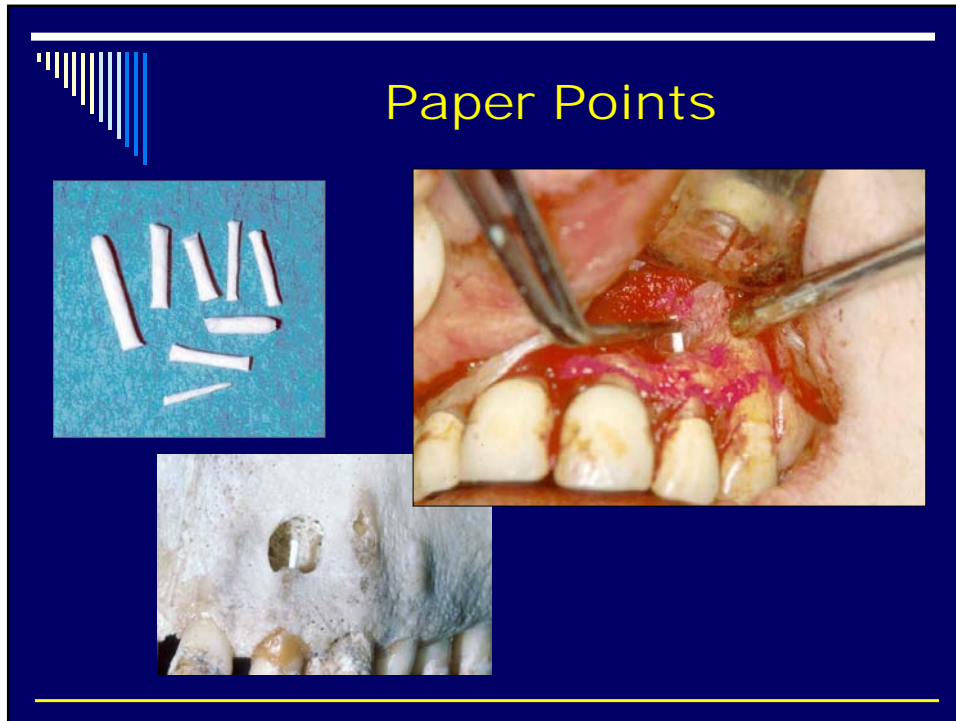
84



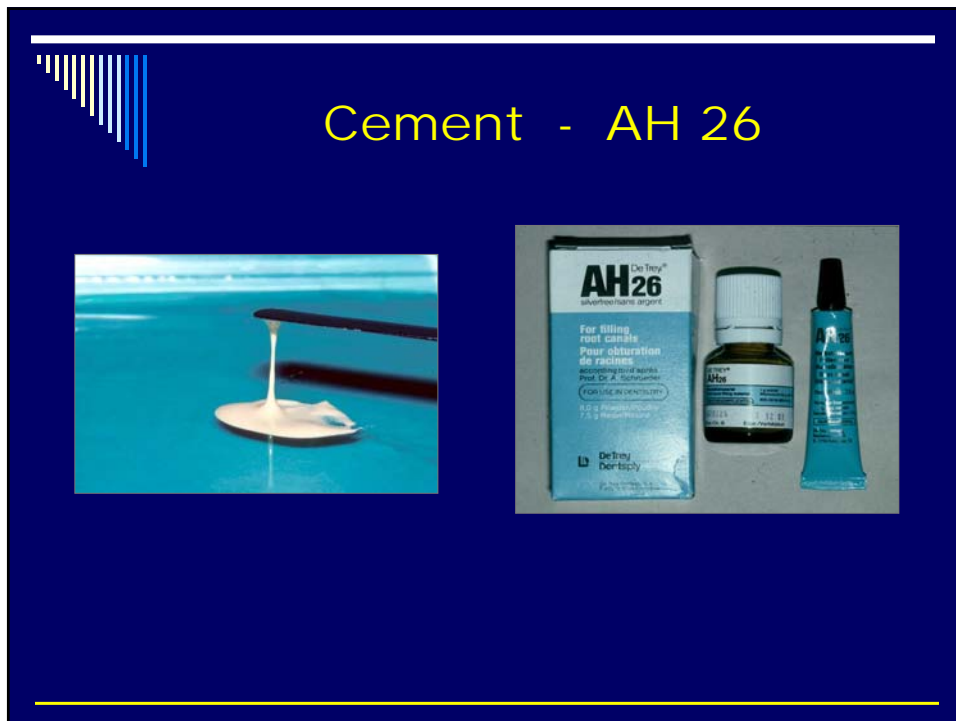
85



86



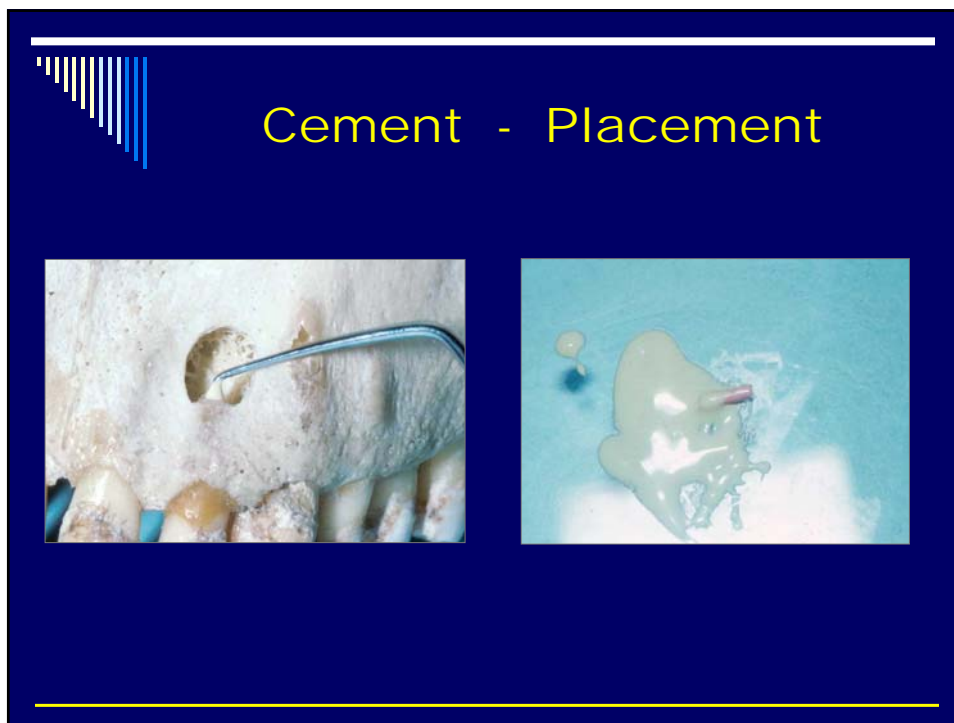
87



88



89



90



91



92



93



94

## Retrograde Root Filling



The image shows a white bottle of Eucalyptus Oil B.P. with a green and white label. The label contains the following text: "POISON" in a red box, "KEEP OUT OF REACH OF CHILDREN", "EUCALYPTUS OIL B.P.", "Dose: 0.05 to 0.2 ml", "BATCH 6H4658A EXP AUG '88 PROD NO 329 500 MLs", and "RAMPRIE LABORATORIES AUSTRALIA H16". To the right of the bottle is a blue paper cone with two white pellets, likely representing the material used for retrograde root filling.

95

## Retrograde Root Filling



The image shows a close-up of a tooth with a retrograde root filling. The filling is a light-colored material, possibly zinc phosphate cement, and is visible through the root canal. The tooth is surrounded by other teeth and a blue background.

