CROWNS USED IN PEDIATRIC DENTISTRY

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Crown

- Crown is an artificial replacement that restores missing tooth structure by surrounding most or all of the remaining structure with a material such as cast metal, resin, porcelain or a combination of materials. It is intended to reproduce both the form and the function of the tooth and to restore the appearance.

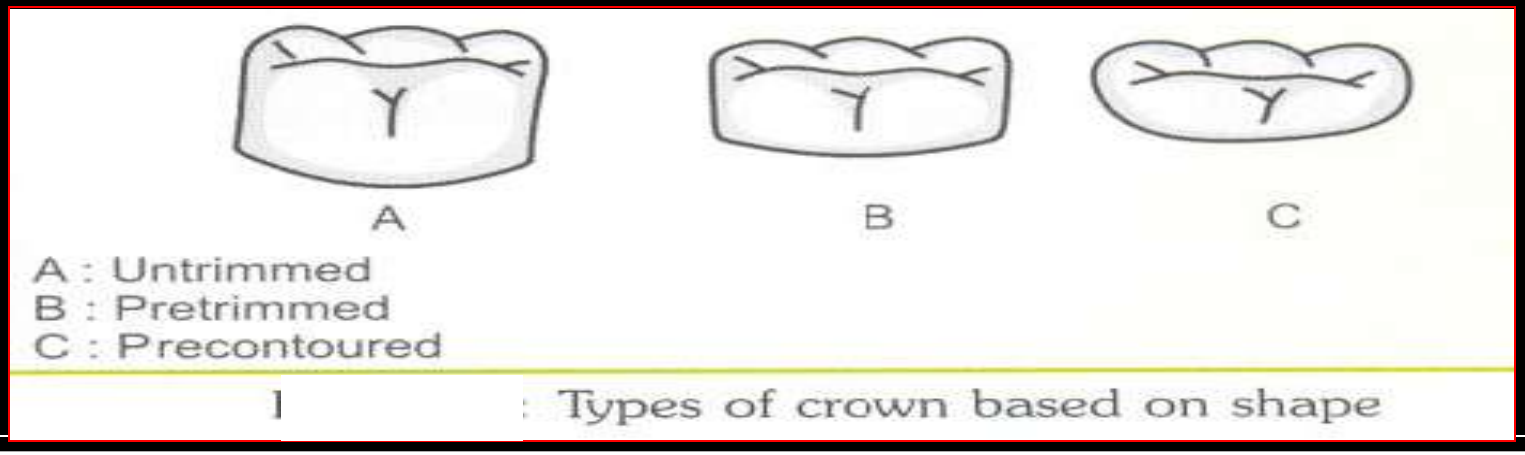
Preformed metal crowns/ Stainless steel crown

Indications —

1. primary molar teeth after pulp therapy
2. restorations of multisurface caries
3. patients at high caries risk primary teeth with developmental defects
4. where an amalgam is likely to fail
5. Hypoplastic tooth
6. Abutment for space maintainer

Different types of stainless steel crowns

- Untrimmed crowns (rocky mountain) nor trimmed nor contoured
- Pretrimmed crown (unitek stainless steel crown, 3M, denvo crowns) – straight noncontoured sides, festooned but require contouring.
- Precontoured crowns (unitek SSC, 3M) festooned & contoured



: Types of crown based on shape

Composition

- SSC (Austentic alloy- rocky mountain , unitek)

  17-19% chromium

  10-13% nickel

  67% iron

  4% minor elements

Austentic type- best corrosion resistance

Steps Involved in Adaptation of the Preformed Stainless Steel Crown

- 1. Crown selection
- 2. Preoperative occlusal evaluation
- 3. LA administration
- 4. Rubber dam application
- 5. Placement of wedges
- 6. Tooth preparation . Occlusal reduction . Proximal reduction . Buccal and lingual reduction . Finishing
- 7. Trial fitting, trimming and contouring the crown
- 8. Finishing the crown
- 9. Cementation
- 10. Post cementation instruction

The factors to *be* considered *during crown selection:*

- *Mesiodistal width of the tooth:* Preoperative MD width is measured with the calipers and matched with the SSC.
- A crown that provides resistance to removal or that requires pressure to place initially -too small
- impossible to contour - a grossly over sized crown.
- Over contoured or oversized crowns on 2nd deciduous molar can prevent normal eruption of the 1st permanent molars.

