

Complex amalgam restorations

Complex posterior amalgam restoration when ►
large amount of tooth structure are missing
,when one or more cusps need capping and
increased resistance and retention forms





INDICATIONS

- They are used:
 - a. To replace missing tooth structure due to fracture or caries or existing restorative material.
 - b. When one or more cusps needs capping.
 - c. When increased resistance and retention forms are needed.

CONTRAINDICATIONS

- If patient has occlusal problems.
- If the tooth cannot be restored properly with direct restoration because of anatomic or functional considerations.
- If the area to be restored is esthetically important to the patient.

ADVANTAGES

- Conserves tooth structure.(less cutting)
- Less time required.
- Resistance and retentive forms significantly increased by pins and slots.
- Economics.

Disadvantages

- Dentinal micro fractures.
- Microleakage.
- Decreased tensile strength of amalgam.
- Penetration and perforation.
- Tooth anatomy cannot be replicated like that in indirect restoration.

RETENTION AND RESISTANCE FORM

- Non pin mechanical features
- Pins
- Amalgam bonding

NON PIN MECHANICAL FEATURES

- Parallel or convergent walls.
- Box form.
- Flat pulpal and gingival floors.
- Grooves in proximal line angles.
- Dovetails.
- Reduction of undermined cusps.
- Coves/locks.
- Amalgapins.
- Slots.

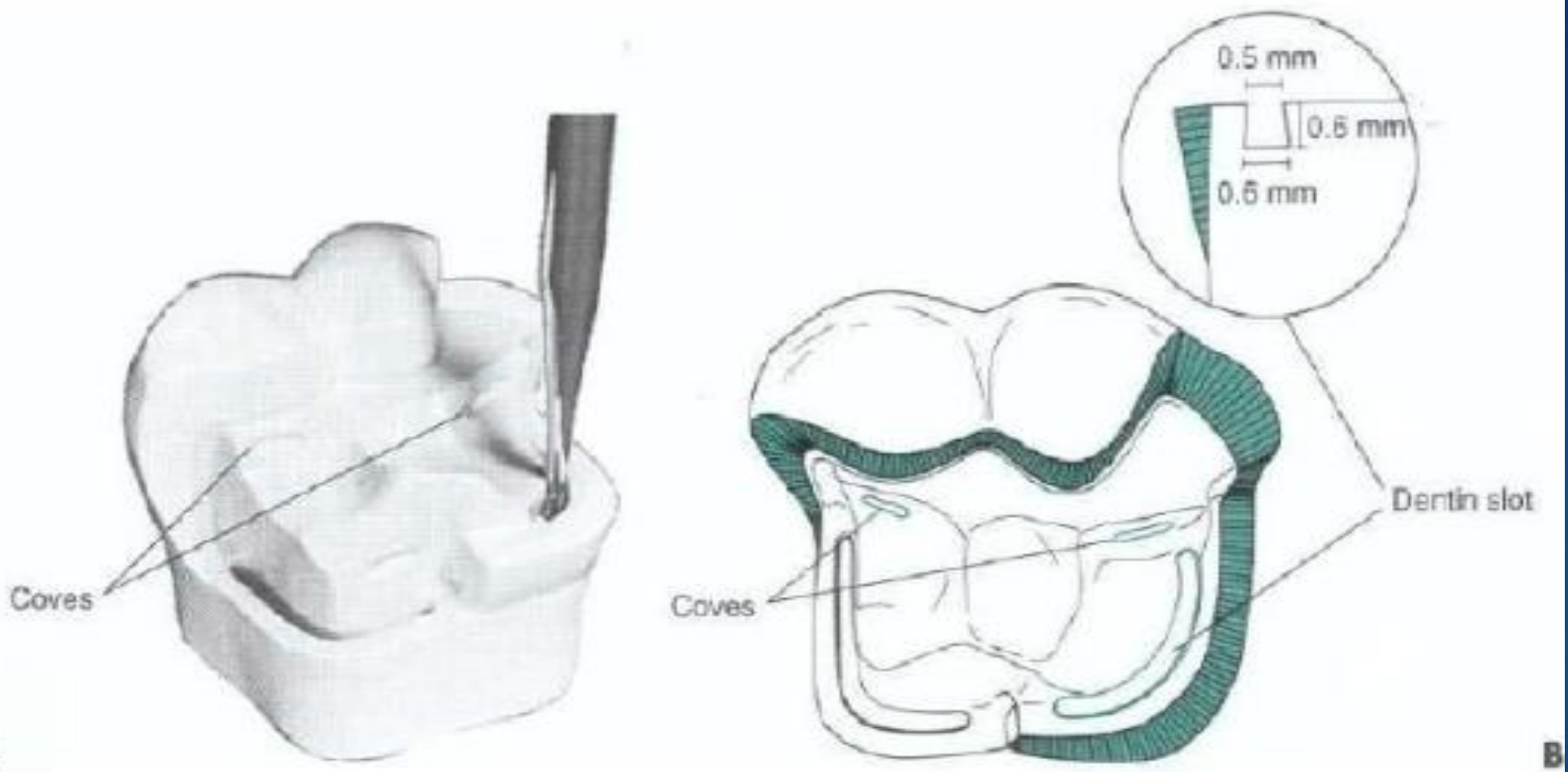


FIG. 19-4 Slots. A and B, With a No. 33½ bur, prepare dentinal slots approximately 0.6 mm deep and 0.5 to 1 mm inside dentinoenamel junction.