96

## Suturing

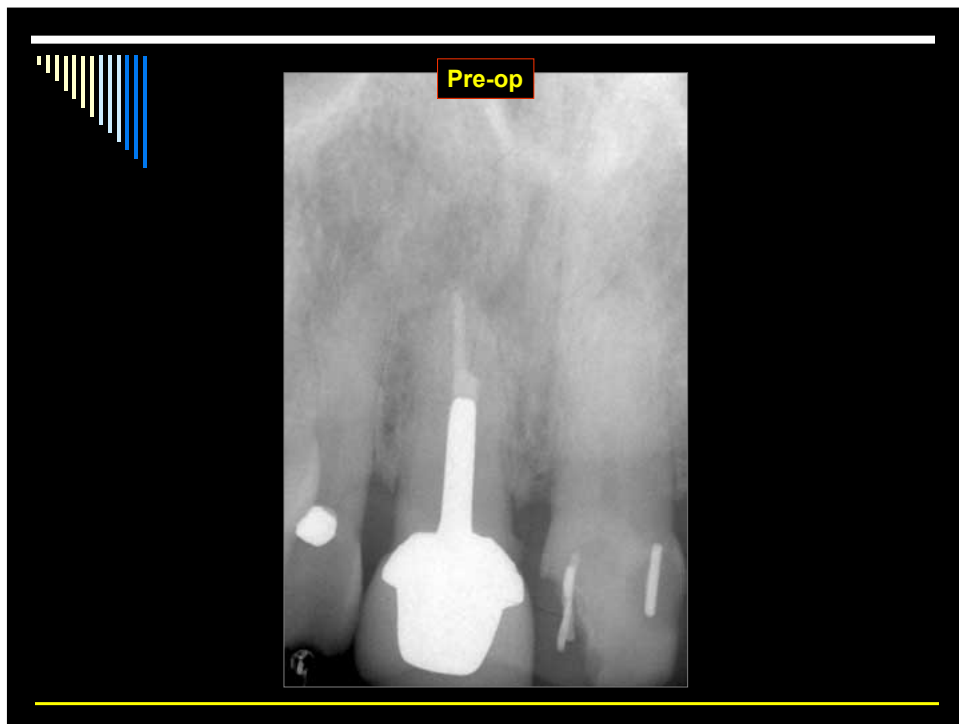
97

## Post-Operative Instructions

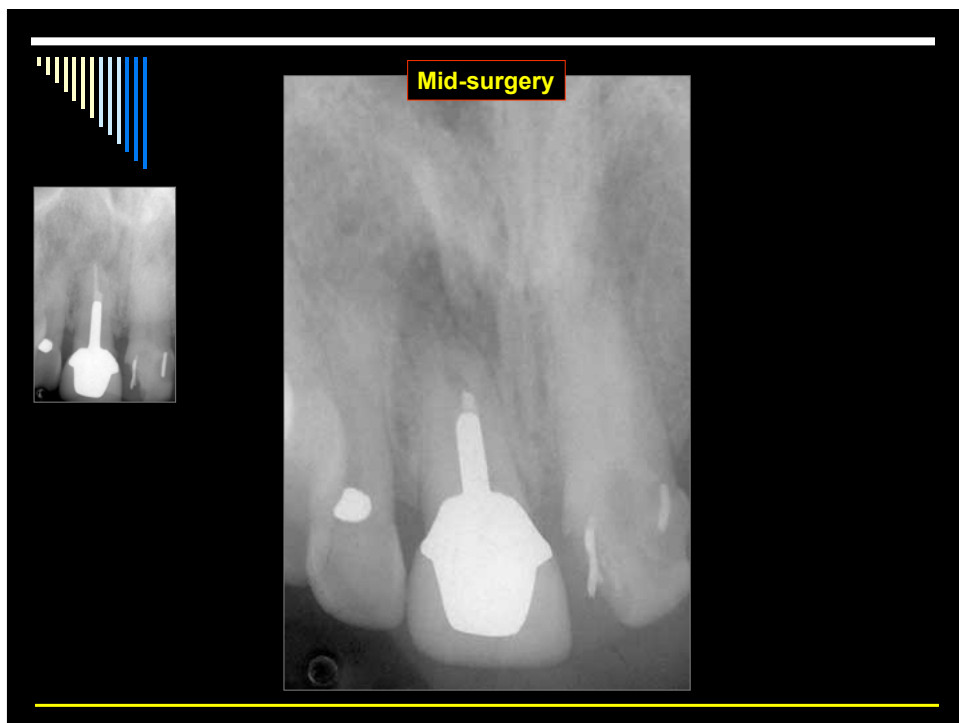
ALSO:

