Sri Aurobindo College of Dentistry

Indore, Madhya Pradesh

INDIA

MODULE PLAN

TOPIC : Aesthetic restoration and Crowns in Pediatric Dentistry

SUBJECT: PEDODONTICS

TARGET GROUP: UNDERGRADUATE DENTISTRY

MODE: POWERPOINT – WEBINAR

PLATFORM: INSTITUTIONAL LMS

PRESENTER:BY-DR.PREENE JUNEJA

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- Modifications
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  - Pedojacket
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  - Pedo pearls
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  - Anterior Stainless steel crown
  - Ni Cr crowns
  - Kudos crown
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  - HDPC
  - Pedo compu crown
  - Whiter Biter Crown
  - Nu smile crowns

Introduction

"You have Ferrari in cars, Harley-Davidson in bikes and Stainless Steel Crowns in Pediatric Dentistry."

Historic Development in Pediatric Crowns

- 1947 - Preformed crowns were introduced by Rocky Mountain Company.
- 1950 - Stainless steel crowns (SSC) was described by **Engel** and popularised by **Willium Humphrey** to pediatric dentistry
- 1950 to 1968 – Various modifications in preformed crowns occurred.
- 1964 – Biologic restorations were advocated by **Chosak and Eildeman**
- 1970 – Polycarbonate crowns were introduced
- 1971 – **Mink and Hill** advised SSC modifications for over and undersized crowns. SSC modifications for deep subgingival caries and solder joint for interdental spacing.

- 1977 – **McEvory** advised modification of SSC technique for SSC with arch length discrepancy or space loss.
- 1980 to 1990 – Various preveneered SSC were introduced
- 1980 – Pedo Pearls was introduced
- 1981 – **Nash** advocated modification of SSC for adjacent crown placement
- 1983 – **Hartman** advised veneered SSC technique for esthetic anterior crown placement
- 1987 – Cheng crowns were introduced by **Peter Cheng**
- 1989 – Kinder crowns were introduced
- 1990 to 1995 – Hall technique was introduced by **Dr. Norna Hall** for SSC adaptation on carious tooth without tooth preparation

- 1993 – **Beemer et al** advised band adaptation on SSC crowns as a space maintainer rather than crown and loop
- 1997 – Pedo Natural crowns were introduced
- 1997 – Zirlock technology was introduced for better retention of preveneered crowns.
- 2002 – **Kuietzky** advised split technique of rubber dam isolation for restoration of multiple anterior teeth
- 2010 – EZ zirconia crowns were introduced by **Hansen JP and Fisher JP** as pediatric esthetic crowns.
- 2017 – Figaro Crowns (Fiberglass Dental Crowns) by **Mancini, Andy** was patented.

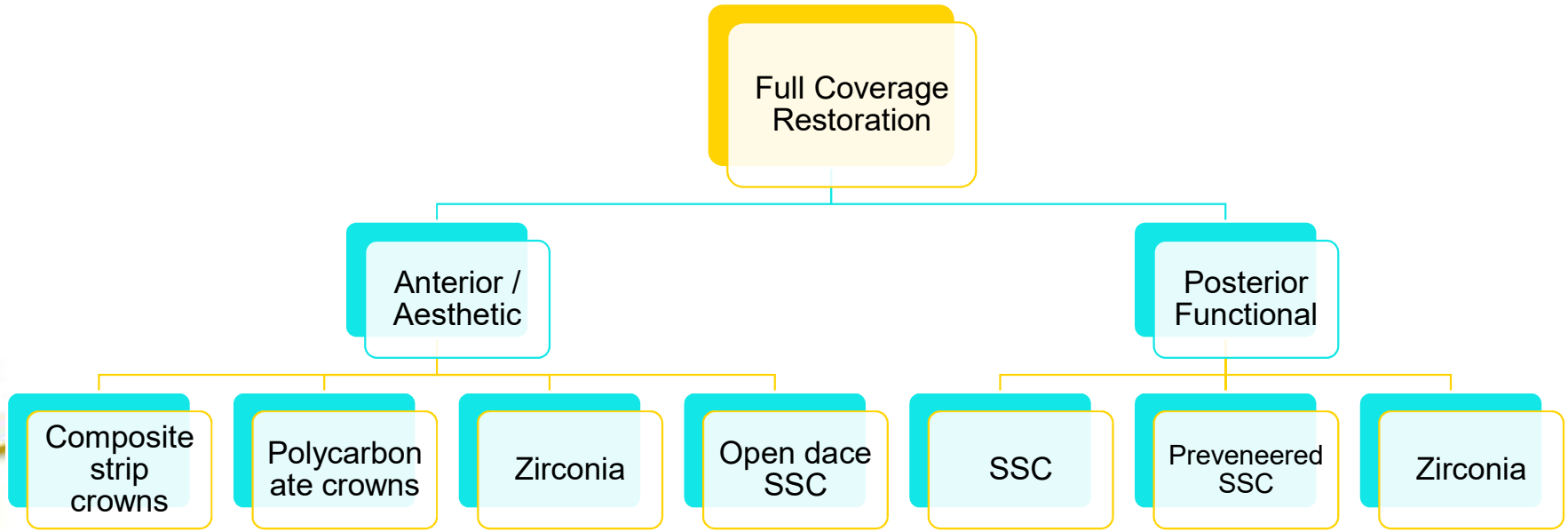
Classification of Preformed Crowns

According to materials used:

1) Stainless steel crowns
2) Nickel chromium crowns
3) Aluminum Crowns
4) Tin Silver alloy
5) Polycarbonate crowns
6) Pedo strip crowns

According to location:

1) Crowns for anterior teeth
2) Crowns for posterior teeth


Full Coverage Restoration
Anterior / Aesthetic
Posterior Functional
Composite strip crowns
Polycarbon ate crowns
Zirconia
Open dace SSC
SSC
Preveneered SSC
Zirconia

From the standpoint of the patient's oral health, the care and placement of temporary crowns is essential for the following reasons:

- To prevent sensitivity in the prepared tooth.
- To protect the dentin from oral fluids.
- To maintain occlusion.
- To prevent fracturing of the finish line or breakdown of the prepared tooth.
- To prevent changes in gingival tissue, caused by infringement of the crown margin on the free gingiva or by food impaction.
- To provide for lost function.
- To maintain aesthetics
- To restore or improve the contour of the original tooth.

Ideal Requirements For Pediatric Crowns

- Should be aesthetically acceptable/should have natural colour.
- Should last until exfoliation of primary teeth (durable)
- Should be biocompatible and not irritant to gingiva.
- Easily and rapidly placed.
- Cost effective.
- Should require one visit treatment.

- Aesthetic covering should not chip off while clinical manipulation or during use in oral cavity.
- Should maintain tooth integrity.
- Should maintain mesiodistal space until eruption of permanent teeth.
- Should retain masticatory function.
- Should not abrade opposing teeth.

Objectives Of Crown Placement

Repair or limit the damage from caries

Restoring Aesthetics

Protect and preserve tooth structure

Preventing psychological trauma

Maintaining Occlusion

Restoring Speech and mastication

Indications

- Children at high risk with anterior and/or posterior decay
- Children with extensive decay
- Large lesions or multiple surface lesions
- Pulpally treated teeth
- Involved inscisal edge
- Extensive cervical caries
- Minimal caries but poor oral hygiene
- Difficult to control moisture due to child behaviour management problems.

- Hypoplastic defects
- Significant tooth loss/fracture due to trauma
- Psychologic benefit
- Posterior crown for masticatory function and to maintain arch length
- Unaesthetic incisors due to discoloration/ intrinsic stain.

Contraindications

- Non restorable teeth
- Teeth which can be restored by conventional means.

Advantages

- Maintains aesthetics of child
- Avoids development of psychological and functional problems due to loss of primary teeth
- Preserves arch length and space.

Crown

Definition

- Restoration that covers a tooth to restore it normal shape and size. It helps in strengthening and improving the appearance of the tooth

- Stainless steel crowns (SSC) can be defined as prefabricated crown forms that are adapted to individual teeth and cemented with a biocompatible luting agent.

Academy of Pediatric Dentistry. Special issue. Reference Manual. 21(5):105.

Stainless Steel Crown

Preformed metal crowns for primary molar teeth were first described by **Engel**

Humphery in 1950 introduced the use of SSC in pediatric dentistry.

First prefomed crowns(rocky mountain)-1947

- Straight sides
- Longer than avg tooth
- Stainless steel was not strain harden before placement

- 1960 – Improved crowns (unitek)- require fewer alteration
  - Crown was only slightly longer than average tooth
  - Stainless steel was not strain hardened before placement
  - Trimming , contouring , crimping and finishing were required.
- Recently introduced- Ni-Cr crown by Hinding 1976
  - Manufactured from iconel
  - Less iron
  - Correspond actual anatomic crown height seldom require trimming
  - They are festooned, contoured and crimped
  - Require modification but fewer than old crowns

1970

The initial crown preparation was suggested by Mink and Bennet which is still being used.

