SEMI – PERMANENT RESTORATION

Lecture By- Dr. SHANTANU CHOUDHARI

Semi-permanent restoration:

- Discovered because of alarming rate of Failure of extensive class 2 restorations in primary molars and class 3 in primary anterior teeth.

- Recommanded to restore the lost tooth structure and stabilize them with prefabricated crowns

POIYCARBONATE CROWNS

- Polycarbonate crowns are temporary crowns which can be given as fixed prosthesis to deciduous anterior teeth.

- Contraindication:

-severe bruxism

-deep bite

-excessive abrsion

Advantages:

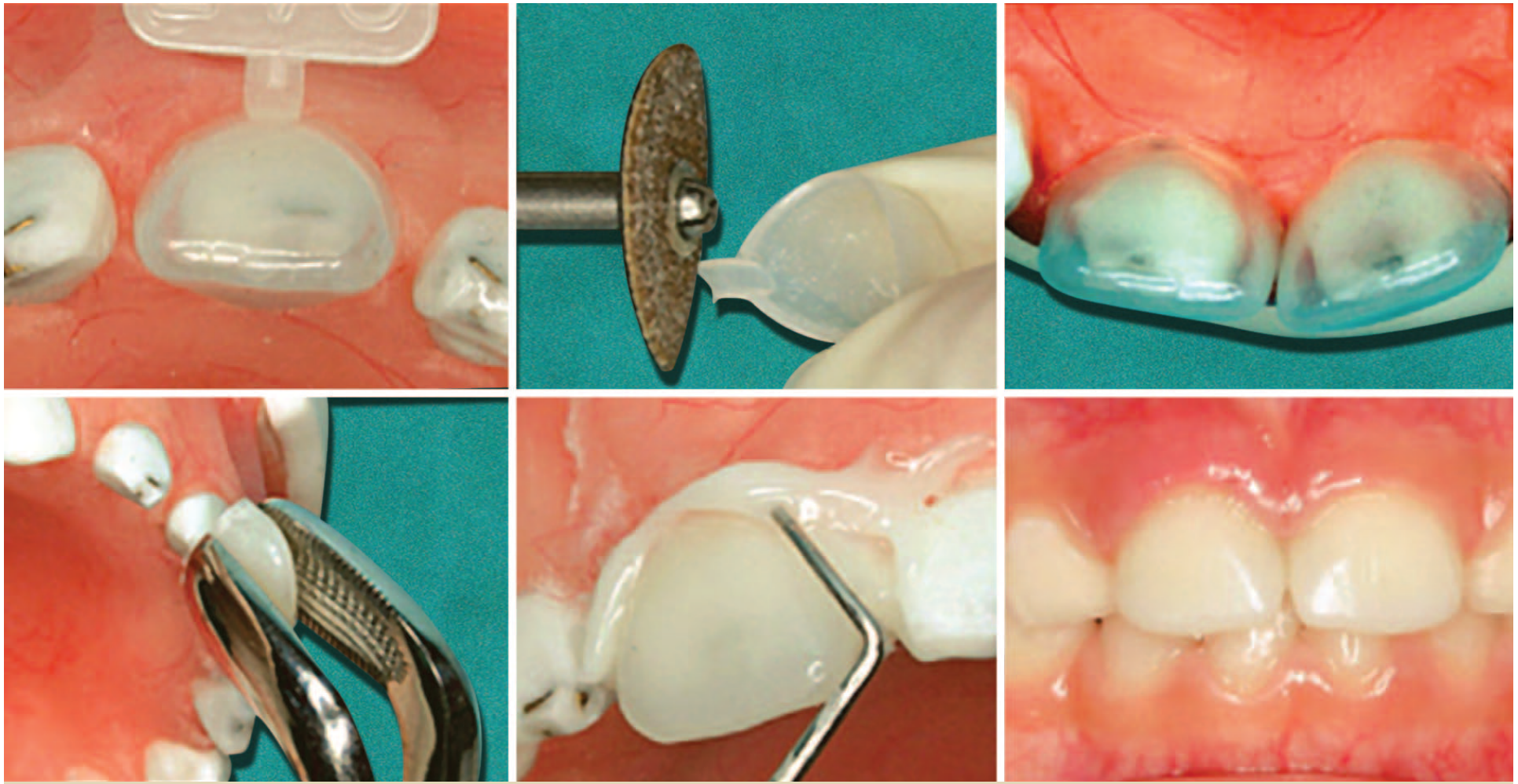
Save time

-easy to trim

-easily adjusted with pliers

Technique:

- Crown selection
- Tooth preparation: -labiolingually 0.5 mm
  -mesiodistally remove contacts
  -1-2 mm incisal reduction
- Lining of crown with acrylic or composite
- Trimming of margins and finishing
- Cementation with luting acrylic cement
- Blanching of gingiva should be checked to avoid overextension in sulcus.



Strip crown:

- Crown forms which are filled with composite and bonded on the tooth and crown form is then removed.
- Most commonly used crowns in pediatric dental practice
- Easy to repair

Pedo jacket crown

- Made of tooth coloured copolyester material which is filled with resin and left on the tooth after copolymerization , instead of being removed.