1. Post-op Radiograph
2. Suture Removal
  - 4-5 days
3. Reviews
  - 3-4 months
  - 12 months
  - 3 years

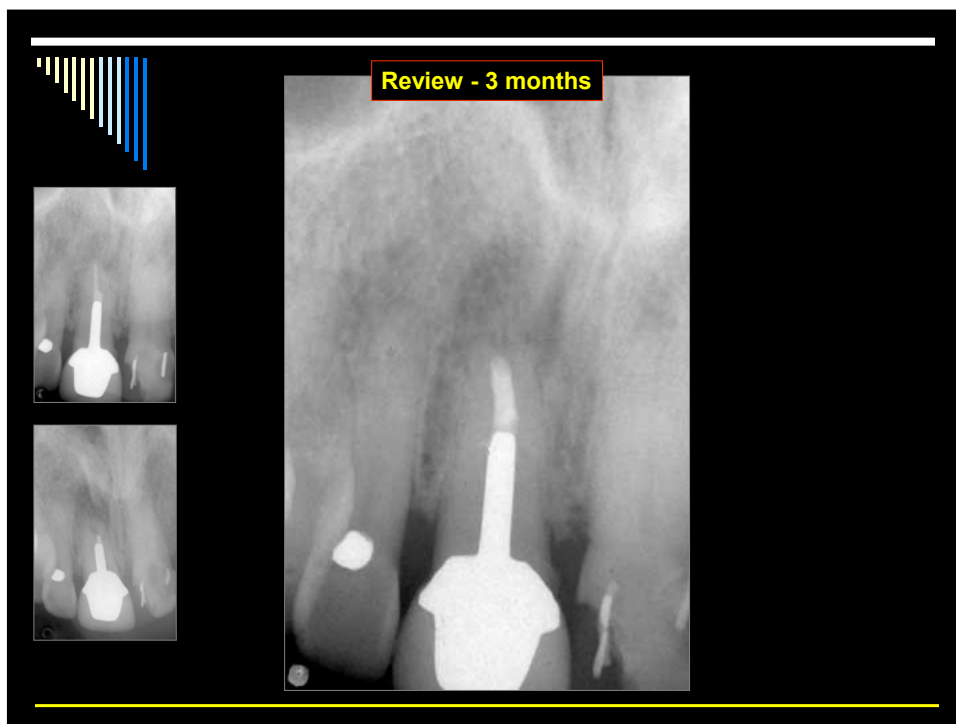
98



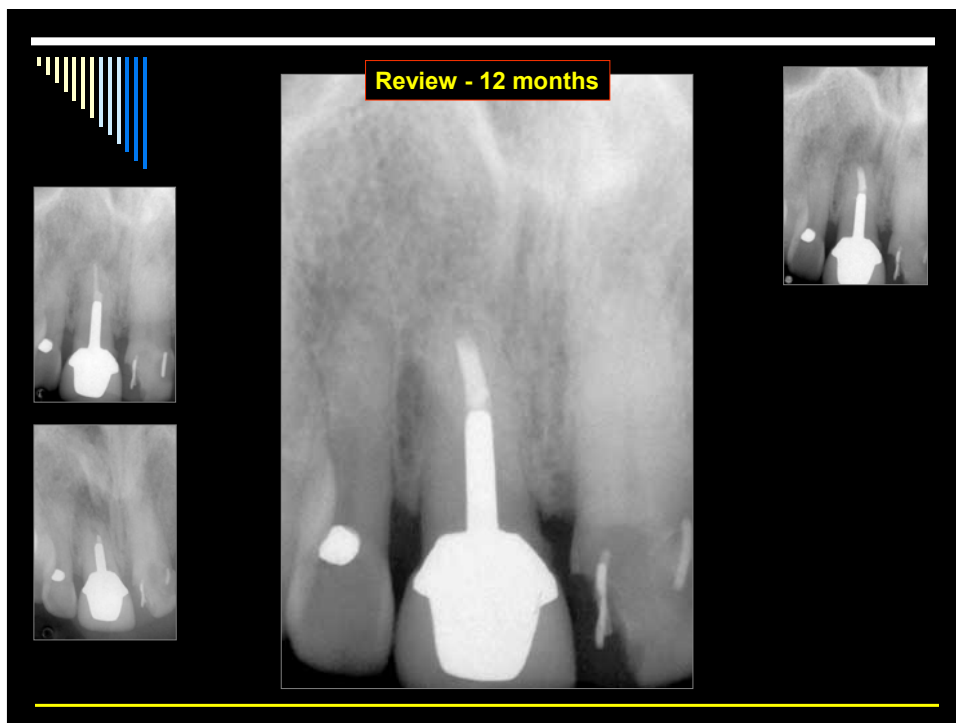
99



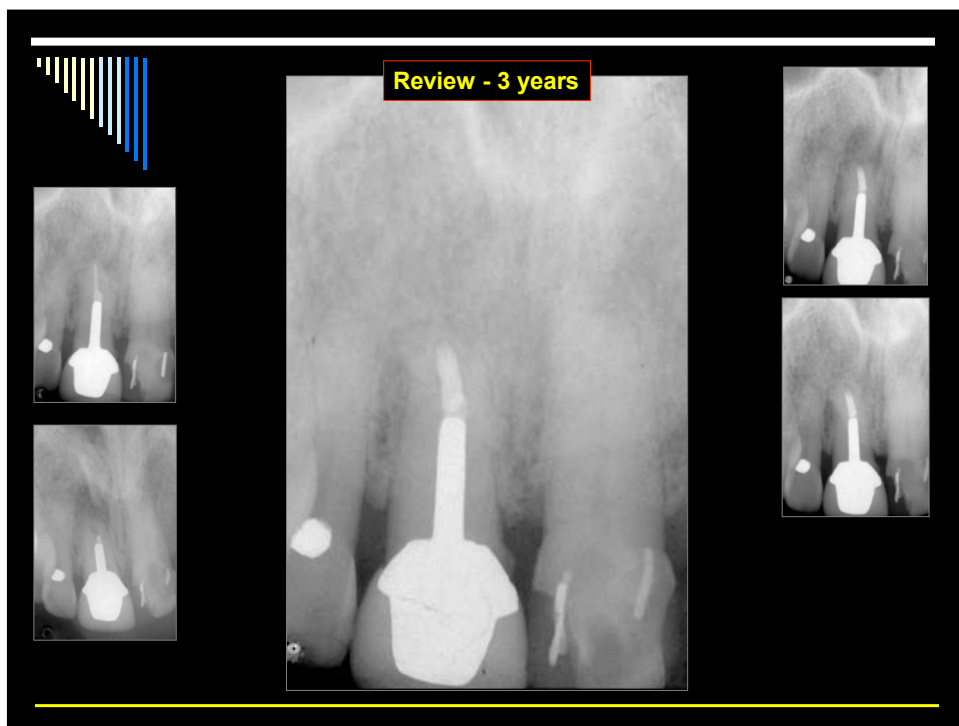