Mc Evory advised modification of SSC technique for SSC arch length or space loss

1977

Types of Stainless Steel Crown

- Stainless steel crowns
- Austenitic types
- Ion crowns

a) Stainless steel crowns:

- Low carbon alloy
- Contain at least 11.50% cr
- 3 general classes
  - The heat hardenable 400 series martensitic types,
  - The non-heat hardenable 400 series ferritic types,
  - The austenitic types of chromium-nickel-manganese 200 series and chromium-nickel 300 series

b) Austenitic types:

- The austenitic types are used by Rocky Mountain and Unitek for their crowns referred to as 18-8 since
- Contain about 18% chromium and 8% nickel.
- In addition, they contain small amounts of other alloying elements, carbon (0.08% to 0.15%), and iron.
- Have high ductility, low yield strength

c) Ion crowns:

- The Ion crown is constructed of Iconel 600, a relatively new addition to the category of performed crowns, and is primarily nickel-chromium.
- The typical constitution is 76% nickel, 15% chromium, 8% iron, 0.08% carbon, and traces of other elements.
- The metallurgic characteristics of the nickel-chromium alloy permit these crowns to be strain hardened during manufacture.

Classification of Stainless Steel Crown

According to trimming

Untrimmed Crowns	Pretrimmed Crowns	Precontoured Crowns
• Rocky Mountain	• Unitek • 3M Co • Denovo	• Ni-chro ion crowns • Unitek Stainless Steel Crowns • 3M Co

FIGURES 3.9A TO C Untrimmed: (A) Untrimmed, uncontoured; (B) Pretrimmed, uncontoured; (C) Pretrimmed and precontoured

Mathewson.: Fundamental of pediatric dentistry. 3rd ED. Quintessence Publishing Co. Shicago, 1995

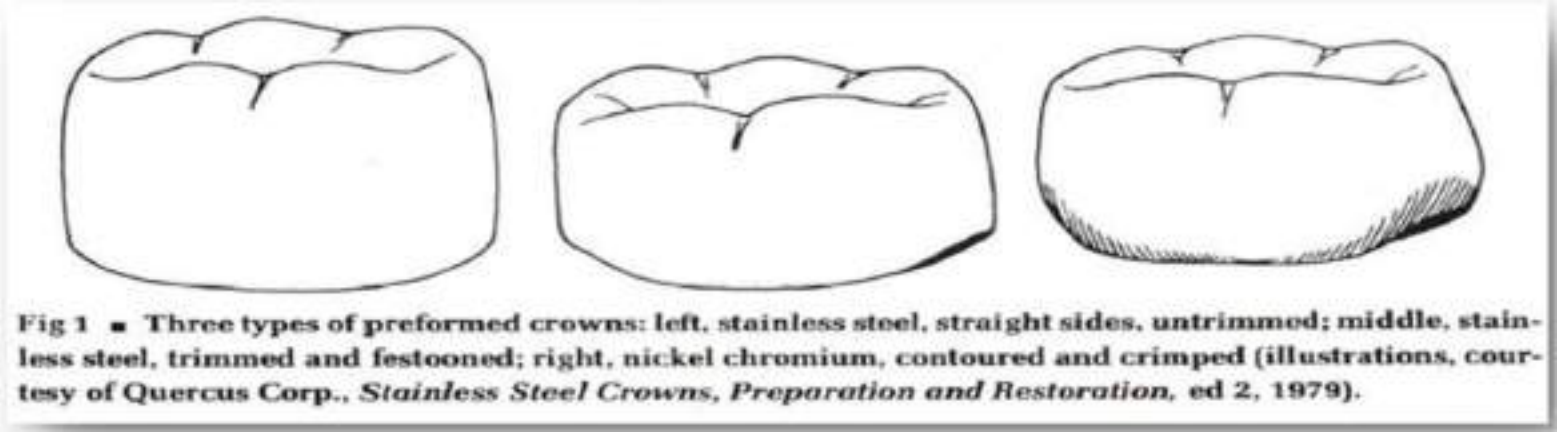


Fig 1 ▪ Three types of preformed crowns: left, stainless steel, straight sides, untrimmed; middle, stainless steel, trimmed and festooned; right, nickel chromium, contoured and crimped (illustrations, courtesy of Quercus Corp., *Stainless Steel Crowns, Preparation and Restoration,* ed 2, 1979).

According to Composition

- Stainless Steel Crowns
- Nickel Chromium Crowns
- Tin based Crowns
- Aluminium based Crowns

Stainless Steel Crowns

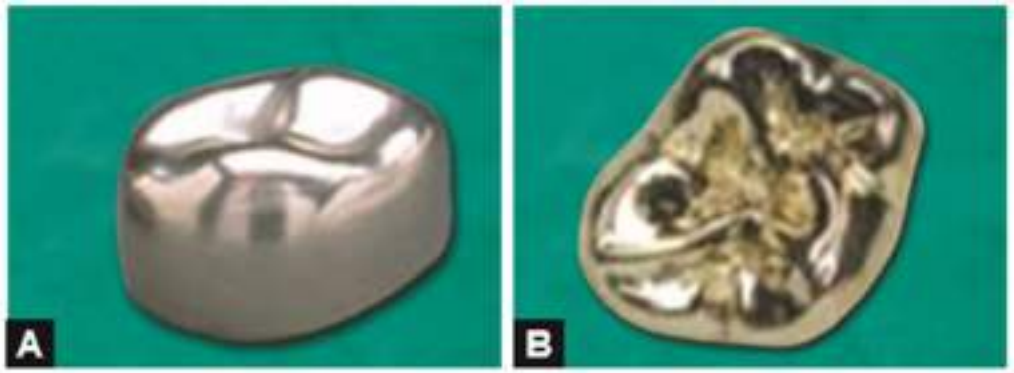
(Rocky mountain, Unitek

- 17~19% chromium
- 10~13% nickel
- 67% iron
- 4% minor elements

Nickel Based Crowns

InConell 600 alloy, 3M

- 72% nickel
- 16% chromium
- 6-10% iron
- 0.04% carbon
- 0.35% manganese
- 0.2% silicon



Figs 48.2A and B: Crowns according to the composition

- Iron (67%), carbon, chromium (17-19%), nickel (10-13%), manganese and other metals (4%).
- Chromium oxidizes - “passivating film”
- The term “stainless steel” is used when the chromium content exceeds 11% and is generally in the range of 12 to 30%.
- SSC contain about 18% chromium and 8% nickel as well as small amounts of other elements and are considered as 18-8 stainless steel.

- Due to its allergic potential, nickel affects 10% of the total general population.
- Feasby et al. (1988) reported an increased nickel positive patch test in children 8-12 years who received old formulation Ni-Cr crowns.
- This is no longer the issue with current composition.

Kulkarni et al. (2016) evaluated the release of Ni-Cr from space maintainers and SSC and revealed that the release is well below the average dietary intake (200-300 ppm/day) and were incapable of causing any toxic effects.

Feasby WH, Ecclestone ER, Grainger RM. Nickel sensitivity in pediatric dental patients. Pediatr Dent. 1988; 10:127-129

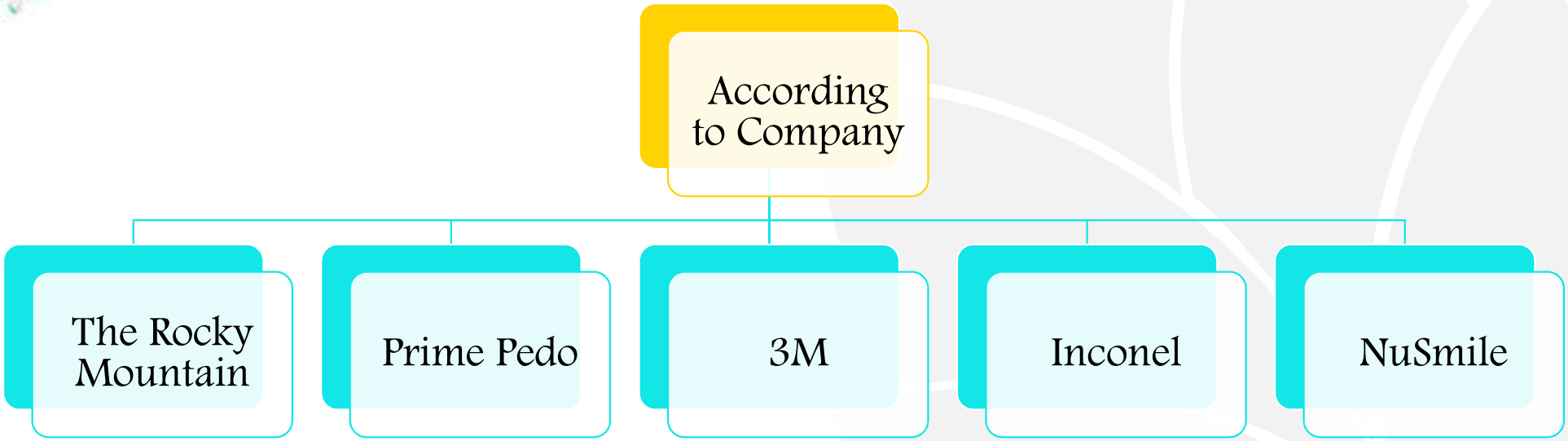
According to Position

Crowns for Posterior Teeth

- Unitek stainless steel crowns, 3M Co.