- Disadvantages:

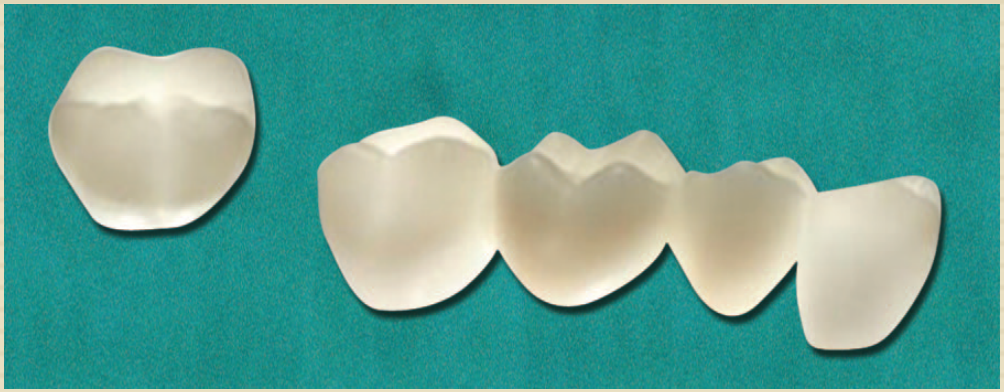
- Cannot be trimmed with high speed finishing bur
- Available in only one shade

Fuks crown

- A dental crown that includes a stainless steel shell sized to cover a tooth portion of a patient and a polymeric coating including a polyester /epoxy hybrid composition.

New Millenium Crowns

- Made up of lab – enhanced composite resin material and bonded to tooth.



- Adv.

-can be trimmed

- Disadv.

-very brittle

-more expensive

Preveneered crowns

- NUSMILE crowns

Indication: when full coverage restoration is needed for longetivity and for protection of remaining tooth structure

Advantages:

-anatomically correct

-compatible colours

-less time consuming

-less technique sensetive

-durable

-color stability

Cheng crowns

- Crowns with pure resin facing making them stain resistant
- Pre-crimped

- Advantages :

-less time consuming

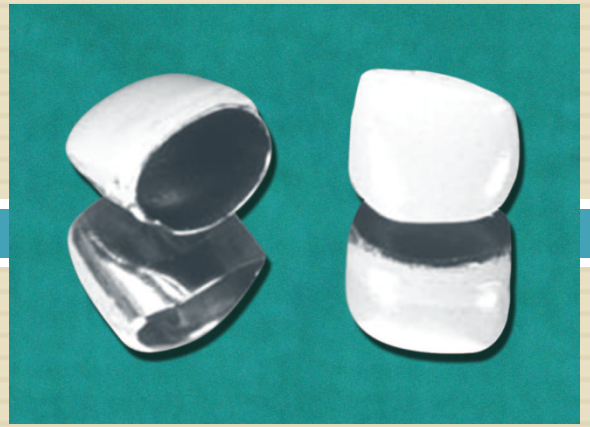
-less technique sensetive

-require single patient visit

-less patient discomfort

-stain resistant

Dura crowns:



- Pediatric white faced crown
- Adv:

-facial and lingual surfaces may be crimped

-easily trimmed with crown scissors

-easily festooned

-full knife edge capabilities

-esthetic

-can be placed with poor moisture or hemmorhage control

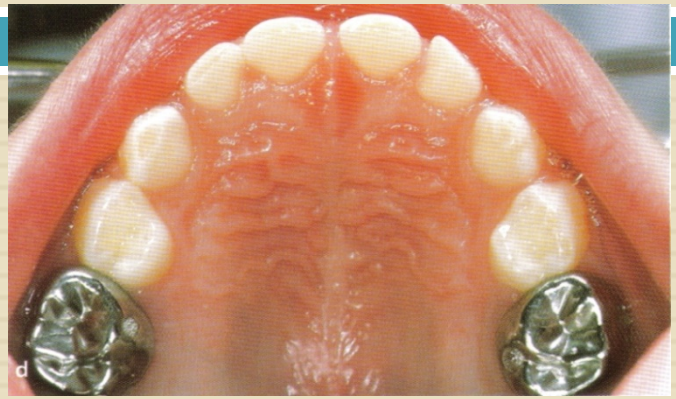
- Disadvantages:

-not easy to fit and require a long lerning curve

Pedo pearls

- Aluminium crown forms coated with a tooth colored epoxy paint.
- Relatively soft , which may hamper long term durability

STAINLESS STEEL CROWNS



- By humphrey in 1950
- Semi permanent restoration used in primary and young permanent teeth
- More frequently used in deciduous dentition because :

-in relatively small primary teeth caries can destroy tooth faster

-deciduous tooth pulp is larger , difficult to make gold casting or pin retained amalgam restorations

- Adv:
  - Superior to multisurface amalgam restorations
  - Acceptable to both patient and dentist
  - Cost effective

- Objectives of using:
  - To achieve biologically compatible ,competent for mastication and clinically acceptable restoration
  - To maintain form and function and where possible vitality of tooth

Different Types of Stainless Steel Crowns

1) Untrimmed crowns :

- Neither trimmed or countoured

- Require lot of adaptation

-Time consuming

Indication -Used in special instances where extra length is needed especially in the deep areas of interproximal caries

Eg. Rocky mountain

- Precrimped crowns:

-made to fit with little alteration

-difficult to alter

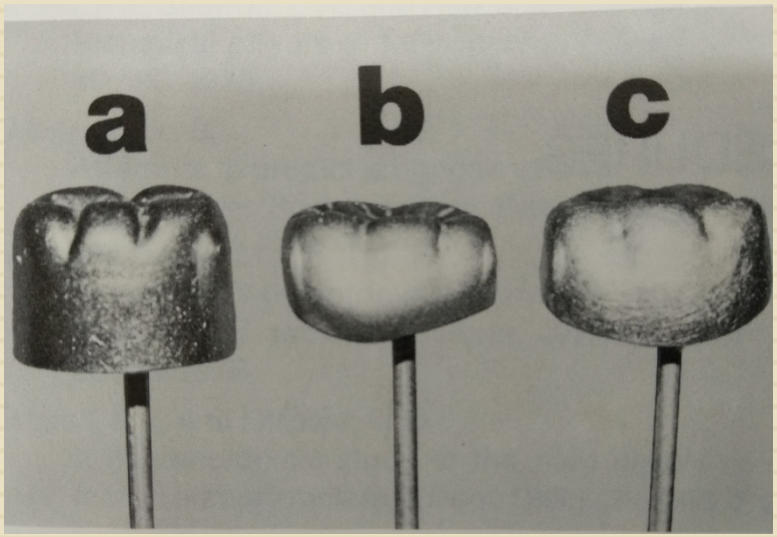
3) Pretrimmed crowns:

-manufractured to approximate length of normal teeth

-minimal trimming

- Contouring and crimping needed

Eg.unitek stainless steel crowns, denvo crown



Composition:

- Stainless steel crowns:
- Austenitic type- provides best corrosion resistance
- 17-19% Cr
- 10-13% Ni
- 67% Fe
- 4% minor element

- Eg. Rocky mountain and unitek
- Available in 6 sizes
- Size 4 and 5 most commonly used
- Size 7 for extra large tooth

- Nickel base crown

72% Ni

14% Cr

6-10% Fe

0.04% C

0.35 % mangenese

0.2% silicon

-good formability and ductility and wear resistaance

- Indications:
- Extensive caries in primary and young permanent teeth
- Teeth with enamel or dentin defects :

  - more susceptible to caries

  - often requires crowning in all 4 quadrant , danger of altering freeway space,crowns should be fitted quadrant wise.
- Fractured teeth
- Teeth used as abutment for space maintainers
- Following pulp therapy

- As a preventive restoration:

  -high susceptibility to caries

  -handicapped child

- In severe cases of bruxism
- Single tooth crossbite

-reverse stainless steel cown or a banded metal Incline at a 45 degree angle to the occlusion plane

-with s.s. crown –correction in 1-2 weeks

Factors in preoperative evaluation:

- Dental age of patient
- Co-operation of patient
- Motivation of parents
- Medically compromised/disabled children

Clinical Procedure

- Evaluation of pre-operative occlusion
- Selection of crown:
  - By M-D dimensions of tooth to be restored
- Three main consideration:

  -adequate M-D diameter

  -light resistance to seating

  -proper occlusal height

-To produce stainless steel margins of similar shapes , contours of buccal and lingual marginal gingiva should be examined

-Buccal and lingual marginal gingivae of 2nd primary molar: resembles a **smile**

-buccal marginal gingivae of mandibular 1st primary molars and maxillary first molars: **stretched out 's'**