100



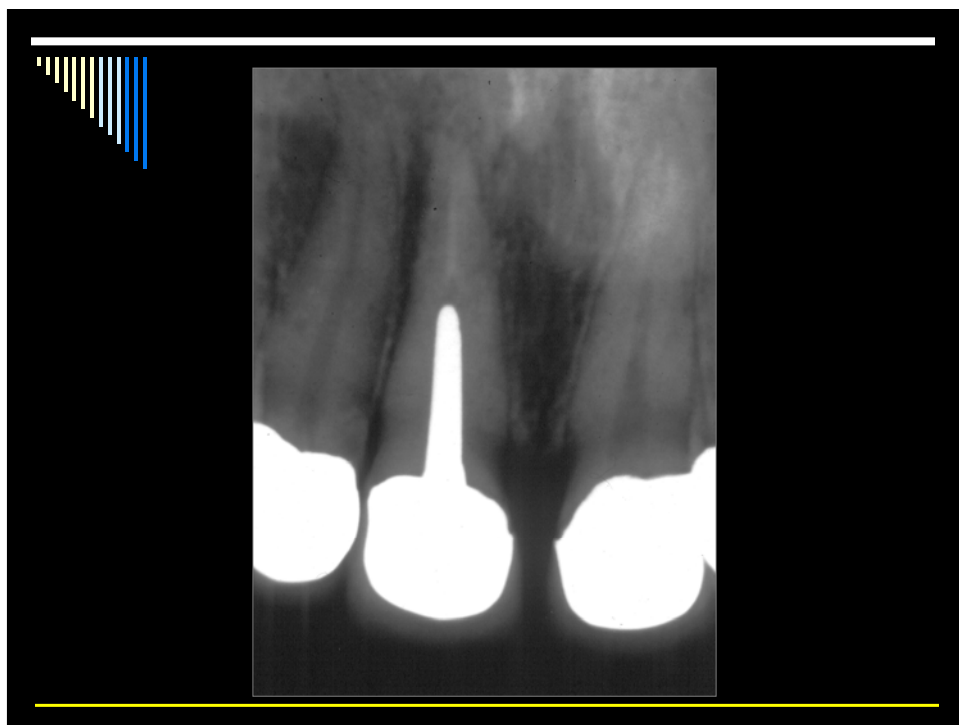
101

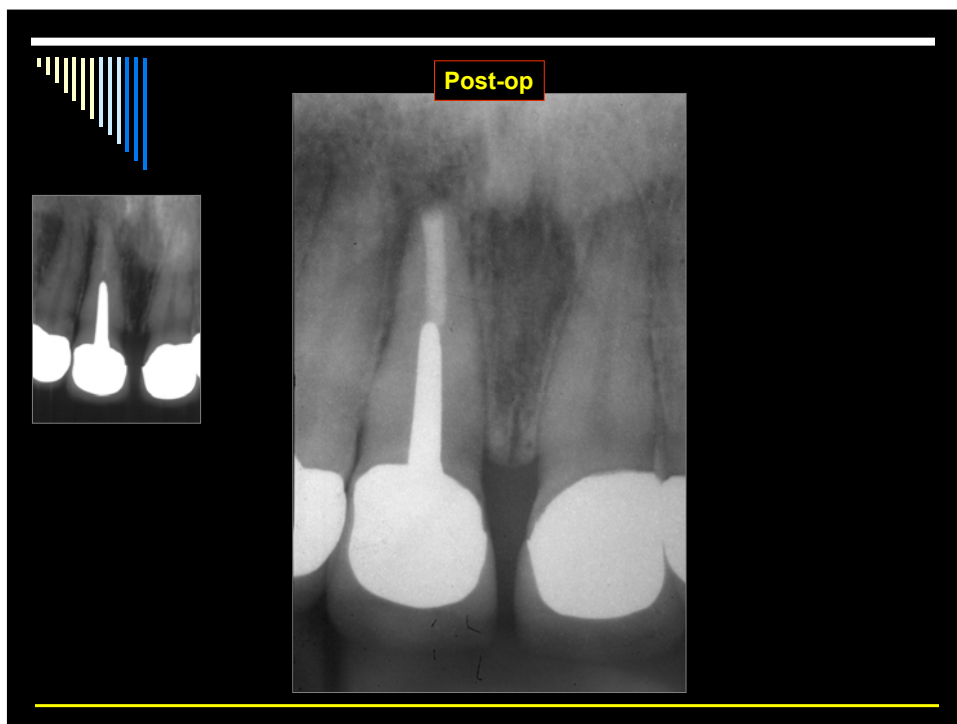


102