Crowns for Anterior Teeth

- NuSmile crowns, Orthodontic Technologies, USA


According to Company
The Rocky Mountain
Prime Pedo
3M
Inconel
NuSmile

According to Occlusal Anatomy

- Ion ~ compact occlusal anatomy
- Unitek ~ best occlusal anatomy
- Rocky Mountains ~ occlusally small
- Ormco ~ smallest and least occlusally carved.
- 3M – Ideal occlusal anatomy

Indications of Stainless Steel Crowns

- Extensive Caries
- Extensive decalcification
- Rampant caries
- Recurrent Caries
- After pulp therapy
- Inherent or acquired enamel defects

- Intermediate Restoration
- Fractures of permanent and primary incisors
- Severe bruxism
- Abutment teeth to prosthesis
- As a part of space maintainer
- Correction of anterior crossbite

Contraindications of Stainless Steel Crowns

- Primary molars close to exfoliation
- Primary molars with more than half the roots resorbed
- Teeth that exhibit mobility
- Teeth which are not resorbable
- Patients with known nickel allergy

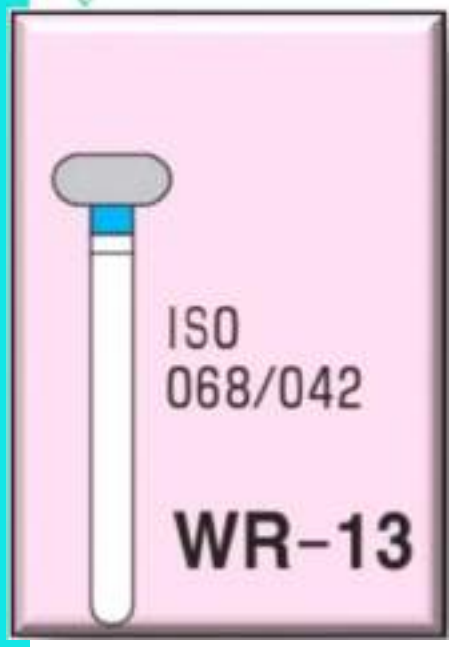
Preoperative Procedures

- Dental age of the patient:
- Cooperation of the patient:
- Motivation of Parents
- Medically compromised/disabled children:

Armamentarium

Burs and stones:

- No. 169L or No. 69L F.G.
- No. 6 or No. 8 R.A.
- No. 330 F.G.
- Tapered diamond F.G.
- Round bur
- Flame shaped diamond bur
- Long thin tapered
- Green stone or heatless stone/rubber wheel
- Rough polishing wheel
- Wire wheel-for finishing crown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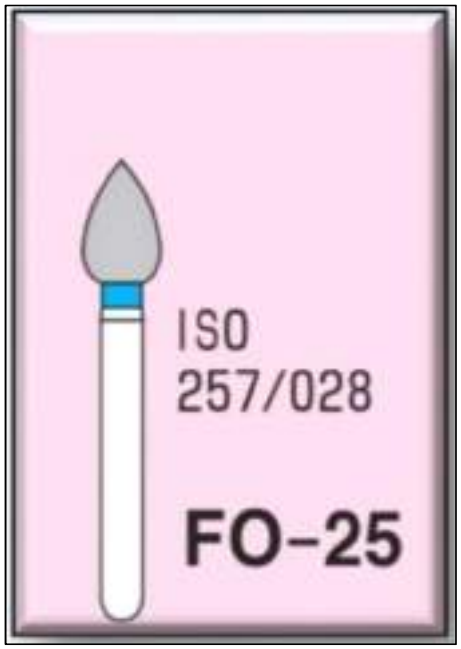
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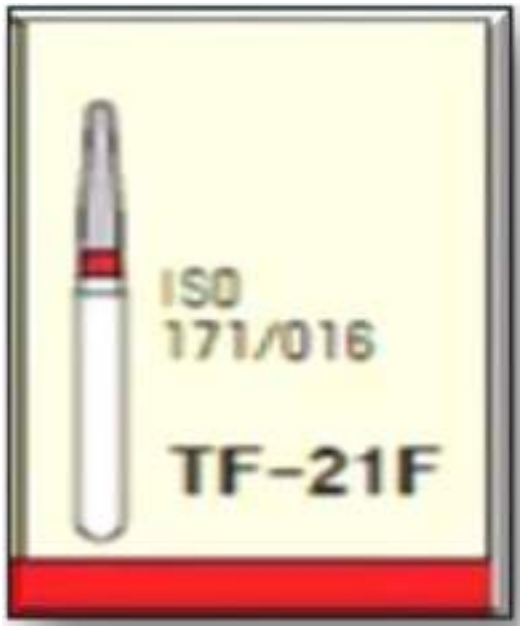
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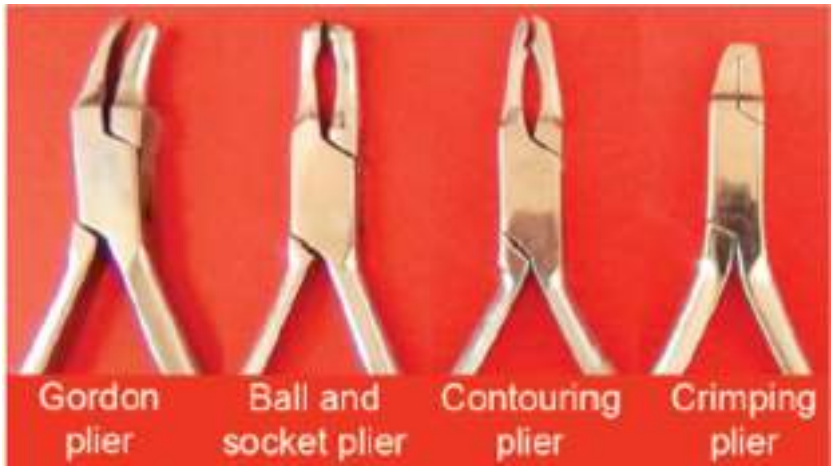
Pliers and Instruments

- No. 114 Johnson contouring plier
- No. 800-417 crown pliers
- No. 112 ball and socket plier
- Sharp scalers or instrument
- Crown and bridge scissors
- No.110 howe pliers
- No. 137 Gordon pliers



Hu-friedy	GDC
SLIM CROWN & BAND CONTOURING PLIERS 678-221MC	JHONOSON CONTOURING 3000/59
BAND CRIMPING PLIERS 678-225	CROWN CRIMPING PLIER 3000/225
CURVED CROWN & GOLD SCISSORS SCGC	CROWN & BAND TC CURVED 12.0 CM S5039

- Glass slab/paper pad
- Spatula/agate spatula
- Rough or whitening polish wheels
- Dental floss
- Crimpling pliers
- Rubber dam

Technique

- Evaluate the preoperative occlusion
- Selection of crown
- Tooth preparation
- Final adaptation of the crown
- Finishing
- Polishing
- Crown fit
- Cementation

Evaluate the preoperative occlusion

- Upper and lower arch impressions with alginate
- Pour the cast - Note the dental midline and the cusp fossa relationship bilaterally

Crown Selection

Three main considerations in selecting the proper stainless steel crowns are:

a) Adequate mesiodistal diameter,

b) Light resistance to seating and

c) Proper occlusal height.

- Measuring the M-D dimensions of the tooth to be restored
- Measuring contralateral tooth
- If the crown is not selected before the tooth reduction - selected as trial and error procedure

TABLE 48.1: Stainless steel crown dimensions

Tooth diameter	*Mesiodistal (mm)*	*Labiolingual diameter (mm)*	*Occlusocervical length (mm)*
⌈D3	8.1	6.6	5.0
⌈D4	8.5	6.9	5.4
⌈D5	8.9	7.2	5.6
⌈D6	9.2	7.7	6.0
⌈E3	9.7	8.8	6.0
⌈E4	10.1	9.1	6.3
⌈E5	10.6	9.6	6.6
⌈E6	11.0	10.0	6.9
⌈D3	6.9	7.6	5.2
⌈D4	7.3	8.0	5.4
⌈D5	7.8	8.4	5.9
⌈D6	8.3	8.7	6.1
⌈E3	9.3	10.0	6.0
⌈E4	9.6	10.3	6.3
⌈E5	10.0	10.8	6.5
⌈E6	10.4	11.0	6.8

ASPECT	MATHEWSON	MCDONALD	SHOBHA TANDON	NIKHIL MARWAH
CROWN SELECTION	• M-D diameter Light resistance to sitting • Proper occlusal Height	Smallest crown that completely covers the tooth preparation	~	M-D diameter. Light resistance to sitting. Proper occlusal Height. Different ways to select: 1. Trial and error. 2. Measurement of M-D by boley guage or Vernier Caliper