-Lingual marginal gingivae of all primary first molars- resemble **smile**

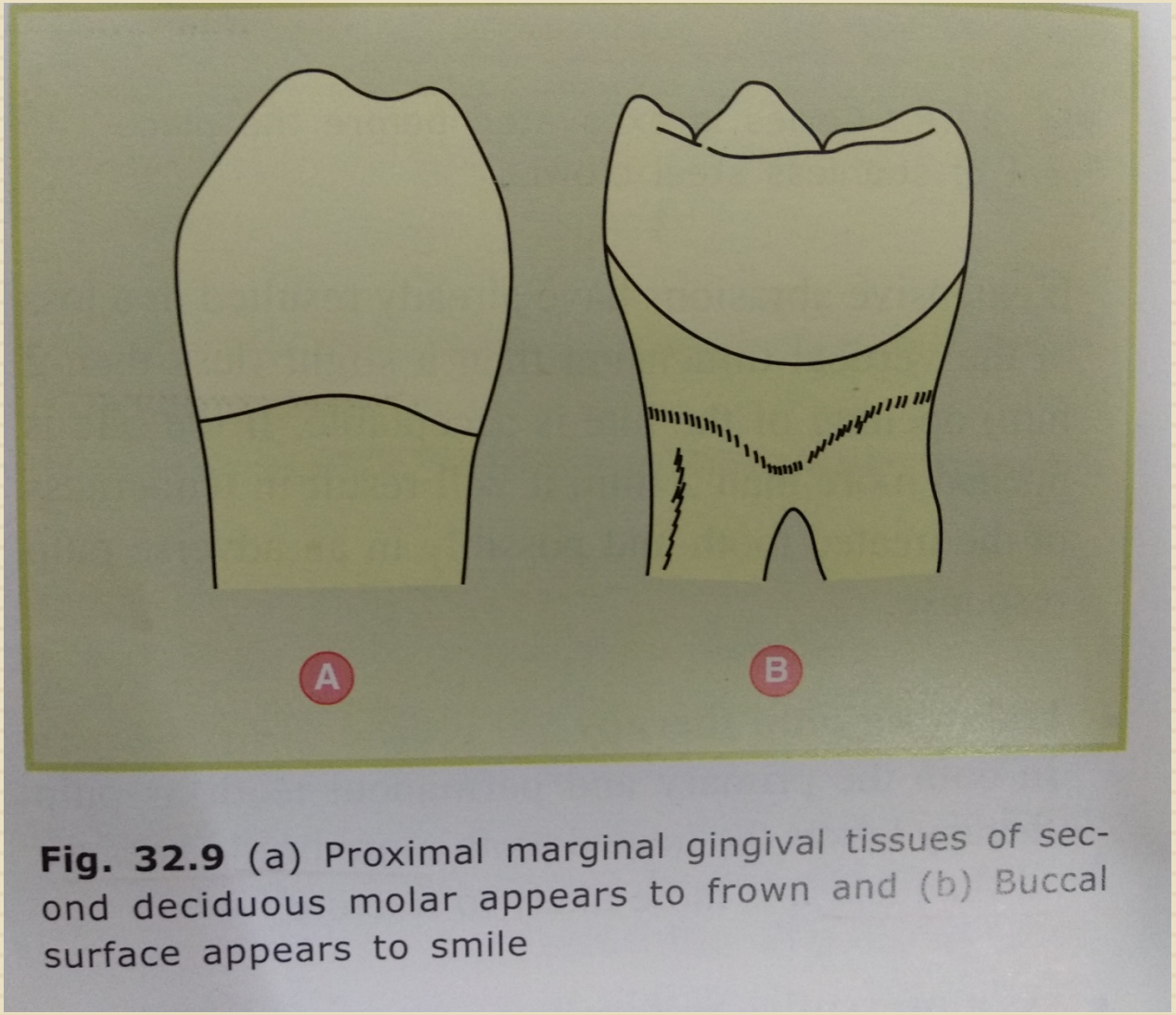


Fig. 32.9 (a) Proximal marginal gingival tissues of second deciduous molar appears to frown and (b) Buccal surface appears to smile

Tooth preparation:

- Administration of LA
- Isolation
- Remove the decay
- Steps in reduction:

1) occlusal reduction:

- 69L or 169L bur

-1.0 to 1.5 mm

-judged by comparison with marginal ridge of adjacent teeth

2)Proximal slices :

-use of wooden wedge to separate the adjacent teeth

-69L or 169L bur , beginning at marginal ridges and at an angle slightly convergent to tooth surface

-depth of slice should be sufficient to break contact and develop a finish line below any existing caries

-avoid development of ledge

-feather edge finish line, margin-0.5 mm subgingivally

3)Buccolingual reduction:

-minimal except there is a large cervical bulge

eg. 1st primary molar

4)Round off all line angles

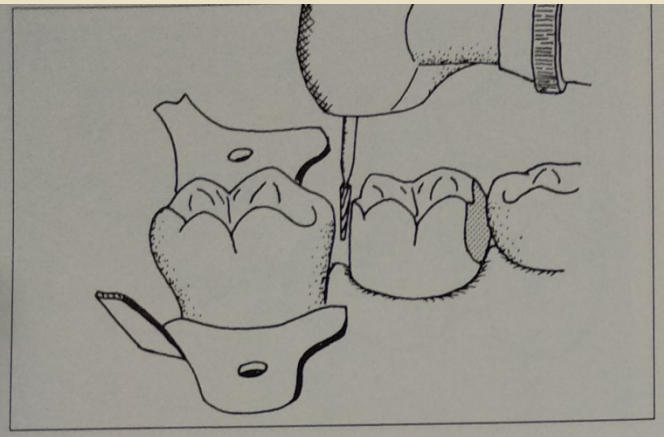


Fig. 21-3 Slicing interproximal with a 169 bur or thin diamond stone.

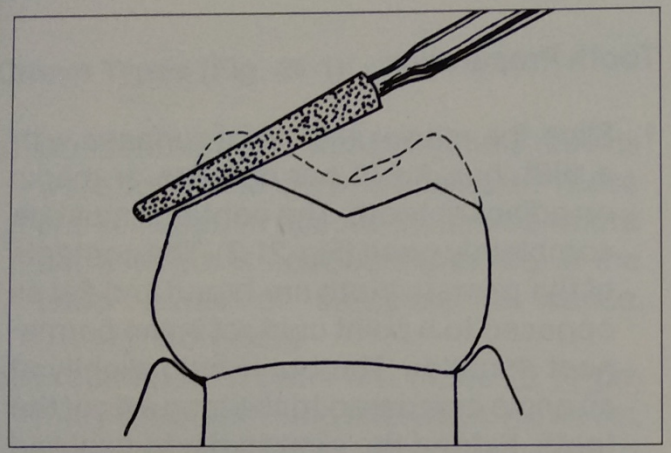


Fig. 21-4 Occlusal reduction of 1.0-1.5 out of occlusion.

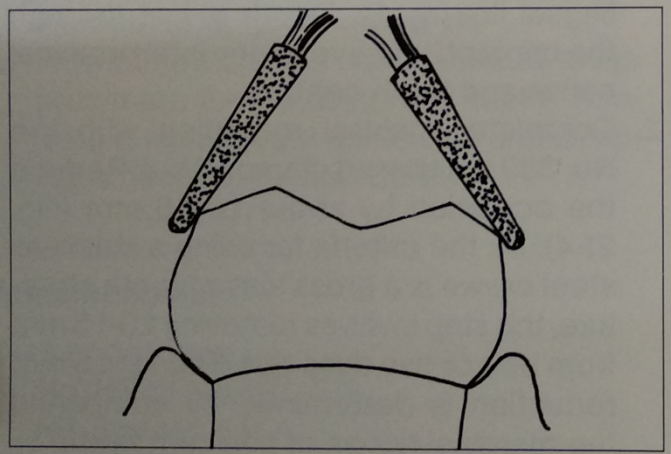


Fig. 21-5 Reduction of all line angles.