FIG 19-5 Prepare coves in dentin with No. Y, bur where appropriate.



FIG 19-7 Prepare vertical locks in dentin with a No. 169L bur where appropriate.

PIN

- 3 types of pins:
 1. Self threading pins.
 2. Friction locked pins.
 3. Cemented pins.

PRINCIPALS FOR PLACEMENT OF PINS

- Pinhole made the diameter of pinhole smaller than diameter of the pin being placed in threaded and friction locked.
- Craze lines created in dentine (the more the diameter of the pin the more the dentinal craze lines).
- Depth of the varies from 1.3 to 2 mm depending on the diameter of pin used.
- Used in addition to non pin retentive features.

SELF THREADED PINS

- Developed by Dr. Going in 1966
- Most popular type among all, the different types and most extensively used pin.
- Made of stainless steel or gold plated titanium pins
- Provide maximum retention among all types of pins
- Cause craze lines
- Used in vital teeth

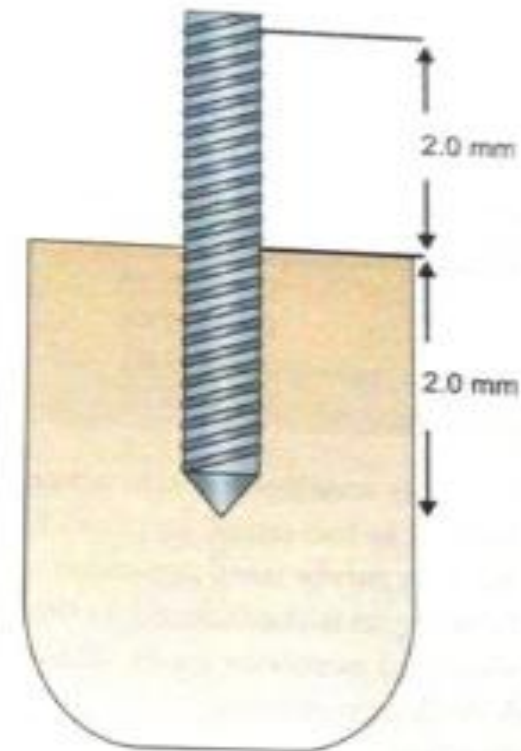
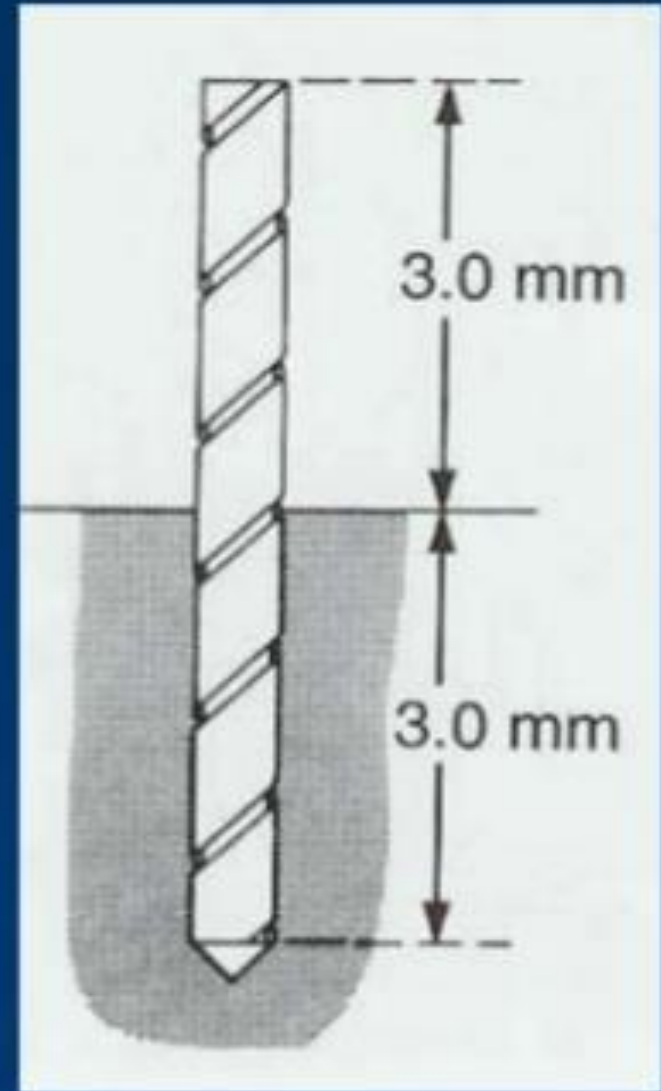