The factors to *be* considered *during crown selection:……..*

- Primate *space:* Impingement of this space may prevent early mesial shift of the 1st permanent molar.
- *Gingival marginal contour:* differs from the 1st to 2nd molar as well from buccal to lingual to proximal aspect.

Occlusal Reduction

- Large round bur, tapered fissure or flame shaped diamond bur

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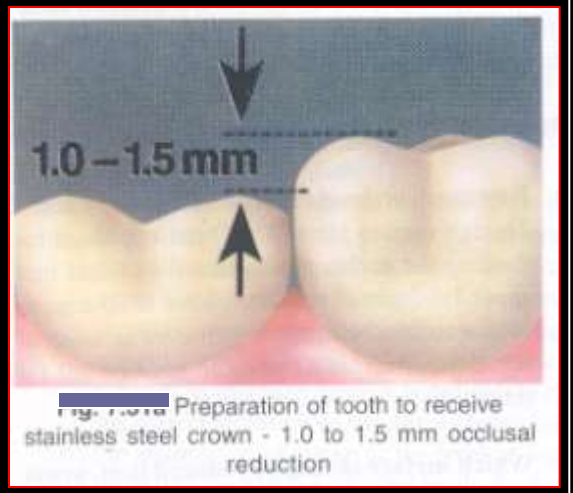
- The occlusal reduction of 1.5-2.0 OR 1.0 -1.5 mm follows the anatomy of the occlusal surface.
- Initial placement of 1mm depth grooves in the occlusal surface followed by removal of remaining portion according to cuspal inclines
- Sharp line angles should be rounded.



Preparation of tooth to receive stainless steel crown - 1.0 to 1.5 mm occlusal reduction

Proximal Reduction

- **The tapered fissure bur moved in bucolingual direction starting at the occlusal surface 1-2 mm away from the adjacent tooth**
- **until the contact area clears gingivally and buccolingually.**

Buccal and Lingual Reduction

Minimal but adequate reduction necessary.
The buccal and lingual cervical bulges can be left uncut if they do not interfere in the placement of the crown

Finishing

All the line angles must be rounded.

Trial Fitting, Trimming and Contouring The Crown

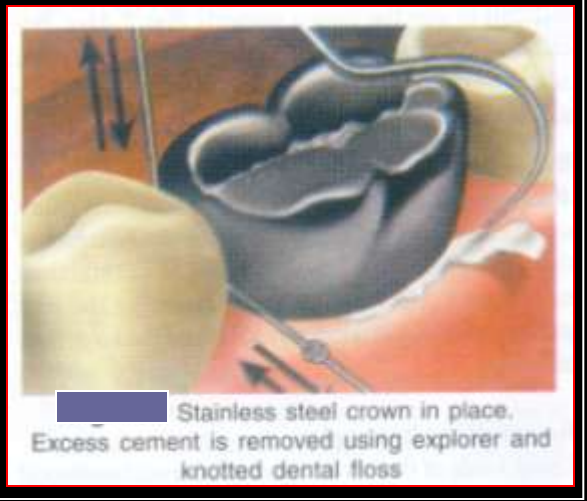
- purpose of crown trimming - to leave the crown margins in the gingival sulcus
- contouring -to reproduce the tooth's morphology.
- **Crimping- Adaptation at gingival margins.**

Fig. 7.32 Contouring done at middle 1/3rd of
belling effect

- Seating of a crown on a mandibular molar done by first fitting the lingual side and then rotating it buccally.

- In the upper arch fit the buccal side first.

- The crown should snap into place when refitted. Care should be taken to see that there is no gingival blanching and no occlusal interference



Stainless steel crown in place. Excess cement is removed using explorer and knotted dental floss

Finishing the Crown

- Final finishing is done with stone and rubber wheel to remove scratches and obtain shine.