Meyers (1976)

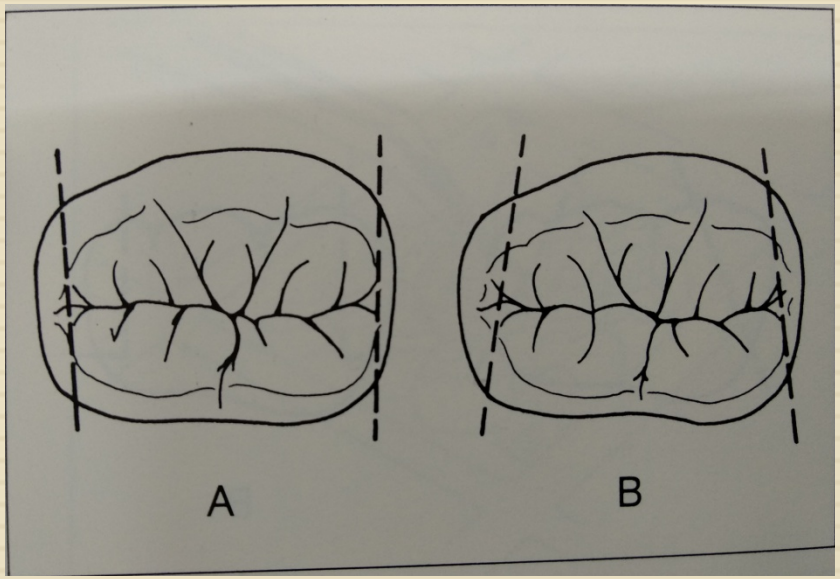
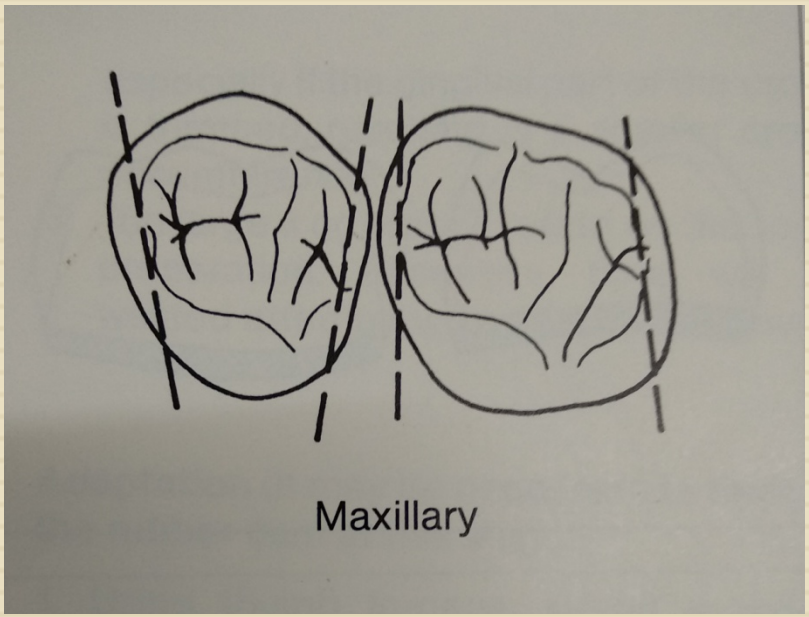
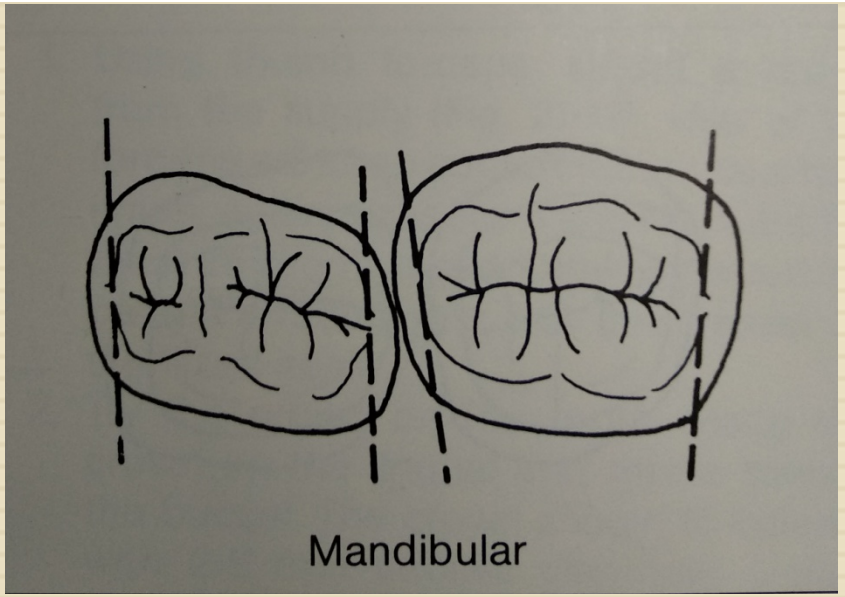