Fig. 21.3: Self-threading pins

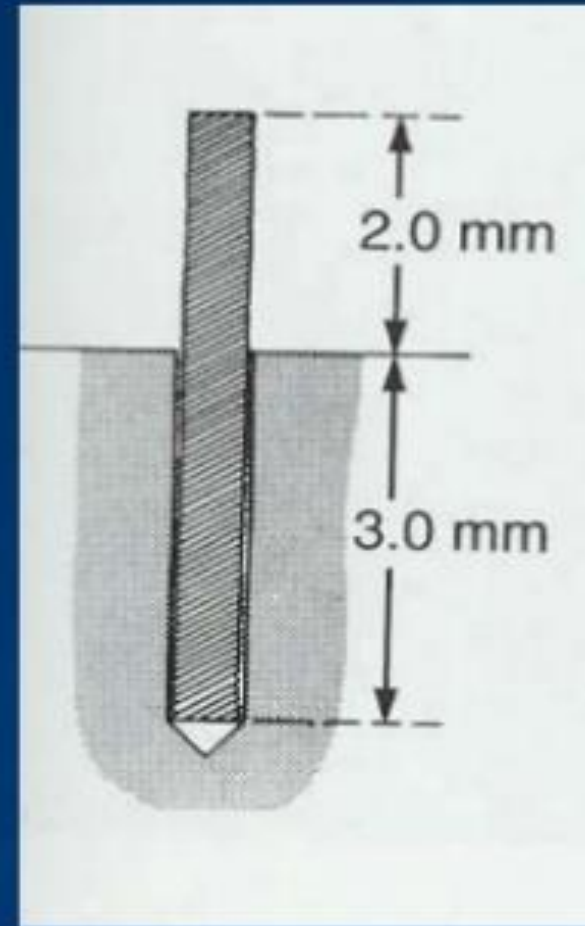
Cemented pin

- Larger than other pin.