Cementation

- Cements used are ZnOE, ZnP04, polycarboxylate, Glass ionomer.
- Debris –removed

  The tooth is isolated with cotton.
- All exposed dentin protected with varnish.
- The crown is 1/2-2/3 filled with cement mixed to luting consistency.
- The crown is seated on the tooth along the pre-determined path of insertion.
- The cotton rolls are removed and patient requested to bite gently on the crown to ensure it's being forced to place.

- the occlusion is rechecked and excess cement is removed using scaler. from the buccal and lingual aspects and floss can be used for proximal surface.

Postcementation Instruction

- The patient should be instructed to avoid heavy chewing with the crown for 24 hours.

- Instructions for maintaining oral hygiene and should be recalled once every 6 months

Modifications of Stainless Steel Crown

a. ***When more than one stainless steel crown has to be prepared additional factors to be remembered are***

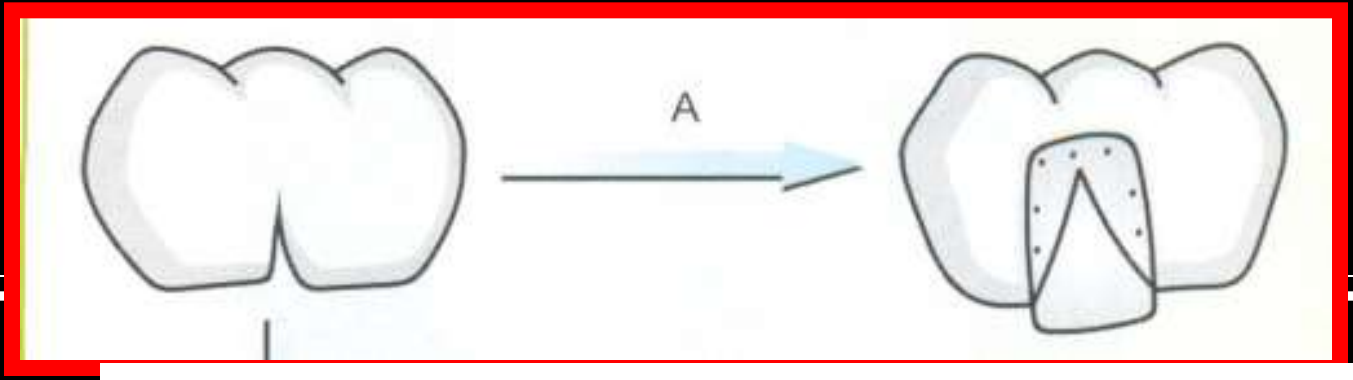
- **i.Occlusal reduction of one tooth should be done completely before starting the second tooth. If done together there is a tendency to over reduce.**
- **ii. Contact point between adjacent teeth should be broken producing 1.5mm space at the gingival level.**
- **iii. Both crowns should be trimmed, contoured and prepared for cementation simultaneously.**
- **Cementation of the distal tooth is done first and should be the same as during trial fitting.**

b. *Drifting of tooth and space loss:*

crown selected to fit M-D Will be too small B-L. In such a case larger crown is taken and M-D width is adjusted by using Howe plier.

c. *Undersized crown*

- A vertical cut is made on the buccal surface of the crown.
- The margins are pulled apart and an additional piece of steel band material is spot welded to the buccal surface increasing the dimensions of the crown.
- After contouring, the crown is soldered, polished and cemented.

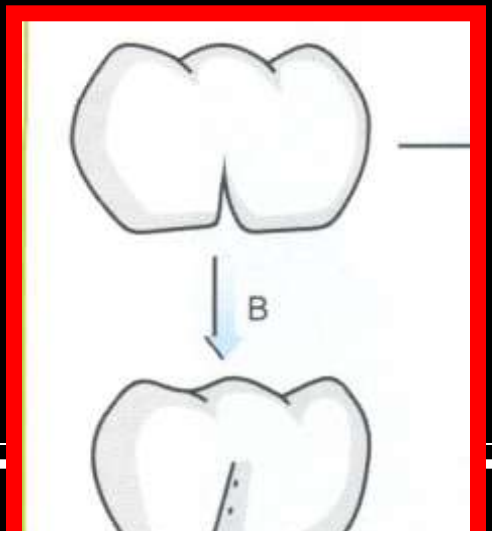


d. *Over sized crown* :

The crown is cut vertically along the buccal wall.