Figure A – correct angulations of the intended slices
Figure B- slice is correct but taper is extreme which makes crown adaptation difficult

from mathewson

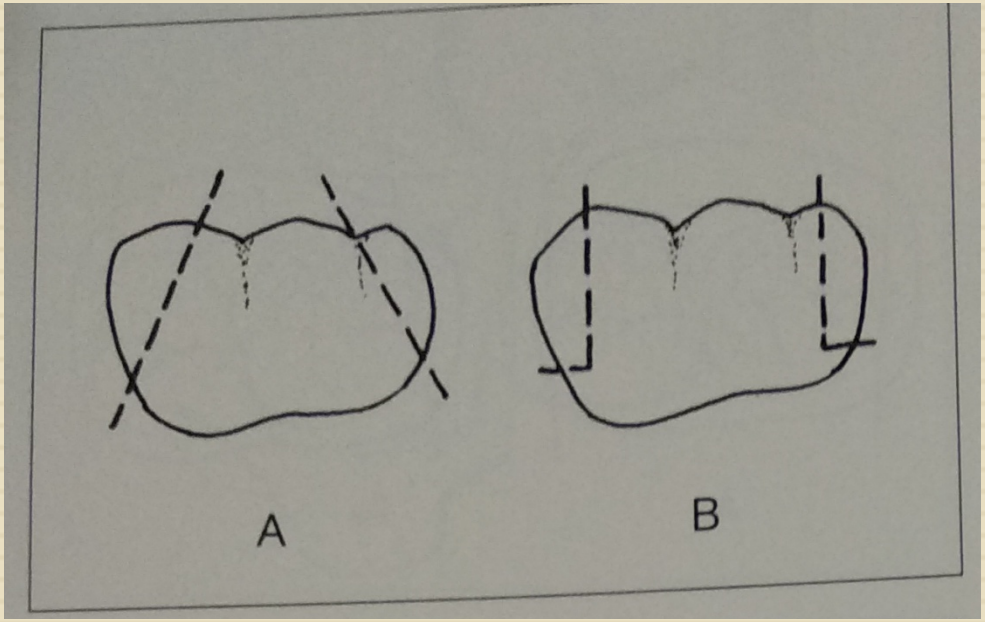




The optimum interproximal slices for the maxillary and mandibular primary molars

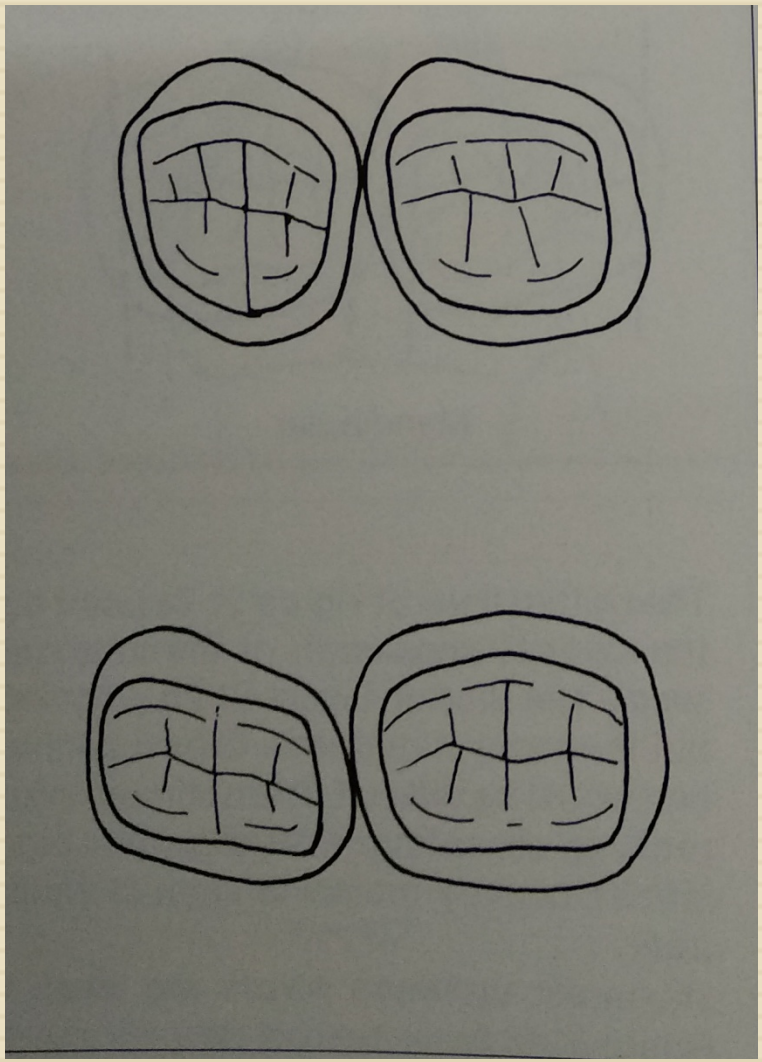
from mathewson

- Common Errors:
  - Figure A shows excess taper, which reduces retention
  - Figure B :shoulder created which increases difficulty of seating the crown and adaptation



“YOU CANNOT FIT A SQUARE PEG (THE CROWN PREPARATION) INTO A ROUND HOLE (THE INTERNAL STRUCTURE OF CROWN”……..

- After rounding of line angles , the outline of tooth should be Apparent
- The contour should conform to the internal contour of the stainless Steel crown



Evaluation criteria:

- Occlusal clearance-1.5-2 mm
- Poximal slices-occlusal convergent
- Explorer can be passed at gingival margin of prepared tooth
- Buccal and lingual surface-0.5 mm reduction with feather edge ,0.5 – 1 mm into gingival sulcus
- Buccal and lingual surface converge slightly occlusaly
- All point and line angles rounded and smoothed

Initial Adaptation of crown

- Two principles related to stainless steel crown length and margin shape , presented by Spedding (1984)

1)crown should be of correct length and margins closely adopted to tooth.

-this can be achieved when when finished crown is correctly seated on tooth with its occlusal surfae in occlusal plane and its margins placed apical to marginal gingiva.

-after placement of correct size of crown , crown height can be removed initially 1 mm with a crown and bridge scissor or carborandum wheel on slow speed hand piece.