- Use Zn Ph cement or Zn Polycarp cement.



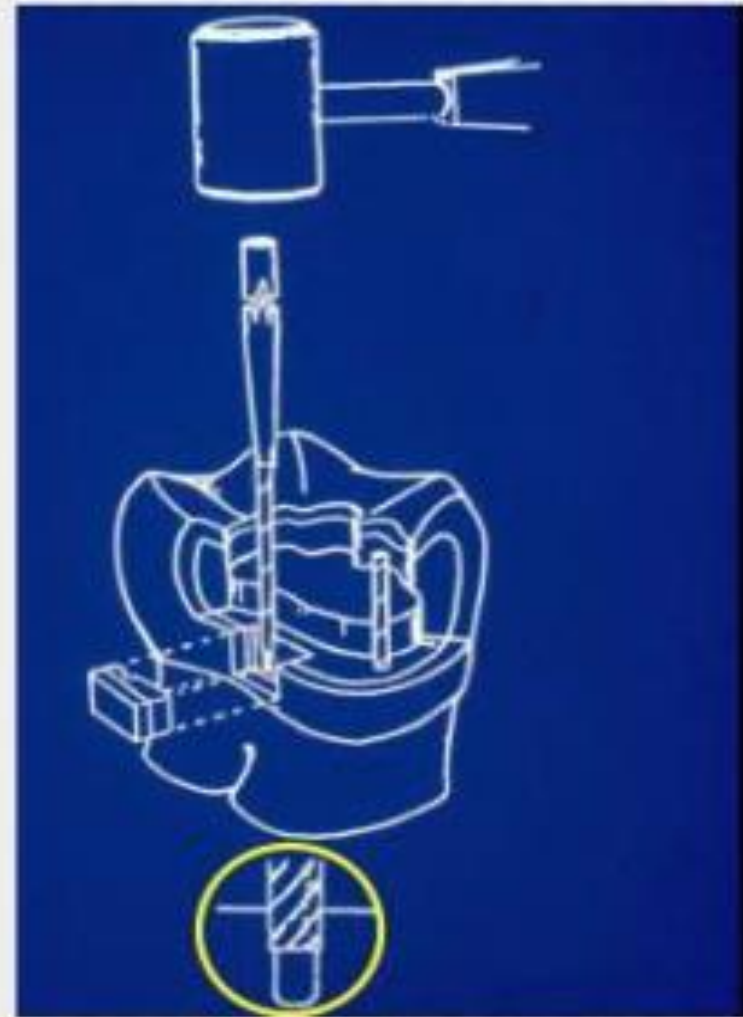
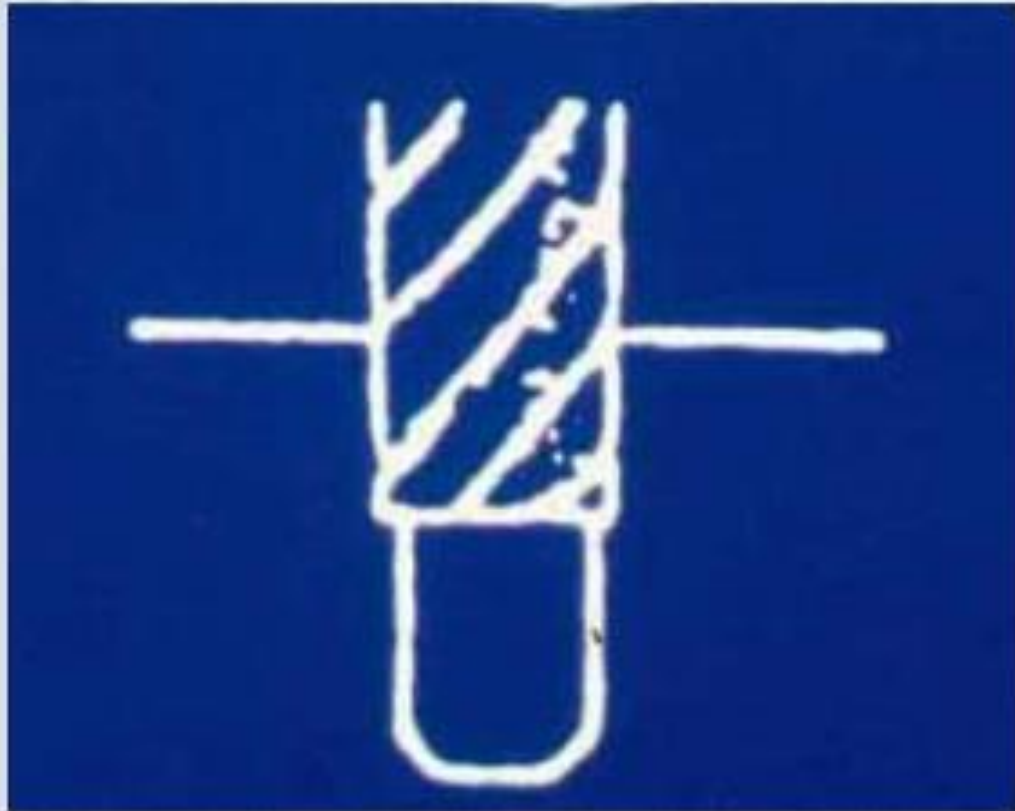
Friction – locked pins