The free crown margin are approximated and overlapped over each other spot welded to reduce the crowns dimension.

After contouring, the cut and relocated area is soldered and polished.

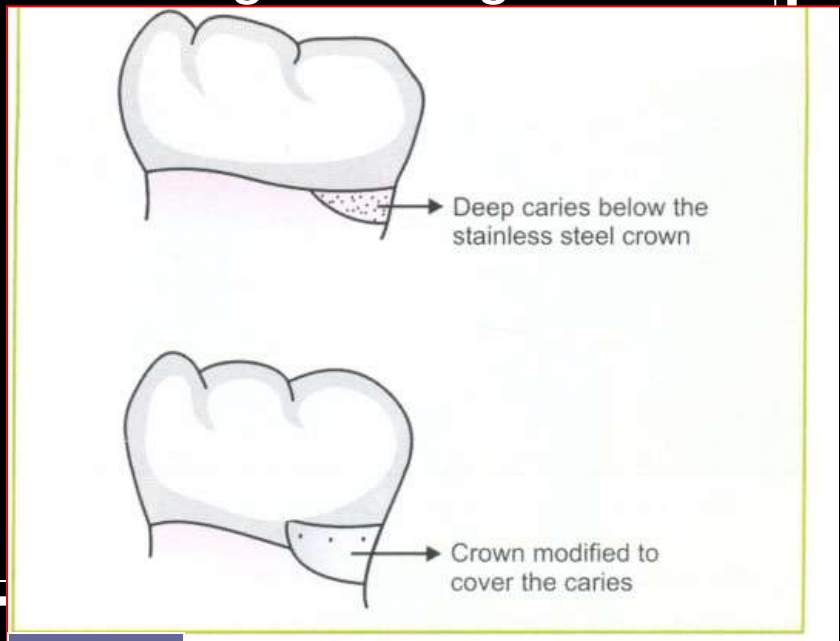


e. *Deep sub gingival caries* in *the interproximal surface*

managed by 2 methods a) unfestooned crown

b) modified prefestooned crown.

A normal prefestooned crown can be used by spot welding an additional band piece thus increasing the length of the crown wherever required.



Extension of stainless steel crown into the deep
mal surface

- f. *Open contact (except the primate space):* corrected by using larger crown,
- g. *Anterior teeth:* Due to its strength and stability SSC -preferred in grossly destroyed anterior teeth.
- Poor esthetics of stainless steel crowns can be improved by removing a portion of the labial surface of the crown or replacing it with a layer of composite resin.
- These crowns are also used in the correction of anterior cross bite,

- *In bruxism:* the thickness of the metal on the occlusal surface is increased by addition of a layer of solder from the impression surface of the crown. - Croll's technique.

Complications that may Develop during Stainless Steel Fabrication

a. *Formation of interproximal ledge- Leads* to inability to seat the crown.

b. *Ingestion of* crown- overcome by using a square piece of gauze as throat screen or by using rubber dam.

Should this happen PA chest radiograph is mandatory and patient is referred to the physician.

- If not found in the radiograph it is assumed to pass uneventfully through the alimentary tract within 5-10 days
- If not found abdominal X-ray is necessary to locate the crown.