2) For shaping the crown margins ,mark 3 light points on the metal at the mesiobuccal,buccal,distobuccal and at the mesiolingual,lingual,distolingual surfaces at the crest of respective marginal gingiva without compressing the marginal gingiva.

-final finished margins should be approx. 1 mm below these marks.

- Correctly shaped margins are parallel to the contours of the marginal gingiva ,about 1 mm into the gingival crevice.

Seating the crown

- Crown is tried on tooth by seating lingual first and applying pressure in buccal direction, so that crown slides over the buccal surface.Resistance should be felt as the crown slips over the buccal bulge.

- -crown should not compress gingival tissue and should produce blanching of marginal gingival tissue.

Crown contouring

- Initial crown contouring
  - Contouring is done at the middle 1/3rd of the crown with a No. 114 plier to Produce a belling effect

  - This gives the crown a more even curvature

- contouring of proximal surface is not done with this pliers as they are already in contact with the adjacent teeth.
- Occasionally 112 pliers are used to contour a proximal surface to establish correct contact.
- Adapatation of the gingival 1/3 rd of the crown is done with the 137 gordan pliers.

Crown Crimping

- Gingival crimping can be done with Unitek 800-412 pliers.

Tight marginal fit aids in:

-mechanical retention of crown

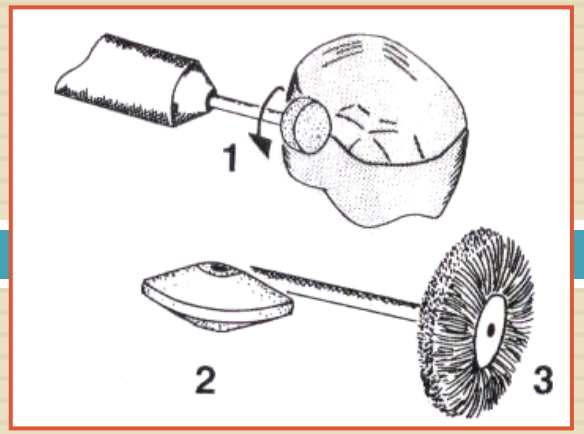
-Protection of cement from exposure to oral fluids

-maintenance of gingival health

Checking of final adaptation of crown

- Crown must snap into place . One should not be able to remove with finger pressure.
- Should fit tightly- no rocking movement
- Properly seated crown should corrospond to the marginal ridge of adjacent tooth
- Crown should be in proper occlusion and should not interfere with eruption of teeth.
- No high points ,when checked on articulating paper
- Crown margin 1 mm apical to marginal gingiva
- Crown margins closely adapted to the tooth and should not irritate gingiva

Finishing and Polishing



- Crown should be finished before cementation with a rubber wheel to remove all scratches.
- While polishing crown margin should be blunt
- A broad stone wheel should run lightly ,in brushing strokes across the margin towards the center of the tooth.
- This will draw metal closer to the tooth without reducing the crown height ,thus helps in adaptation.

Radiographic confirmation of the Gingival fit

- Bitewing is taken before cementation to verify proximal marginal integrity.
- If crown too long , reduce the length
- If too short , then add an orthodontic band or adaptation of another crown indicated.

Cementation

- Crown should be cemented on clean dry tooth only.
- Rinse and dry crown
- Zinc phosphate ,polycarboxylate or GIC is preferred
- Cement should be of consistency that it strings about 1.5 inch from mixing pad with spatula
- Seat the crown on dry tooth
- Cement should be expressed around all margins,excess should be removed with a explorer tip . Interproximal areas can be cleaned by passing dental floss.
- Patient is asked to bite in centric occlusion by applying a pressure through cotton roll and confirm occlusion has not altered

Special consideration:

1)Quadrant dentistry:

-when quadrant dentistry is practiced s.s. crowns are to be placed on the adjacent teeth

-prepare occlusal reduction of one tooth completely before beginning the other

- reduce the adjacent proximal surface of the teeth being restored more ,than when only one tooth is restored

- Both crowns should be trimmed,contoured and prepared for cementation simultaneously to allow for adjustment in interproximal areas and establish proper contacts

-seat the crown on most distal tooth first and proceed mesially

Crowns in areas of space loss (McEvoy 1977)

- When there is long standing caries or inter proximal caries primary teeth shift into interproximal contact areas
- So… crown required to fit over the B-L dimension will be too wide in M-D dimension

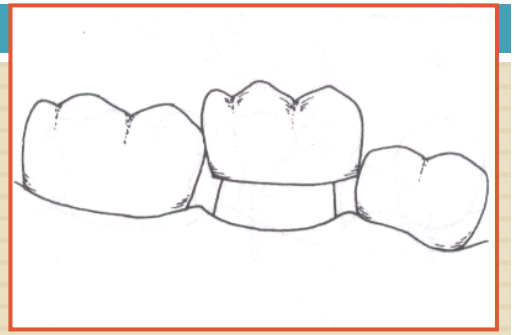
  crown selected ro fit over the M-D space will be too small in circumference
- Select a crown which will fit over tooth's greatest convexity
- Reduce the M-D width by grasping the marginal ridge of the crown with Howe utility pliers and sqeezing the crown
- Recontour the buccal ,lingual and proximal walls with No. 137 or No. 114 pliers
- Do the additional reduction of buccal and lingual surface of tooth

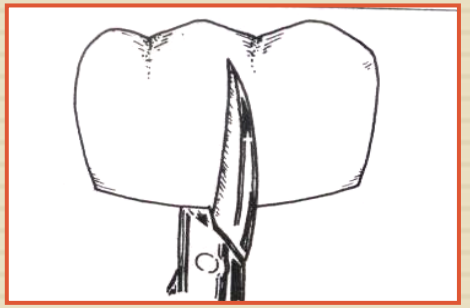
S.S. Crown adjacent to amalgam restoration