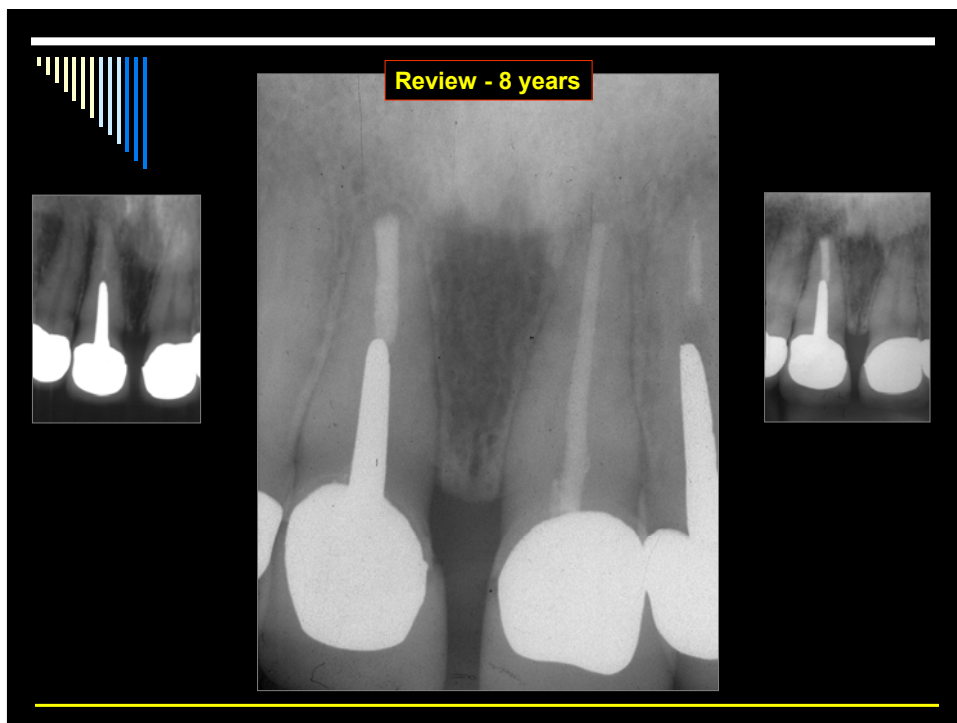


103

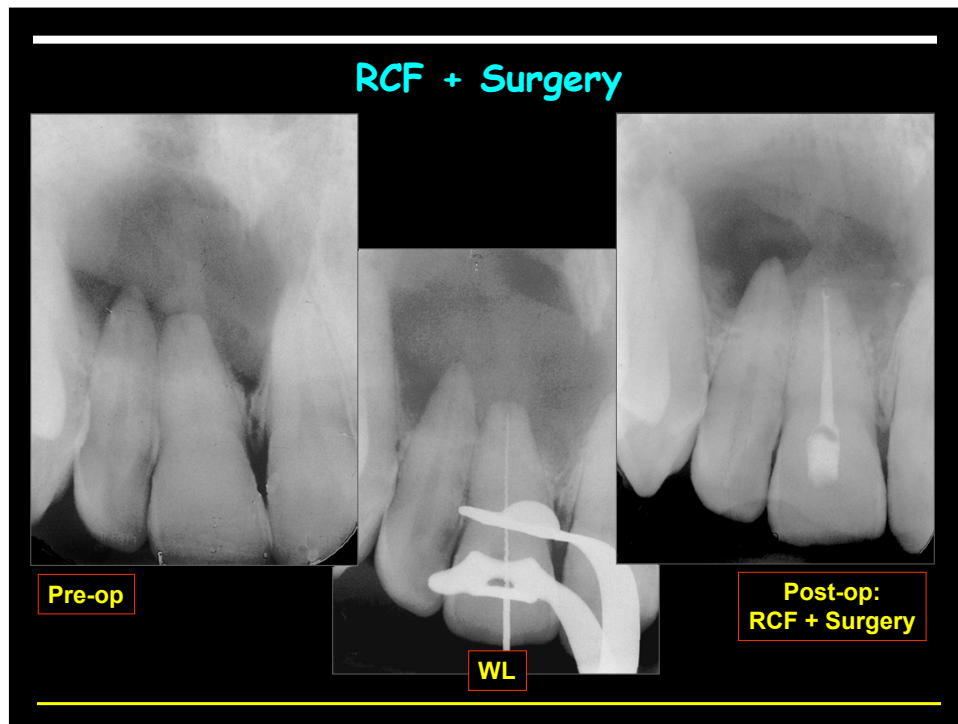




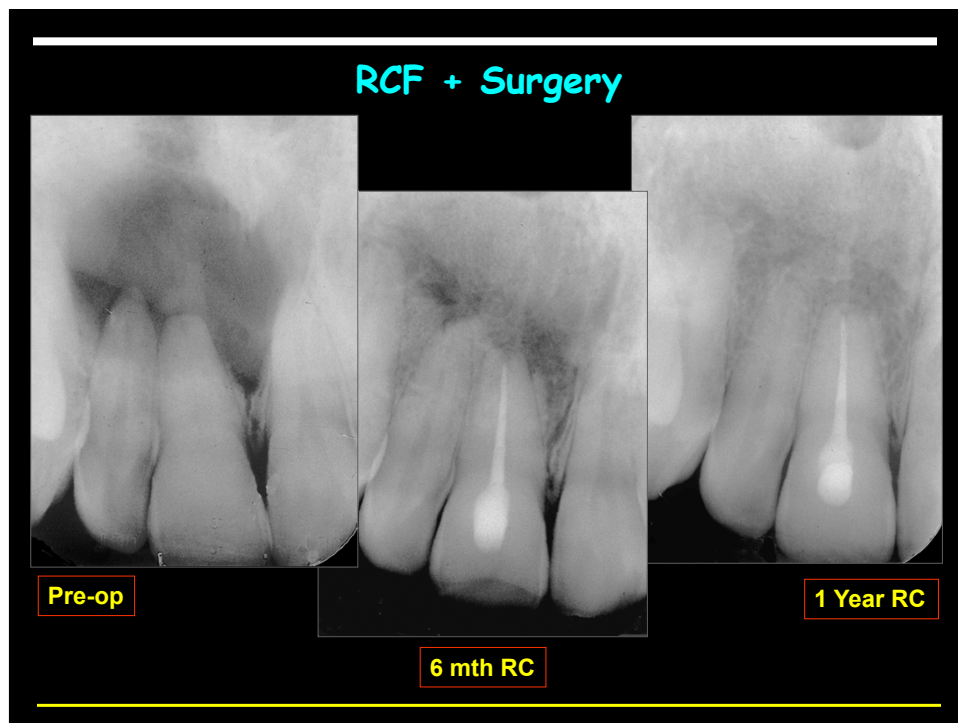