Brand *Company*	Sizes and Shapes available Sizes: 0–7 • Shapes: L/R, Up/Low, or Universal		Highest Average Thickness (mm) *Location*
	Anterior	**Posterior**	
Hu-Friedy PEDO CROWNS *Hu-Friedy*	N/A	1st and 2nd Molars: Up/Low, L/R (2-7)	0.11 mm *Mesial / Buccal*
Primary Stainless Steel Crowns *3M ESPE*	N/A	1st and 2nd Molars: Up/Low, L/R (2-7)	0.13 mm *Mesial*
Unitek Primary Stainless Steel Crowns *3M ESPE*	Upper Incisors: L/R (1-6) Cuspids: Up/Low (1-6)	1st and 2nd Molars: Up/Low, L/R (1-7)	Posterior †: 0.17 mm *Lingual*

Tooth preparation

The aims of the tooth reduction are:

- To provide sufficient space for the steel crown
- To remove the caries to have sufficient tooth for retention of the crown

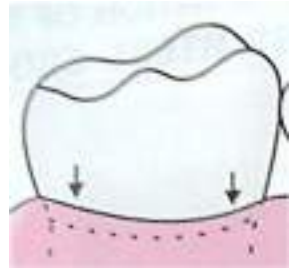
Isolation

- Use of rubber dam for isolation. Before placing a rubber dam, check the child's occlusion.
- When it is not possible to use rubber dam, use cotton rolls.

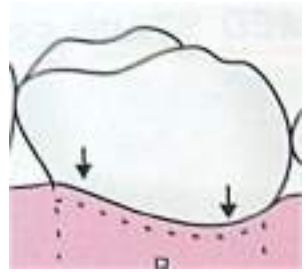
Observe for the following

- The opposing tooth has extruded
- There has been mesial drift due to carious lesions
- Tooth reduction is needed so that the restored tooth can be returned to normal function

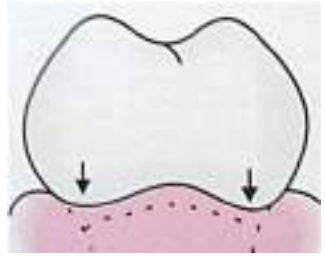
- **Buccal** marginal gingiva of the **2nd primary mandibular molar** and **lingual marginal gingiva of all** the primary molars resemble **smile** with greatest Occluso-gingival height - midway



- **Buccal** marginal gingiva of **1st primary mandibular and maxillary molar - stretched out smile** having greatest cclusal-gingival height located at the mesiobuccal portion.



- **Proximal** marginal gingival tissues of aspect - **Frown**



Occlusal first or Proximal first?

Proximal

Occlusal

Reduction of tooth

Occlusal reduction

- No 330 (pear) or tapered diamond bur
- Humphrey (1950) - Cusps be reduced, if necessary

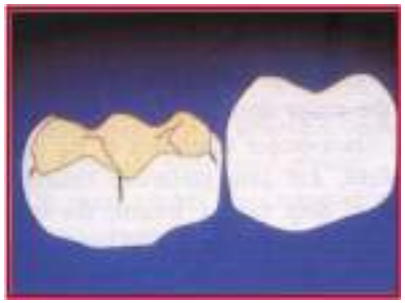


TABLE 3.5 Occlusal reduction for primary molars suggested by various authors

SL No	Researchers	Year	Occlusal reduction in mm
1	Humphrey	1950	Cups should be reduced if necessary
2	Mink and Bennet	1968	1–1.5 mm uniform reduction
3	Mathewson et al.	1974	1–1.5 mm
4	Troutman and Kennedy	1976	1.5–2 mm
5	Rapp	1966	Preparation height 4 mm from gingival margin

Variations - timing of the reduction of the occlusal surface relative to the inter-proximal reduction

Occlusal - initial step since; gingival bleeding will occur if the proximal reduction is done, making the diagnosis of very small pulp exposure, difficult

Placement of Separators

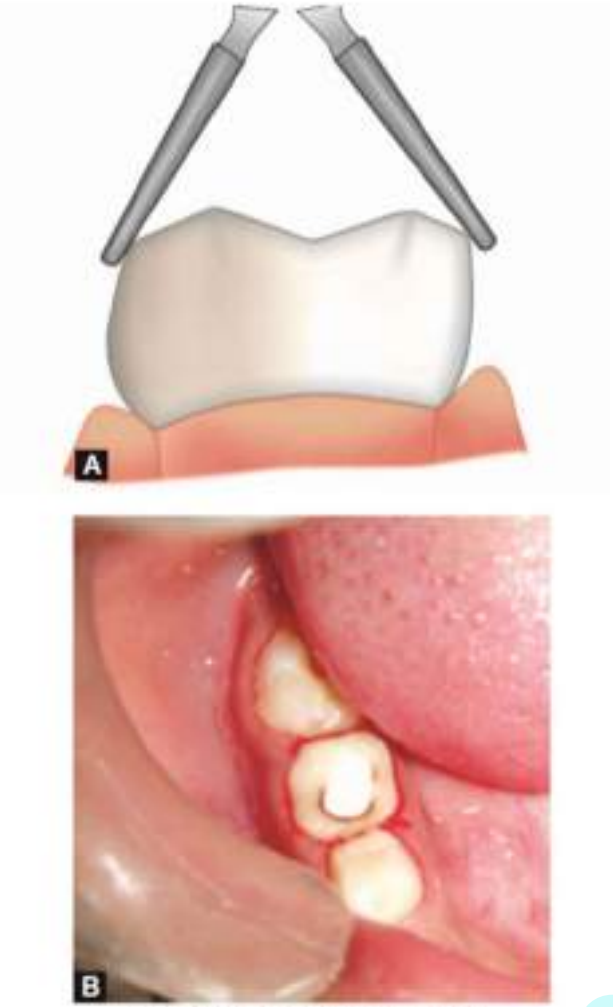
Wedging

Advantages:

- Better access and to reduce risk of iatrogenic damage to adjacent teeth
- It also helps to depress gingival tissue and rubber dam.
- Moisture control.

Proximal reduction

- Slice - No 69 L or 169 L bur
- Making a slice - helps to eliminate the interproximal ledge
- **Distal reduction** is required even when there is no erupted tooth distally
- The width clearance between teeth should be at least 1 mm at the gingival level, and preparation for 2 ssc need at least 2 mm between teeth.



Figs 48.8A and B: Proximal reduction

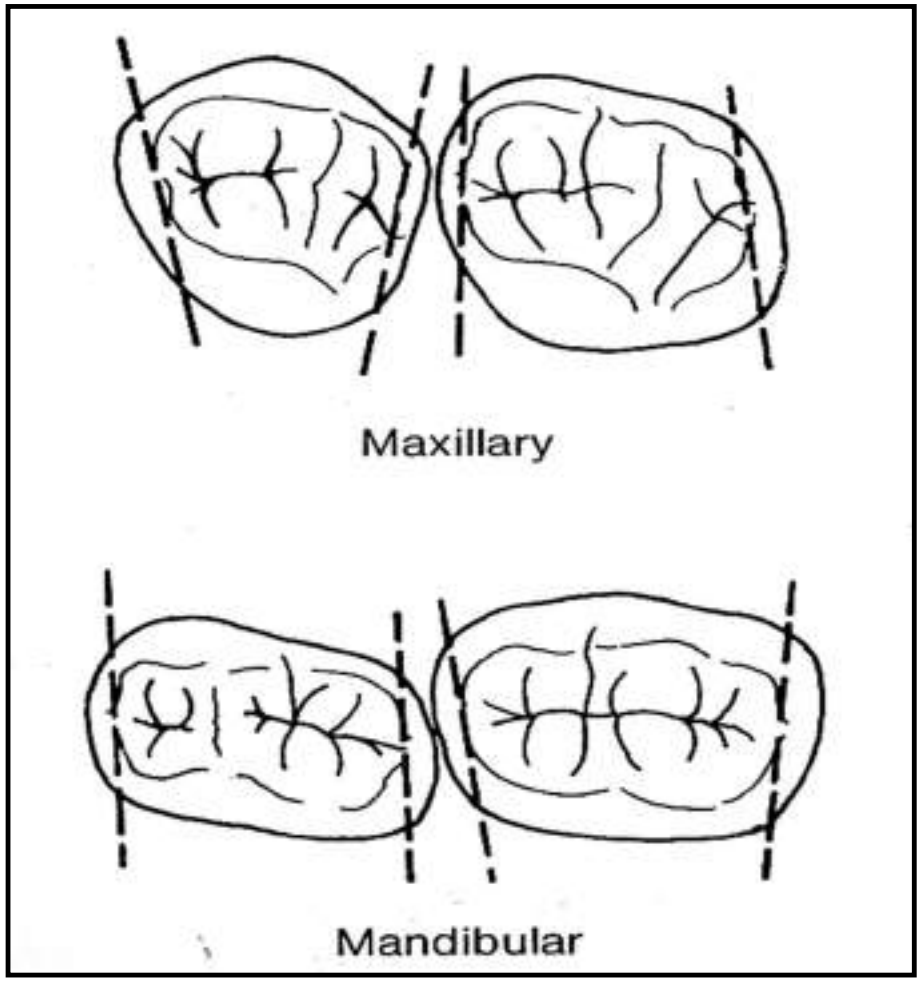
- Full et al. considered that preparing the occlusal surface first allows better access to the proximal areas of the tooth.