Final placement of SSC

Polycarbonate crown

- Heat molded acrylic resin to restore ant. primary teeth

contraindications

- Severe Bruxism
- Excessive abrasion of anterior teeth
- Deep bite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Technique

- Crown selection- MD dimension of crown should be determined
- Preparation of tooth- MD surface reduced till contacts are open, surface becomes parallel

  labial & Lingual reduced 0.5mm
- Finish line – Stewart et al prefer Chamfer

- Incisal edge –reduced 1 -2 mm
- Add an undercut – increase the retentive prop of prep
- Remaining caries –removed
- Pulp protection
- Crown adaptation – selected crown adapted to prep by selective grinding of gingival margin & internal portion of crown

Cementation of polycarbonate crown

- Drill a hole through palatal surface of crown – allows excess cement to escape

Cementation of polycarbonate crown on left central incisor

ARTGLASS CROWNS

- current material for restoring ant primary teeth

- It is a crosslinked three dimensional polymer. Its filler material (microglass & silica) provide- greater durability & esthetics than composite strip crowns

- Available in 1 shade & 6 sizes for prim central, lateral,& canine teeth
- The vast majority of the failures were due to bond failures.

STRIP CROWN/ CELLULOID CROWN

Indications :

1. **Primary incisors with loss of mesial & distal incisal corners**
2. **Nursing bottle caries**
3. Enamel hypoplasia

Strip crown *technique*

Step 1. Isolation desirable, not essential,

- All caries removed
- advisable *to* restore all *four* incisors at the same time.

Step 2. the length *of* the crown is reduced Incisally

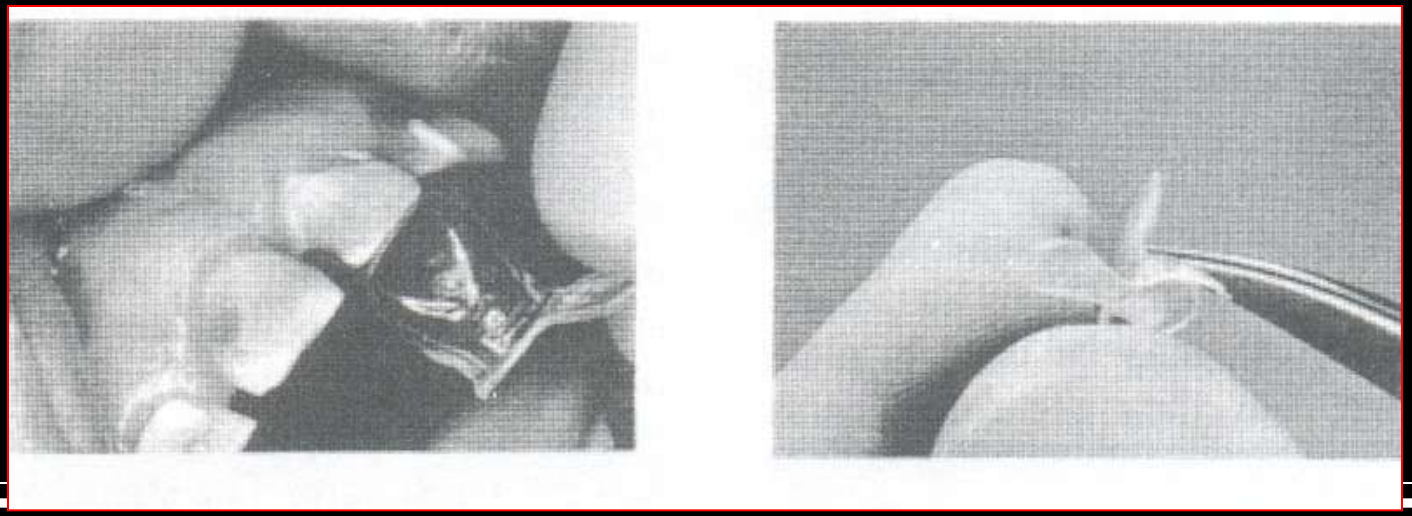
Mesial & distal slices are cut tapering *to* a knife edge at the gingival margins

- If deep overbite - reduce the palatal bulk *of* the enamel.
- A calcium hydroxide lining material is applied to the pulpal wall of any exposed dentine

Step 3. shade of composite resin is now chosen, usually a very light shade

Step 4. Celluloid strip-crown forms are selected of the right size and trimmed using fine curved scissors

The crowns are thin and easily split if care is not taken at this stage.