- Smaller.
- Retained by resilience of dentin
↑ retentive than cemented pin.
- With time dentin relax →
loose pin.



Types of pin

- Friction-locked pin



FACTORS AFFECTING RETENTION OF THE PIN IN DENTIN AND AMALGAM

- Type
- Surface characteristics.
- Orientation number and diameter.
- Extension into the dentin and amalgam.

TYPE

- Self threading are the most retentive followed by friction locked and then cemented.

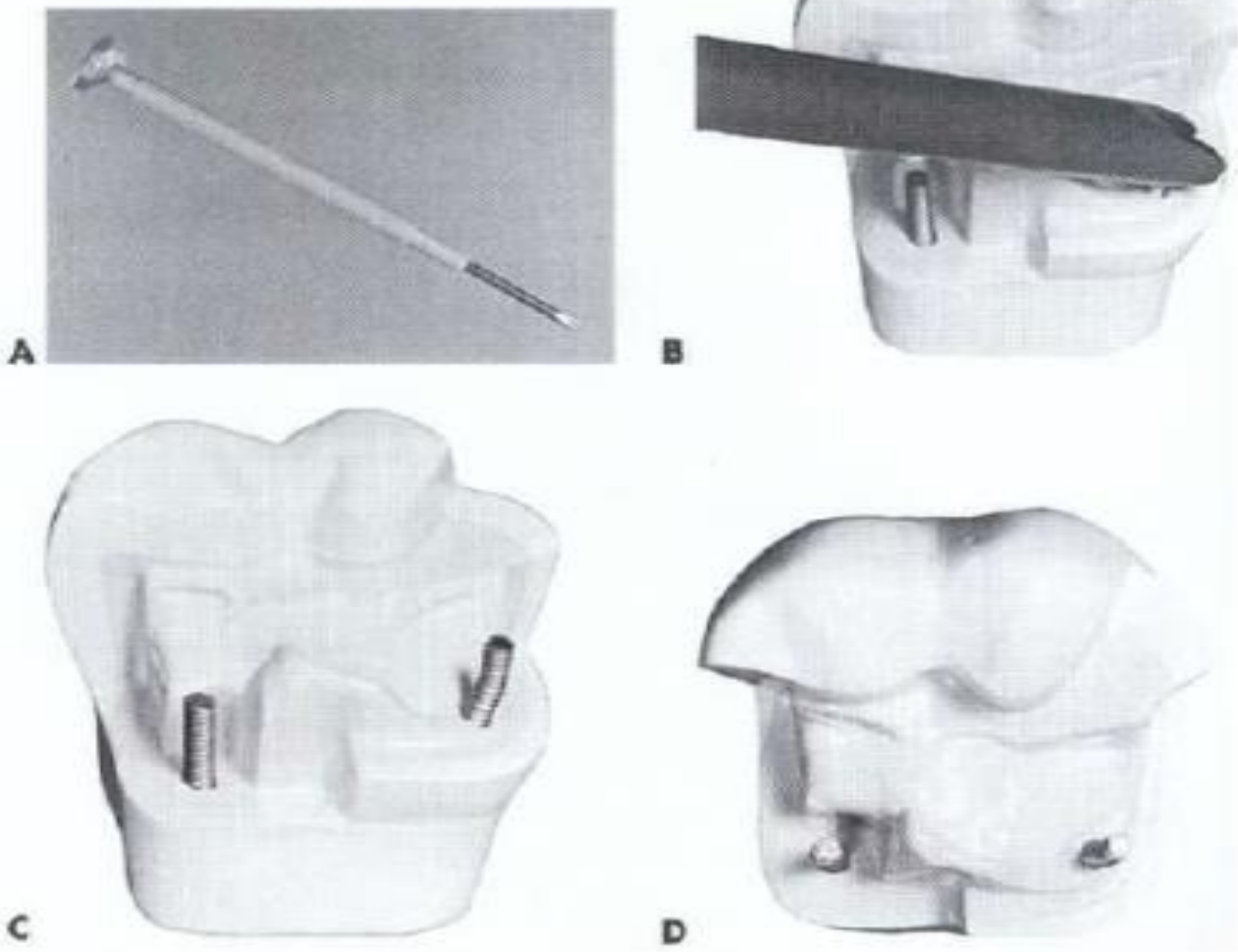
SURFACE CHARACTERISTICS

- The number and dept of elevations (serrations or threads)on the pin influence retention of the pin in the amalgam restoration.

ORIENTATION

- Should be placed in non parallel fashion to increase retentiveness.
- Bending pins in amalgam is not desirable if bending of the pin is done it should be done with a proper tool and at least 1mm of bulk of amalgam should be there between the pin and external surface of the finished restoration.

115 **19-36** A, TMS bending tool. B, Use bending tool to bend pin. C and D, Pin is bent to position that provides adequate bulk of amalgam between pin and external surface of final restoration.



NUMBER

- As the number of pins increases the retention in dentin and amalgam increases but the problems created also increases. Chances of

1. Crazing of dentin increases.

2. The amount of available dentin between the pins decreases.

3. The strength of amalgam restoration decreases.

Increasing the diameter also increases retention.

PIN PLACEMENT FACTORS AND TECHNIQUES

- 1.Pin size.
- 2.Number of pins.
- 3.location.
- 4.Pinhole preparation.
- 5.Pin design.
- 6.Pin insertion.

NUMBER OF PINS

- Factors considered when deciding how many pins are required
 - 1.The amount of missing tooth structure.
 - 2.The amount of dentin available to receive pins safely.
 - 3.The amount of retention required.
 - 4.The size of the pins.
- As a rule, one pin per missing axial line angle should be used.

LOCATION

- Several factors aid in determining pin hole location:
 1. Knowledge of the normal pulp anatomy and external tooth contours.
 2. A current radiograph of the tooth.
 3. A periodontal probe.
 4. The patient's age.