Full CA, Walker JD, Pinkham JR. Stainless steel crowns for deciduous molars. JADA. 1974;89:360-364

- Other authors recommended preparing the mesial and distal slices before reducing the occlusal.

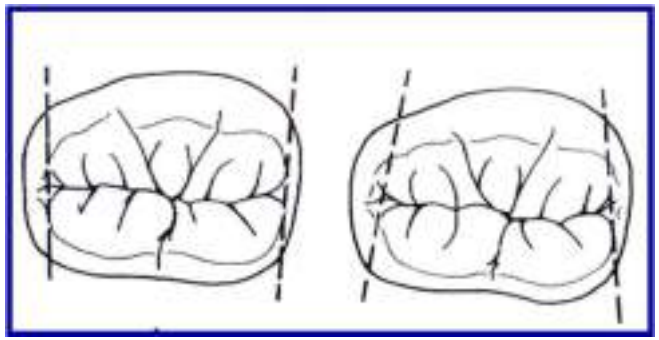
Mink JR, Bennett IC. The stainless steel crown. J On Dent Assoc. 1968;45:420-430.

Optimum slices on the four primary molars



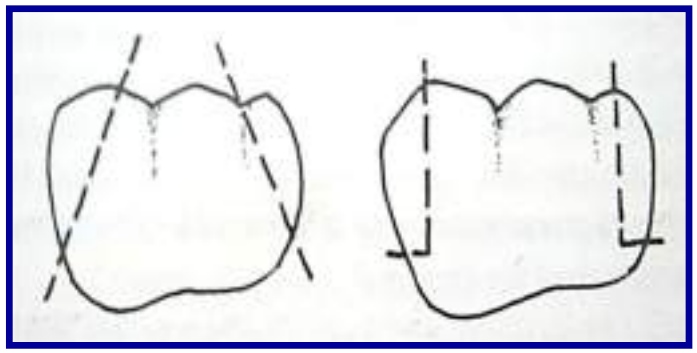
Angulation of slice

1. Proper slice 2. Improper slice



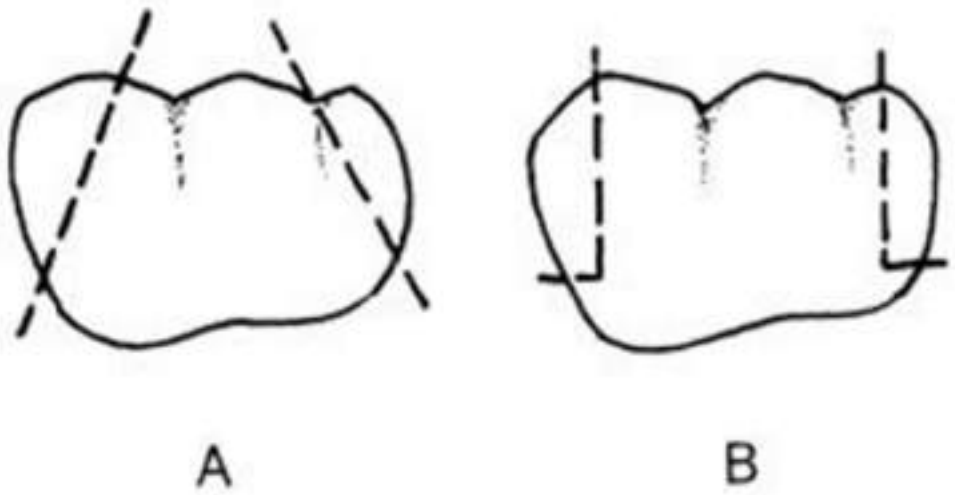
Common errors in crown slices

1. Excessive taper 2. Creation of a shoulder



Common errors in crown slices:

(A) excessive taper; (B) creation of a shoulder.



Buccal and lingual reduction

Reduction of the buccal and lingual surfaces - to be the most controversial

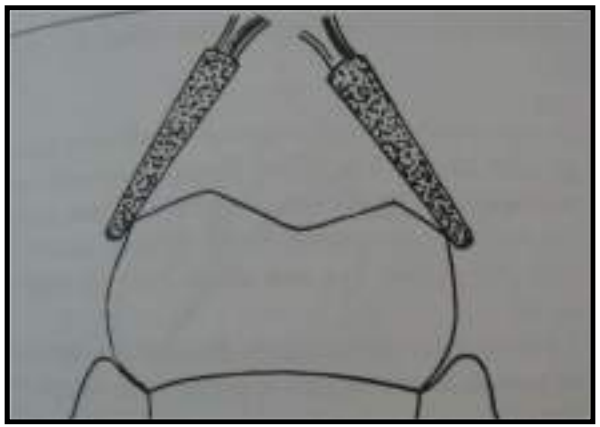
- **Mink** and **Bennett :** The questions is whether to

(1) Reduce the entire bulge

(2) Permit the buccal and lingual cervical bulges to remain and reduce only the occlusal third of the preparation

- **Stewart & Barber :** The Buccal and Lingual surfaces are reduced atleast 0.5mm, with the reduction ending in a featheredge, 0.5 to 1mm into the gingival sulcus.

- **Mc Donald :** Not necessary to reduce the buccal or lingual surfaces. In Some cases - distinct buccal bulge, particularly in primary 1st molar - reduced
- All **line and point angles - rounded** and **smoothed**



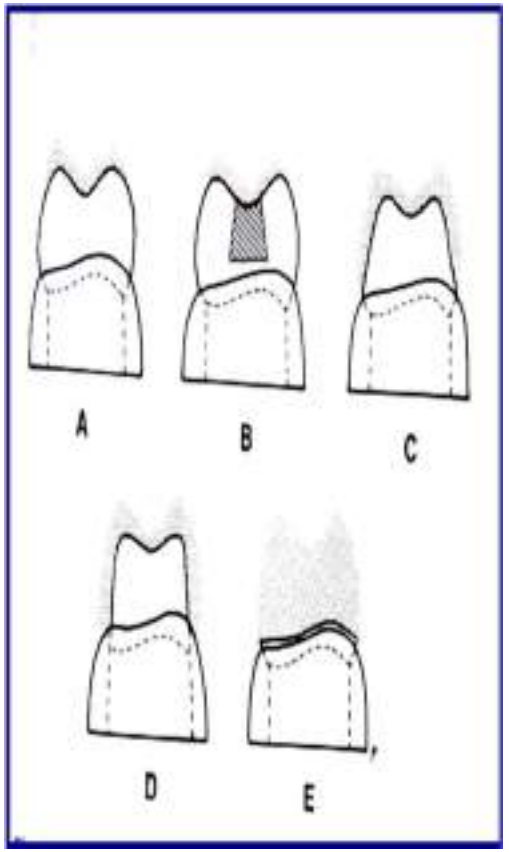
ASPECT	MATHEWSON	MCDONALD	SHOBHA TANDON	NIKHIL MARWAH
Occlusal Reduction	1-1.5mm	1mm	1.5-2mm	1-1.5mm
Mesial and Distal Surface/ Proximal Reduction	Break the contact	-	Break the contact	Break the contact
Margin Preparation	Rounding the margins	Rounding the margins	Round off margins	Rounding the margins
Bucco-Lingual Reduction	No reduction	Not required	Minimal	0.5mm

Adaptation and Retention

- The flattened proximal surfaces combined with rounded line angles should be somewhat oval rhomboidal in preparation.
- It has been stated by **Rapp** that the retention of the stainless steel crown restoration originates from contact between the tooth and the margins of the crown.
- **Mink and Bennett** state that it is necessary to reduce the buccal and lingual surfaces of the crown except on the buccal surface of the mandibular primary first molar or where an abnormal bulge of enamel may be present.

Savid et al (1979) compared five different types of preparations for retention capabilities:

1) Only the **occlusal third** of both buccal and lingual surfaces is reduced
2) **Class II preparations,** in which the buccal and lingual walls of the boxes converge toward the occlusal
3) Reduces the **buccal and lingual supragingivally** to the crest
4) Which removes the **supragingival bulge,** extending 0.5 mm below the gingival crest
5) **All supragingival tooth** structure, permitting only part of the anatomic crown to remain



According to **Rector et al (1985)**

Two procedures are thought to be critical for obtaining good retention.

- Precise trimming of the crown with respect to the gingival undercut.
- Adapting and crimping the crown along its entire gingival margin.

Evaluation Criteria for tooth preparation

1. The occlusal clearance ~1 to 1.5mm.

2. Proximal slices converge toward the occlusal.

3. An explorer can be passed between the prepared tooth and the proximal tooth at the gingival margin of preparation.

4. Buccal and lingual surface are reduced at least 0.5 mm ending in a feather edge, 0.5 to 1 mm into the gingival sulcus.