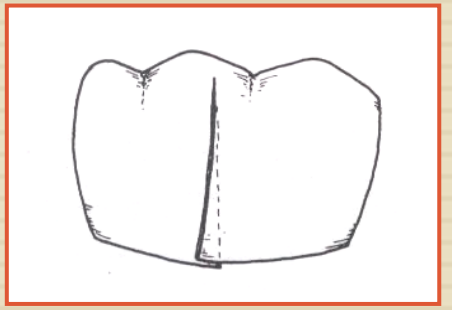
- Placement of rubber dam
- Tooth reduction and crown adaptation
- Placement of matrix band and wedges
- Amalgam restoration done and carved
- With matrix band in place crown is removed without fracturing the amalgam
- Remove band and final carving of amalgam
- Complete crown adaptation and cementation of crown

S.S. crown modifications

- Undersized tooth or Oversized crown:
  - Cut along the buccal surface
  - Free margins are approximated & overlapped over each other and spot welded
  - After contouring, the cut & relocated area is soldered and polished





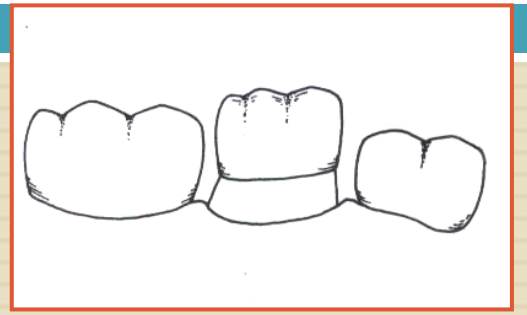


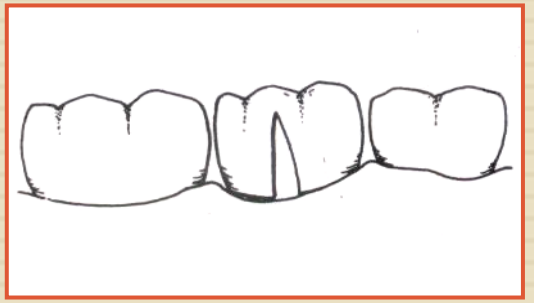
Oversized tooth or undersized crown

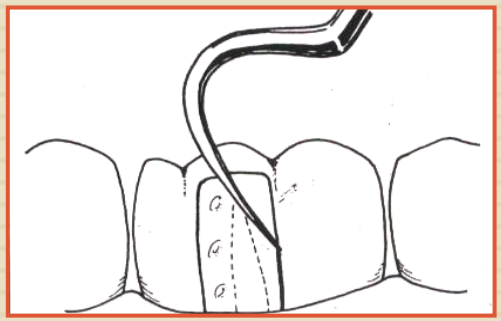
- Separate the edges as needed and weld a piece of 0.004 inch orthodontic Band material across the cut

-apply solder to fill any microscopic deficiencies

-polishing







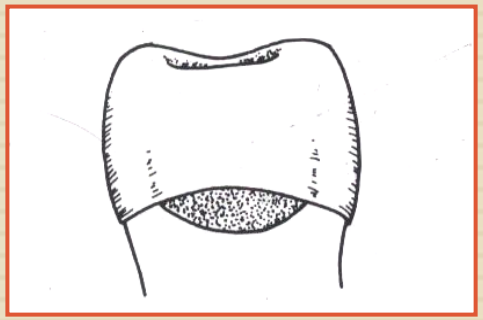
Deep subgingival caries

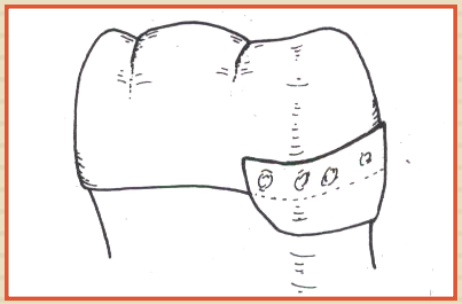
- Complete indicated pulp treatment

-restore with amalgam ,which will be considered as substitute for tooth structure

-crown adaptation

- Unfestooned Rocky mountain crown
- To solder an extension on interproxial areas of crown





The open contact(Except primate space)

- Selection of large crown
- Exaggrated interproximal contour with 112 (ball and socket)
- Addition of solder

Open faced stainless steel crown

- In anterior teeth by trimming away the labial surface to leave a crown perimeter which is then restored with crown veneering.
- Adv:

-improved esthetics

Complications:

- Interproximal ledge:
- - Incorrect angulation of the tapered fissure bur can produce a ledge instead of a shoulder free interproximal slice
- Failure to remove the ledge result in inability to seat the crown

Crown tilt

- Destruction of complete lingual or buccal wall by caries or over instrumentation may result in crown tilting towards deficient side
- Placement of restoration prior to crowning provides support to prevent crown tilt
- In case of young permanent molars it can lead to supra eruption of the opposite tooth

Poor margins

- Recurrent caries
- Gingivitis

Inhalation or ingestion of crown

- Use of rubber dam
- Attempt can be made to remove the crown by holding the child upside down
- Medical referral and immediate chest x ray
- If in bronchi or lung,medical consultation result in attempt to remove it by bronchoscopy
- Ingestion is of less consequencess ,will eventually

Pass through alimentary tract within 5-10 days.

THANK YOU