105



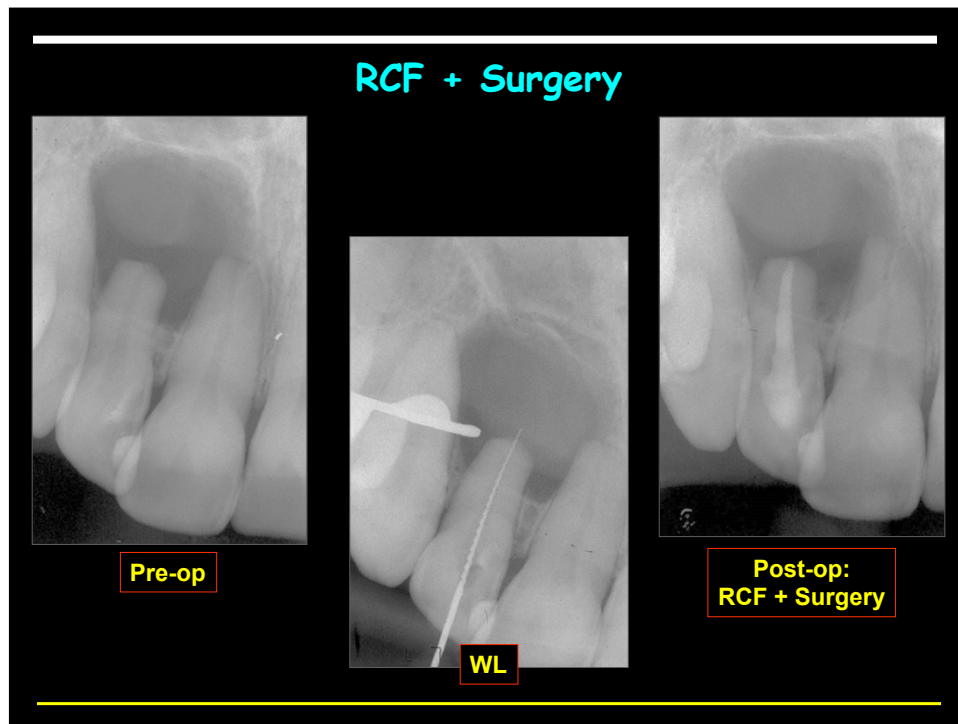
106



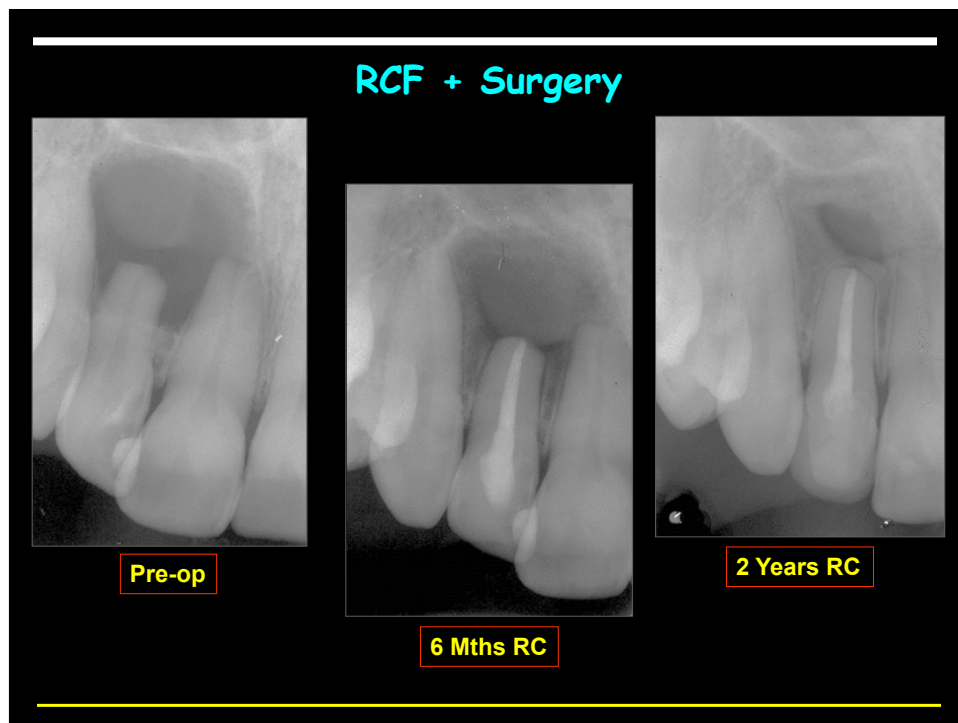
107



108



109



110