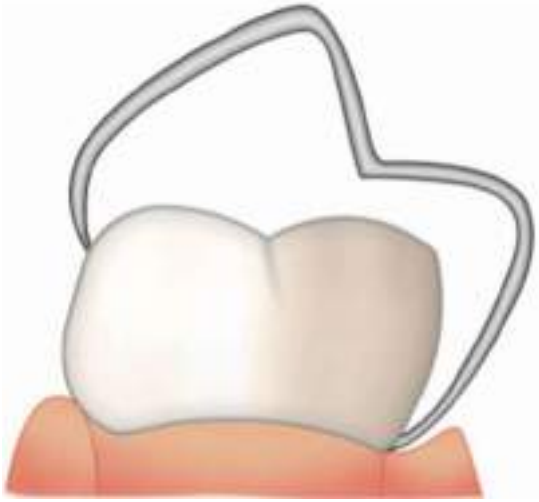
5. Buccal and lingual surfaces converge towards the occlusal.

6. Line angles rounded and smoothened.

7. Occlusal third of buccal and lingual surfaces are rounded.

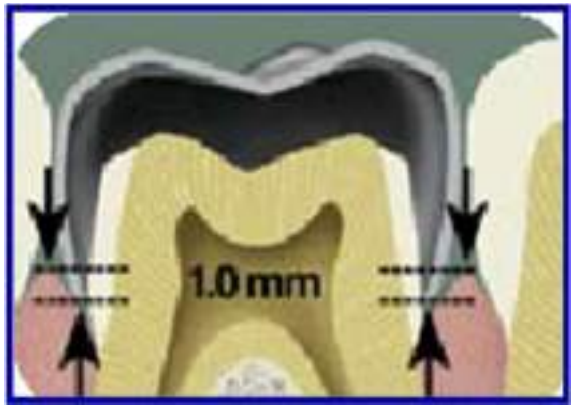
Crown Adaptation

- Try the selected crown
- Place the crown on the lingual side and rotate it toward the buccal.



- Should fit loosely, with 2-3 mm excess gingivally
- With a scaler, scratch around the gingival margin on the crown

- With the scissors, cut the crown 1mm below the scratch line.



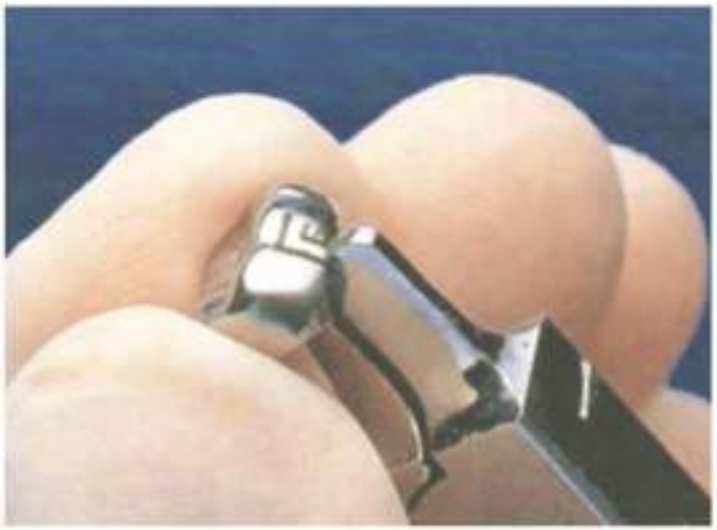
- Retry the crown, if there is blanching of the gingiva, rescrub the crown and re-trim it.
- Contour the crown with pliers. Adaptation is very important
- A poorly adapted crown will serve as a collection point for bacteria

Contouring

- Initial crown contouring is performed with help of No. 114 Johnoson Contouring plier, in the middle 1/3rd of the crown to produce a belling effect.
- This will give the crown a more even curvature..
- The advantage of contouring is that the crown gets work hardened by manipulation and becomes more retentive.

Crimping

- Important to the gingival health of the supporting tissue Using the No. 417 Crimping pliers the crown is crimped in the gingival third.
- The procedure of crimping is that the pliers must be ‘walked’ through the entire crown continuously without
- lifting. After completion of crimping there will be a gradual bend in the gingival third of crown.



Re-Crimping

TITLE	Comparison of Marginal Circumference of Two Different Precrimped Stainless Steel Crowns for Primary Molars After
AUTHORS JOURNAL	Hossein Afshar, Mehdi Ghandehari, Banafsheh Soleimani Journal of Dentistry, Iran 2015. LEVEL: 4
AIM	To assess the changes in the circumference of 3M ESPE and MIB precrimped stainless steel crowns (SSCs) for primary maxillary and mandibular first and second molars following re-crimping
CONCLUSION	Considering the significant reduction in the marginal circumference of precrimped SSCs following re-crimping, it appears that this manipulation must be necessarily performed for MIB and 3M pre-crimped SSCs. By using 3M SSCs, higher marginal adaptation can be achieved following crimping.

- Retry the crown, it should snap fit into position under firm finger pressure
- With an explorer check all the margins for adaptation, where the margins are open re-crimp.

Final adaptation of the crown

- Crown must snap into place
- No rocking on the tooth
- Proper occlusion, not interfere with eruption of teeth
- No high points
- Crown margin extend 1 mm to gingival crest
- Closely adapted doesnot cause gingival irritation
- No blanching
- Enable patient to maintain oral hygiene

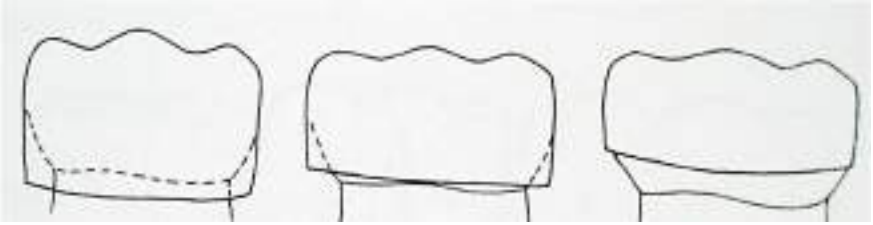
Securing the Crown

- The crown can be secured by creating a hole 1mm above the cervical margin of crown and tying a floss of atleast 16 inches in length.
- This shall help to retrieve the crown from the airway in case of accidental aspiration or ingestion of the stainless steel crowns.
- The length of the floss corresponds to the length of airway tract in children.

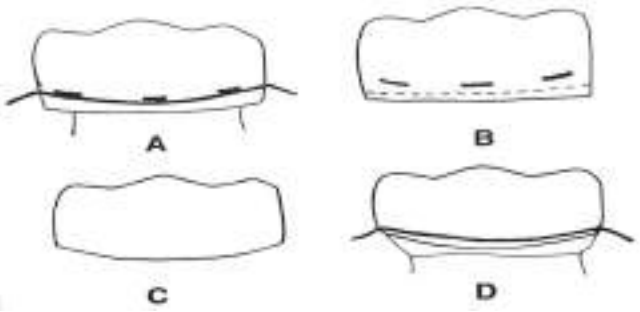
Crown Fit

Spedding (1984) observed that most stainless crowns seemed acceptable when observed clinically. Unfortunately, radiographs of the same crowns revealed many to be overextended, with ragged margins

Principle 1

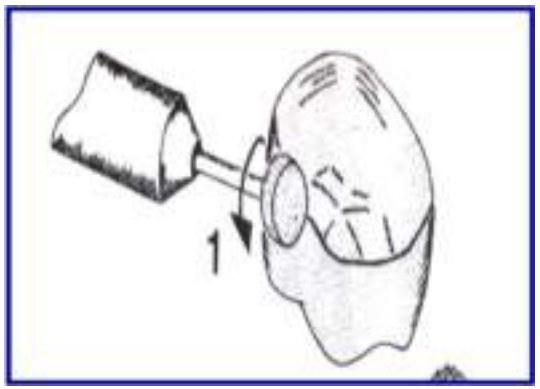


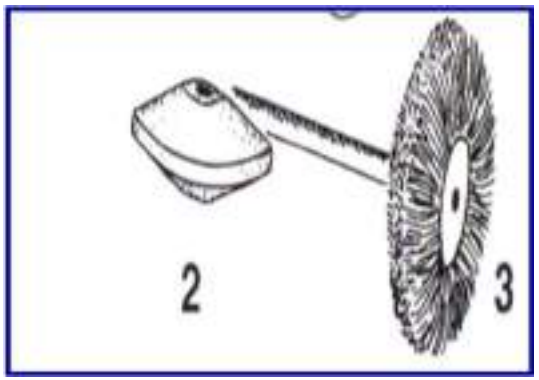
Principle 2



Finishing and Polishing

- **Broad stone wheel**- light brushing strokes, across the margins towards the center
- Wire brush
- Rouge whitening