Step 5. Vent holes at the incisal-edge corners of the crown form -allow air to escape when it is filled with composite resin.

crowns trial-fitted for length and cervical fit

Step 6. The teeth are etched , washed and dried

- bonding agent applied and cured

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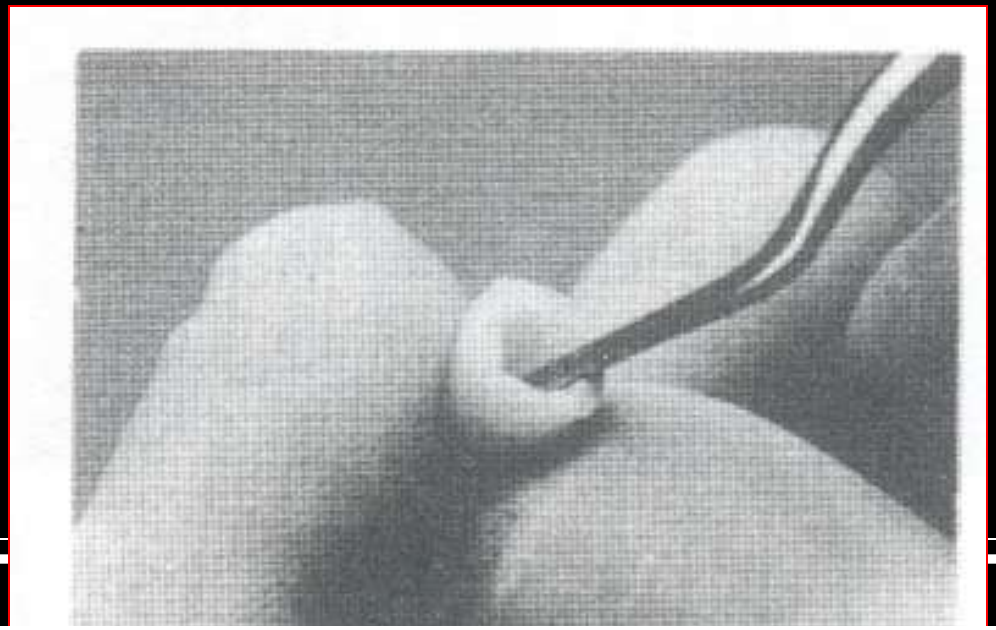
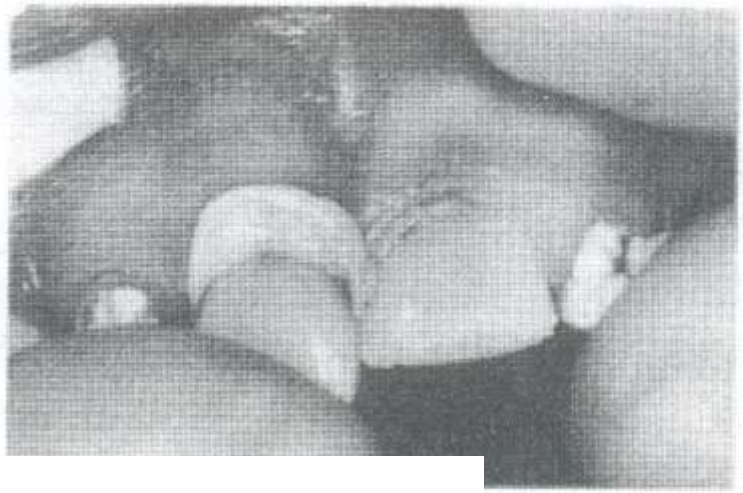
Step 7. The crown form is then filled with composite resin



- Step 8. The crown forms with composite resin are firmly seated on to the prepared teeth If more than one incisor is being restored the crowns should be seated together.
- Care should be taken to remove excess resin with a probe or small Hollenback carver
- Excess pressure can result in the crown form splitting so the amount of pressure required is that to seat the crown only