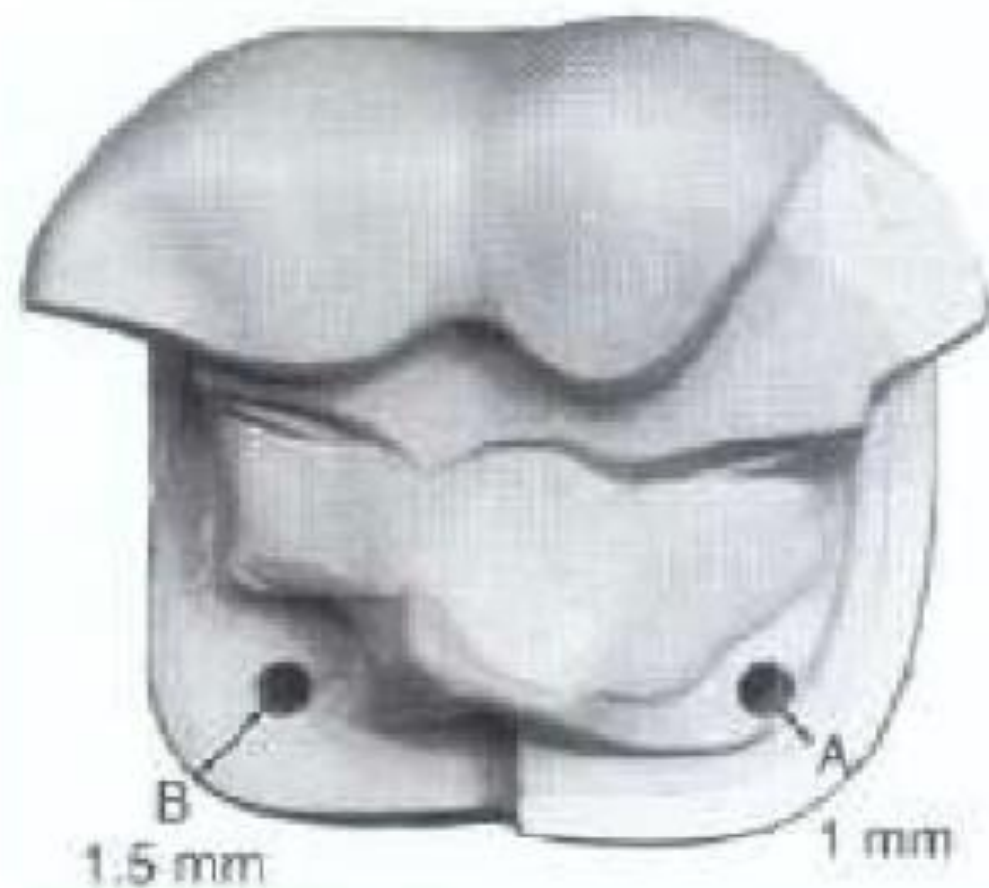
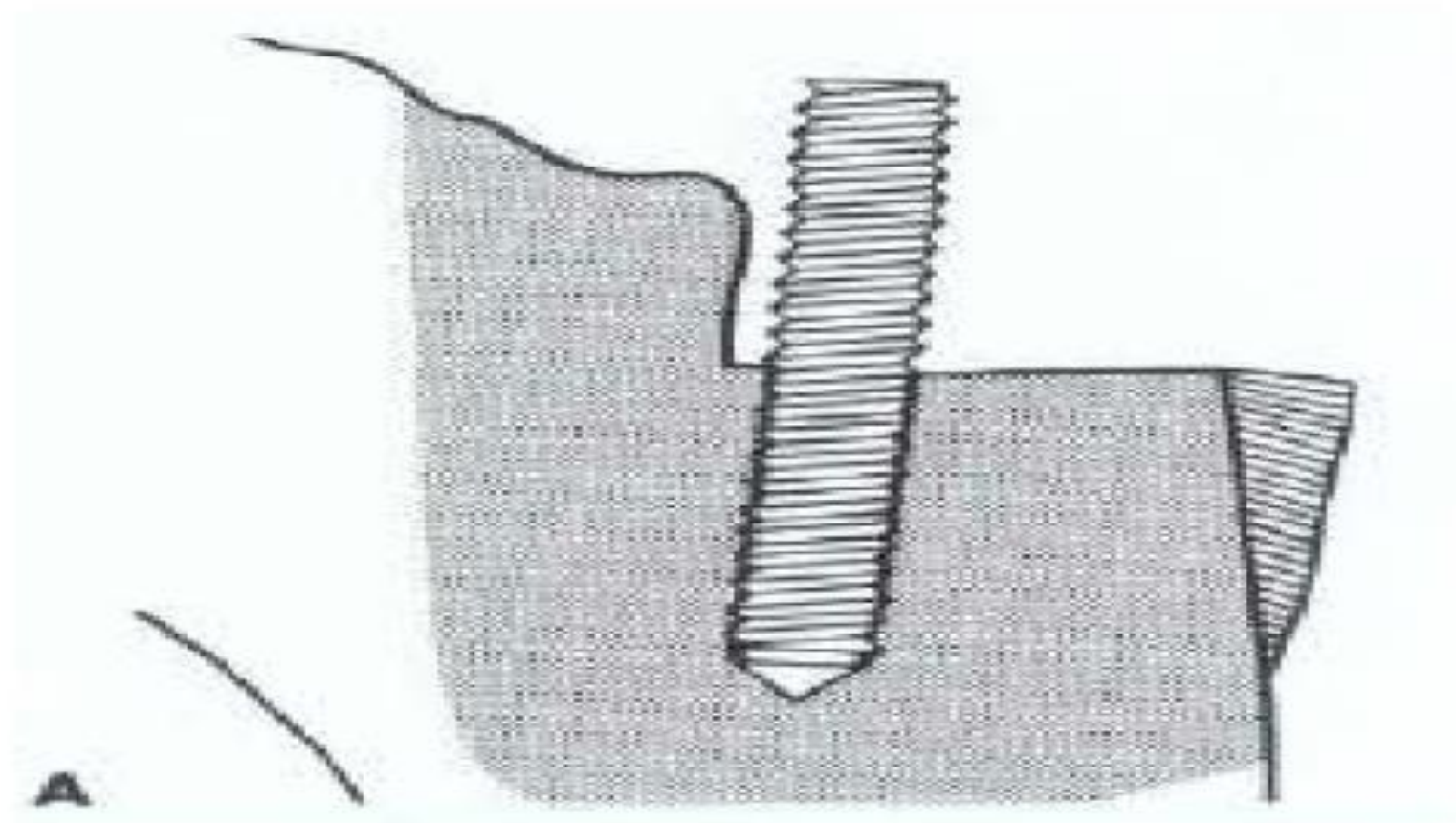


FIG 19-15 Pinhole position. A, Position relative to DEJ. B, Position relative to external tooth surface.