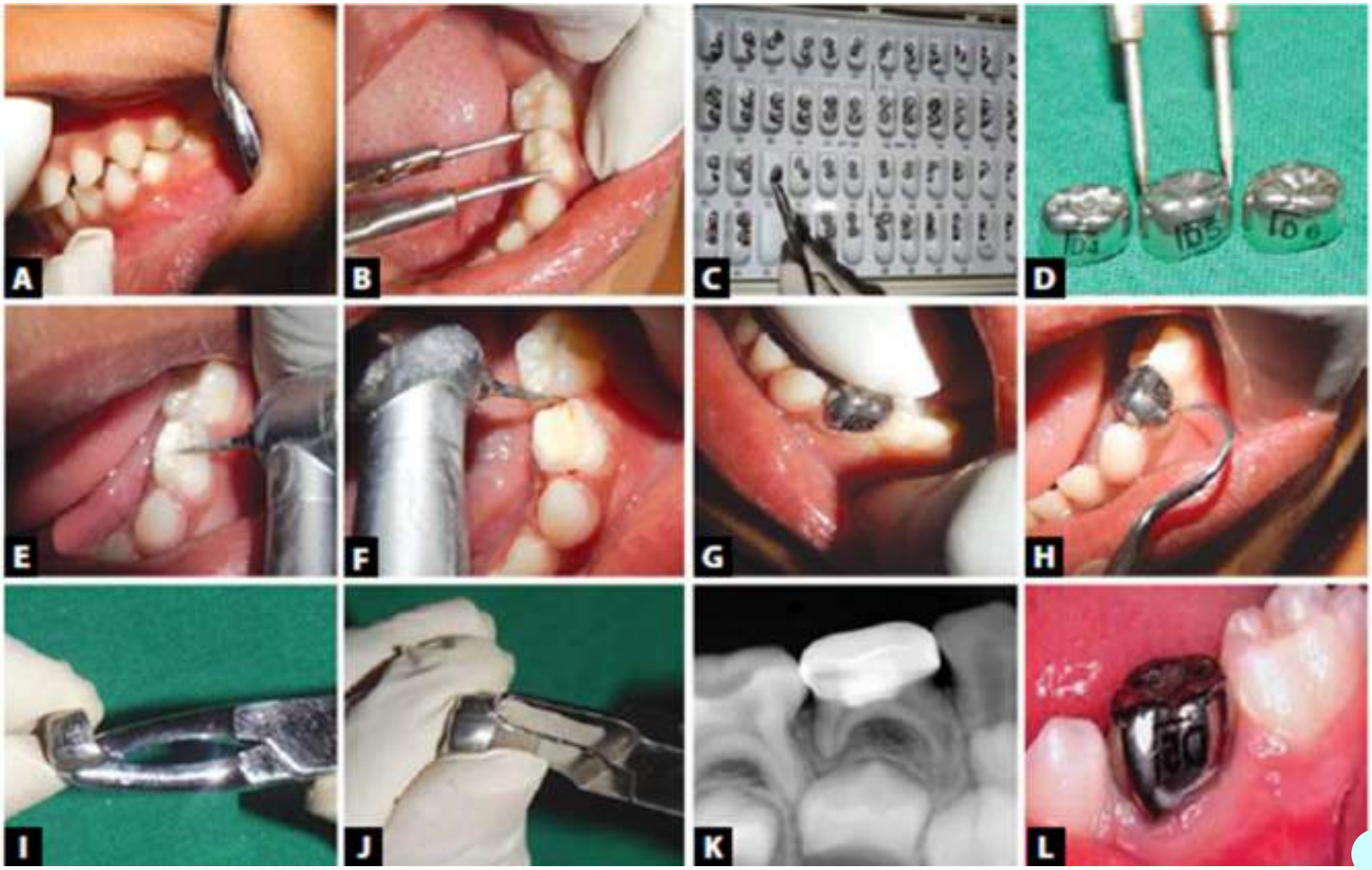




ASPECT	MATHEWSON	MCDONALD	SHOBHA TANDON	NIKHIL MARWAH
CROWN FINISHING	1) Green stone- Knife edge finish.	Rubber abrasive wheel can be used to finish crown margins	Round off at 30-45 degree	Reduce and round off all surfaces.
	2) Smooth & polish- Rubber wheel			How to check Clearance? Ask patient to bite on wax block and no marking of prepared tooth should be seen

Checking the Final Fit

Figs 48.16A and B: Final fit of SSC


A
B
C
D
E
F
G
H
I
J
K
L

Cementation

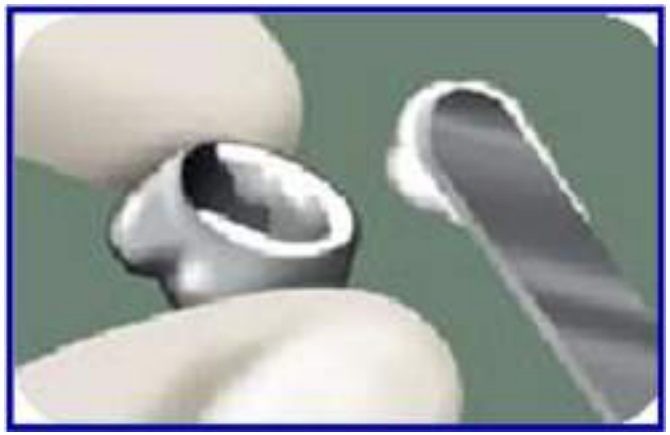
- Zinc phosphate
- Zinc oxide eugenol
- Silicoposphate
- Polycarboxylate
- Glass ionomer
- RMGI cement
- Polyacid modified composite resin
- Resin cement
- Adhesive resin

Cementation

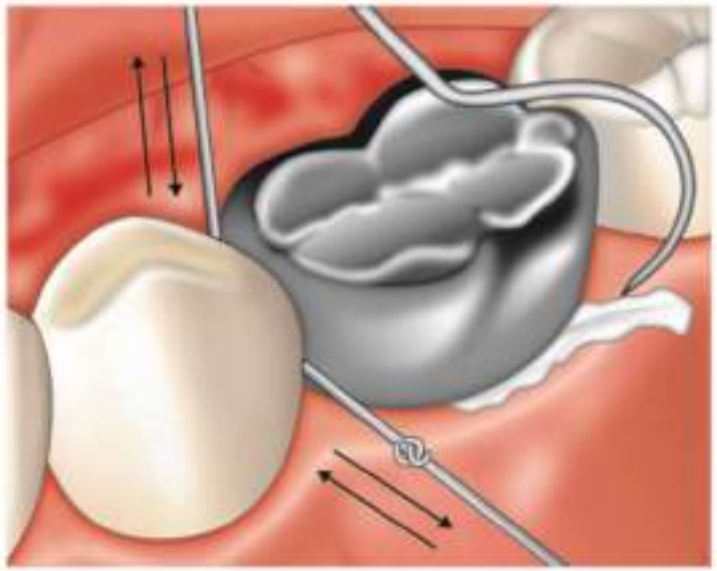
- Among all the cements used for cementation, GIC was found quiet promising.
- **Smith (1983)** ~ there is yet no ideal dental cement. Each material must be used on its merits with knowledge of its limitations

Steps for Cementation

- Remove, clean and dry the crown as well as the tooth surface.
- Isolate with cotton and instruct the patient to not close the mouth.
- **Myers (1983)** has advocated the application of varnish before cementing crown especially in case of a vital tooth.
- At least 2/3rd of the crown must be filled with the luting consistency of cement.



- Seat the crown, usually first on the lingual side and then the buccal side at the same time supporting the child's mandible with one hand as you seat the crown.
- Before the cement sets, ask the patient to close into centric occlusion
- Remove excess cement with a scaler or explorer after it has set.



Post Cementation Instructions

- Avoid heavy chewing with the crown for 24 hours.
- Maintain oral hygiene.
- Recalled after 6 months.

ASPECT	MATHEWSON	MCDONALD	SHOBHA TANDON	NIKHIL MARWAH
BEFORE CEMENTATION	Cavity varnish to be applied before.	~	Cavity varnish to be applied before.	Cavity varnish to be applied before.
MATERIALS TO BE USED				
VITAL TEETH	1. Reinforced ZOE 2. Polycarboxylate 3. Glass ionomer cement	~	1. Polycarboxylate 2. Glass ionomer cement 3. Zinc Phosphate cement	1. Polycarboxylate 2. Glass ionomer cement 3. Zinc Phosphate cement
NON VITAL TEETH	Zinc Phosphate Cement			

ASPECT	MATHEWSON	MCDONALD	SHOBHA TANDON	NIKHIL MARWAH
How much cement to be filled?	~	~	2/3rd of crown	2/3rd of crown

Retentive strength of luting cements for stainless steel crowns: an in vitro study

It was concluded that retentive strength of adhesive resin cement and resin modified glass ionomer cement was significantly higher than that of the conventional glass ionomer cement

Subramaniam P, Kondae S, Gupta KK. J Clin Pediatr Dent. 2010 Summer;34(4):309-12

Microleakage of adhesive and non adhesive luting cements for stainless steel crowns

Conclusions:

Adhesive cements were more effective in reducing microleakage in stainless steel crowns than nonadhesive cements. Use of a bonding agent with a resin-modified glass ionomer cement yielded better results than using the latter alone.