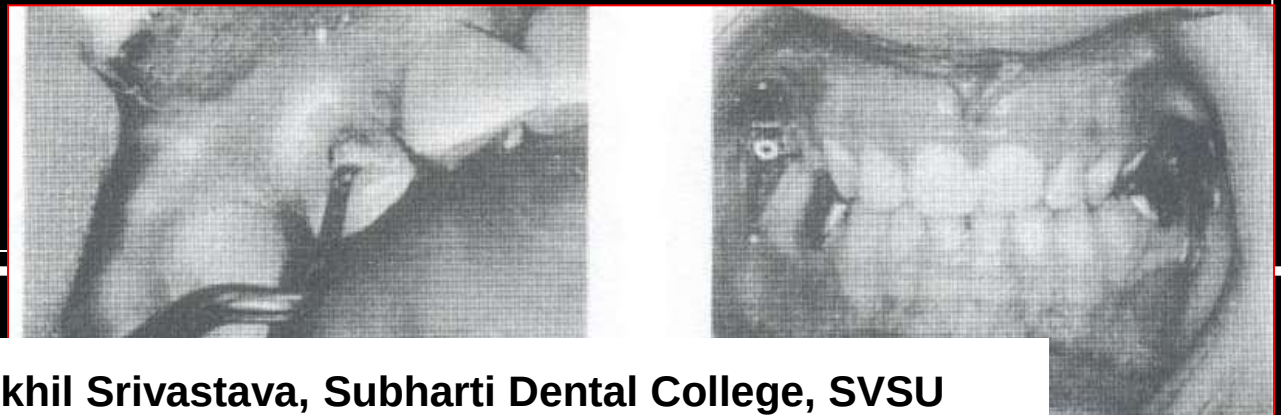
Step 9. composite resin cured for I min, cure thoroughly both labially and palatally.

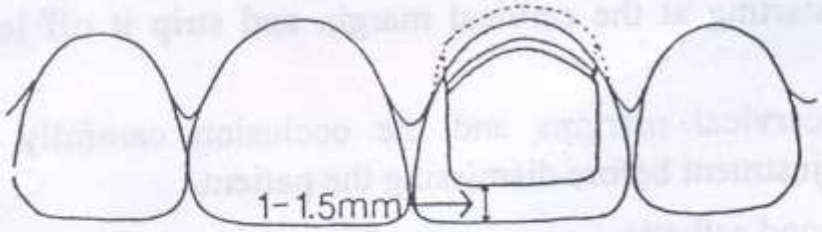
Step 10. An excavator or probe is inserted beneath the edge of the celluloid and the crown formes stripped off

- Reduction of the incisal length may be needed

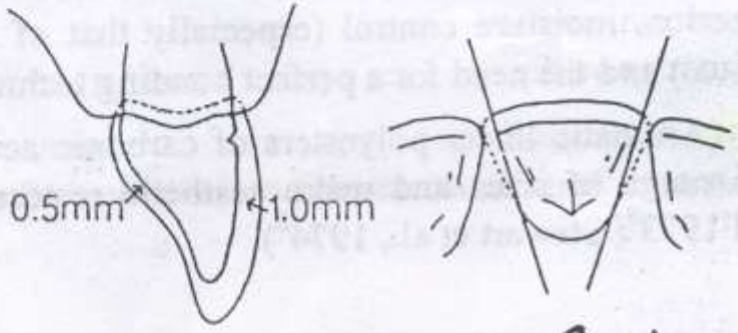
Final Step. The cured crown is smoothed and polished.

- The finished crowns restore the aesthetics





A → Labial view



B
Proximal view

C → Incisal view
(The proximal slice should be ll to the natural external contour of the tooth)

Acid-etched (Strip)
Composite crown preparation

ADVANTAGE: Strip crown technique is quick & simple method for restoration of primary incisors

- encourages an interest in dental health for both parents and child.
- Very good esthetic.

- Drawbacks: Strip crown are difficult to place because of the

  complexities of tooth preparation,

  pulp protection,

  moisture control (especially that of marginal bleeding when caries is subgingival)

thank you