PIN PLACED CLOSE TO THE VERTICAL WALL



TWIST DRILLS FOR DRILLING A PINHOLE

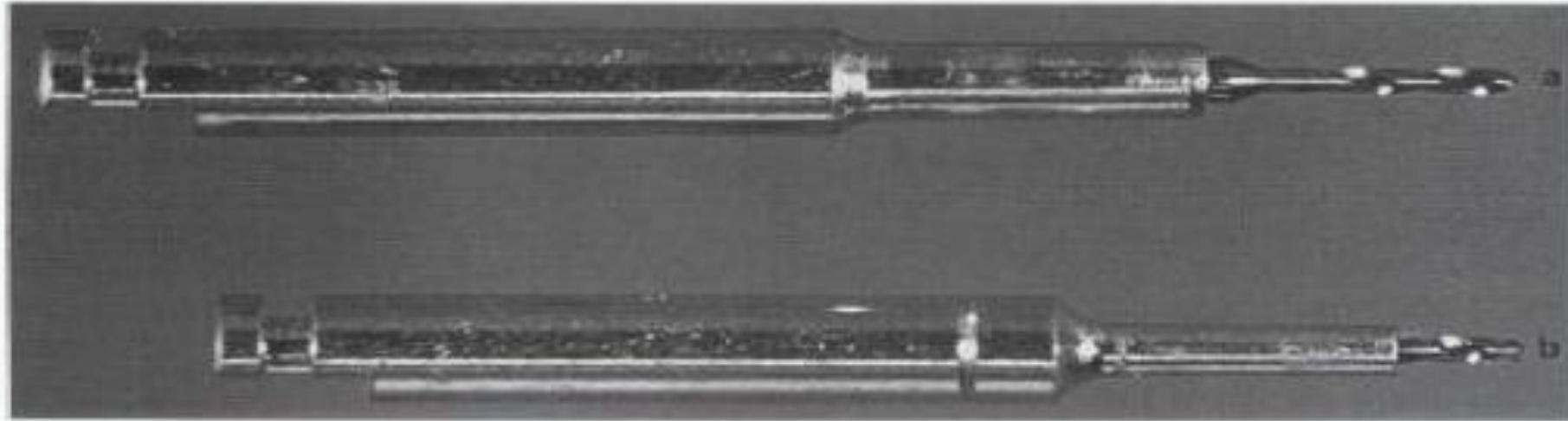
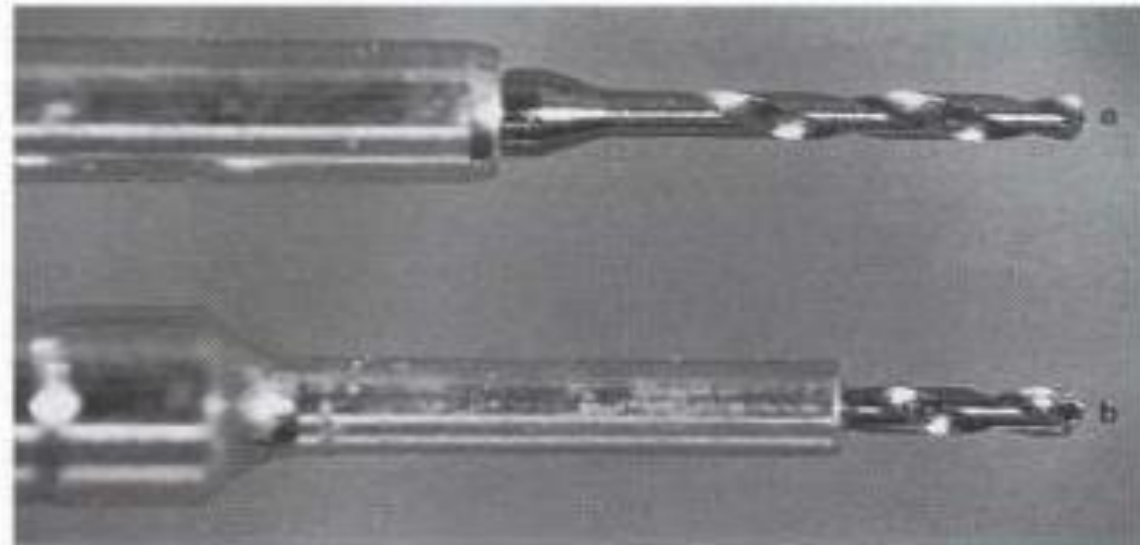
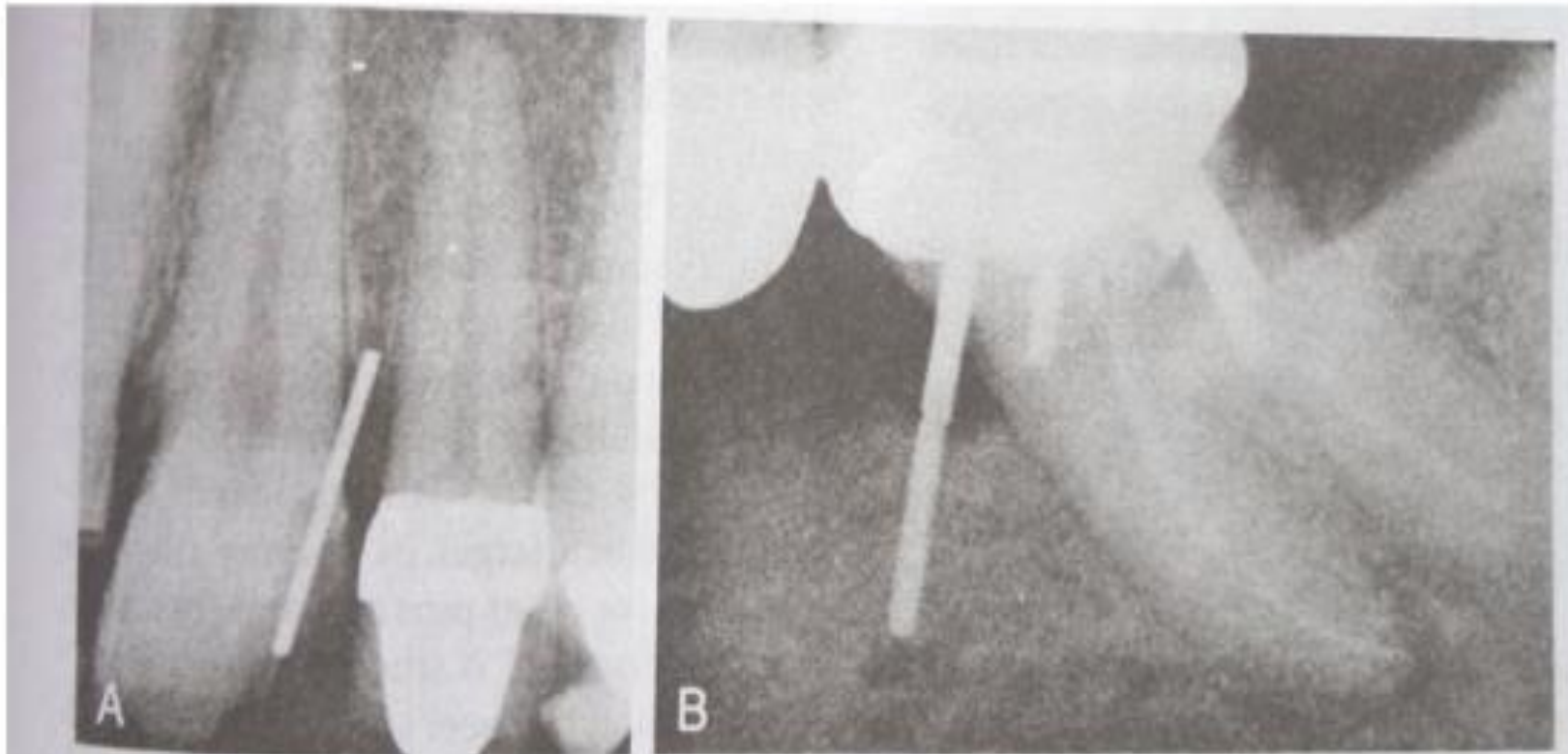


FIG 19-20 A, Two types of Kodex twist drills: standard (a) and depth-limiting (b). B, Drills enlarged: standard (a) and depth-limiting (b).





Failure of dental pins



Failure of amalgam restoration

1- **secondary caries** :in CL I and II caries around the margin and also amalgam fail result from high caries ►

2- **isthmus fracture** or marginal ridge fracture of restoration : ►

A) **axio-pulpal line angle** not rounded in cl II ►

B) **marginal ridge** left too high ►

C) **improper** removal of the matrix ►

3- **tooth fracture** : excessive tooth cutting or excessive caries , ►
may be result from in large cavity with thin wall .

4- **improper** marginal adaptation and marginal fractures: ►


A- improper marginal preparation ►

B-**improper** carving and finishing ►

C-**excess mercury** ►

D-**use** of low copper amalgam ►

E- **amalgam** expansion ►



Other causes includes faults in clinical ►
procedures during amalgam placement such
as :gingival overhang of the restoration (due to
improper use of wedge) and improper contact
area with adjacent tooth which lead to
periodontal problems.

thank you ▶