Memarpour M, Mesbahi M, Rezvani G, Rahimi M. Microleakage of adhesive and nonadhesive luting cements for stainless steel crowns. Pediatric dentistry. 2011 Nov 15;33(7):501-4

The effect of retentive groove, sandblasting and cement type on the retentive strength of stainless steel crowns in primary second molars - An *in vitro* comparative study

MM Veerabadhran, V Reddy, UA Nayak, AP Rao, MA Sundaram

It was found that the crowns luted with resin-modified glass ionomer cements (RMGIC's) offered better retentive strength of crowns than glass ionomer cements (GIC) and stainless steel crowns which were cemented without sandblasting showed higher mean retentive strength than with sandblasting of crowns. The presence of groove did not influence the retentive strength of stainless steel crowns.

Veerabadhran MM, Reddy V, Nayak UA, Rao AP, Sundaram MA. The effect of retentive groove, sandblasting and cement type on the retentive strength of stainless steel crowns in primary second molars-An in vitro comparative study. Journal of Indian Society of Pedodontics and Preventive Dentistry. 2012 Jan 1;30(1):19.

Retentive strength of luting cements for stainless steel crowns: A systematic review

Shruti Virupaxi, Ramya Pai, Praveen Mandroli

The in vitro literature seems to suggest that the use of self-adhesive resin cements shows higher retentive strength, followed by resin-modified glass-ionomer cement (RM-GIC) and conventional GIC. However, RM-GIC can be a preferred luting agent due to its clinical advantages over resin cements.

Virupaxi S, Pai R, Mandroli P. Retentive strength of luting cements for stainless steel crowns: A systematic review. Journal of Indian Society of Pedodontics and Preventive Dentistry. 2020 Jan 1;38(1):2.

Clinical Studies on SSC and Gingival Health

Sr. No.	Author	Year	Finding
1.	Sharaf et al	2004	Crowns with poorly adapted margins: gingivitis; variations in crown margin extension and radiographical adequacy: no effect on gingival health. Proximal contact area-open or closed, had no effect on gingival health
2.	Kara NB et al	2014	Gingival index score , probing depth and GCF volume was lowest with SSC and NuSmile than Pedo Pearls .

Evaluation at the follow up visit

Crown retention	**0 = Present, 1 = Absent**
Customized modified gingival index	0 = healthy 1 = mild inflammation involving some papilla 2 = moderate inflammation involving entire papilla 3 = severe inflammation
Plaque index	0 = no plaque 1 = film at gingival margin 2 = moderate accumulation 3 = abundance of plaque
Gingival margin extension	0 = subgingival 1 = supragingival
Occlusion	0 = contact, marked and visible 1 = no contact
Alignment relative to arch form	0 = normal alignment 1 = rotated 2 = malaligned
Proximal contact	0 = good, resistance to floss 1 = poor, no contact

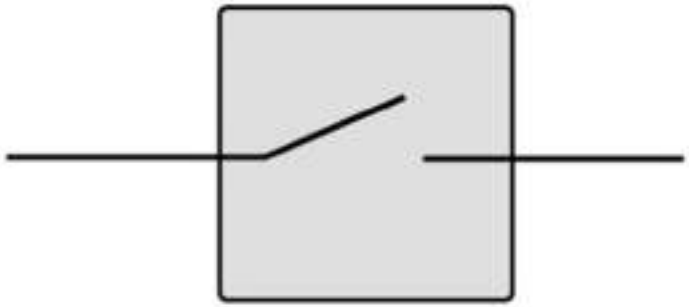
AUTHORS	Aim (What they did ???)	Outcome (What they found ???
Subramaniam P *et al* 2010	Evaluated and compared the retentive strength of three luting cements.	*Retentive strength of adhesive resin cement and resin modified glass ionomer cement was significantly higher.*
MM Veerabadharan *et al* 2012	Evaluated the effect of retentive groove, sand blasting and cement type on the retentive strength of stainless steel crowns in primary second molars	*Resin-modified glass ionomer cements (RMGIC's)*
Memarpour M et al 2011	Compare the ability of 5 luting cements to reduce microleakage at stainless steel crown (SSC) margins on primary molar teeth.	*Resin-modified glass ionomer cement yielded better results*
Sidhant Pathak *et al* 2016	Assessed and Compared the retentive strength of two dual-polymerized self-adhesive resin cements (RelyX U200, 3M ESPE & SmartCem2, Dentsply Caulk) and a resin-modified glass ionomer cement (RMGIC; RelyX Luting 2, 3M ESPE) on stainless steel crown (SSC).	*Dual-polymerized self-adhesive resin cements:SmartCem2 and RelyX Luting 2. Showed higher retentive strength*
Krishna Chaithanya Reddy 2017	Evaluated and Compared the micro leakage and tensile bond strength of stainless steel crowns cemented with GC Fuji I cement, Rely X luting 2 cement and new self-adhesive cement that is Smart cem 2 cement.	*Self-adhesive cements reduced micro leakage and increases the tensile bond strength.*

Modifications of Stainless Steel Crown

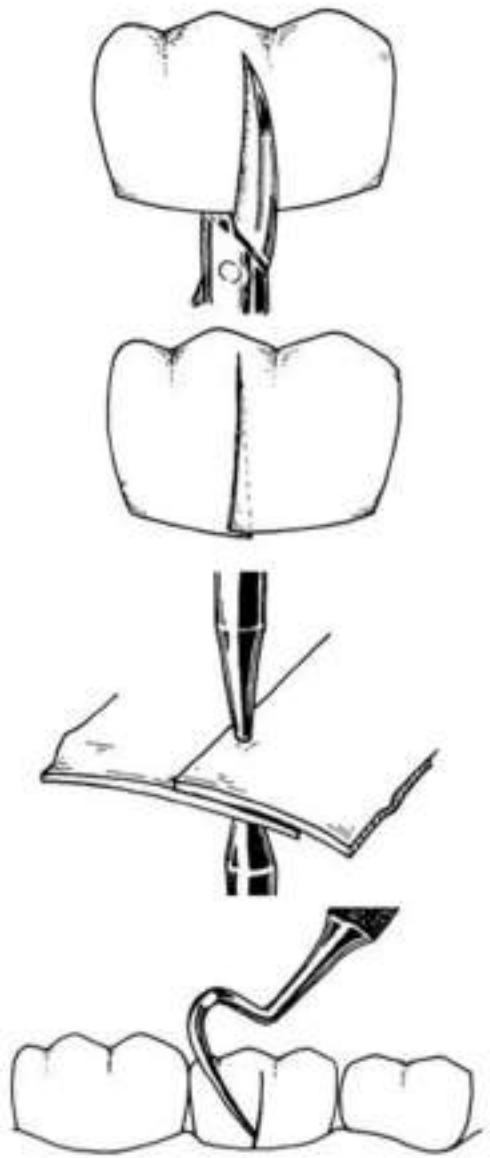
In 1971 Mink and Hill reported several ways of modification of stainless steel crown when the crowns are either too large or too short.
This commonly occurs due to a long-standing interproximal caries, space loss or due to inappropriate crown size.

Undersized Tooth

Oversized Tooth



Open Contact



Oversized Crown

Try the crown on the tooth

Cut the crown from gingival to the occlusal surface either buccally/ lingually

Then gingival margins of the crown should approximate the gingival margins of the tooth

The cut edges can then be repositioned and spot welded.

Polish the soldered area.

Check the crown for marginal adaptation, contour, crimp & cement the crown

Undersized Crown

- Try the crown on the tooth
- Cut a V shaped groove in the crown on the buccal or lingual side
- Try the crown on tooth for fit.
- Then spot-weld a strip of orthodontic band material over the V-shaped groove
- Retry the crown on tooth.
- Solder, adapt, contour and crimp the crown.
- Polish the soldered area and cement the crown.

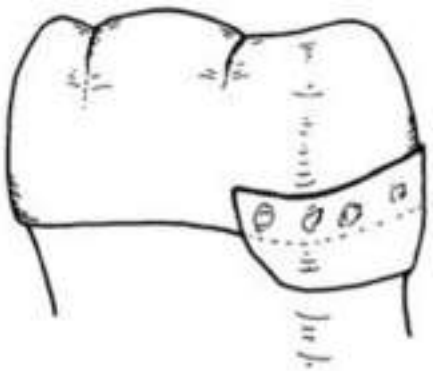
Crown extension for deep subgingival caries

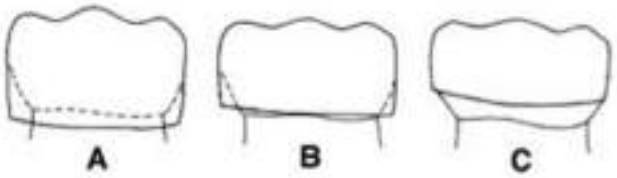
Prepare the crown for tooth.

In the area where the crown is deficient, spot weld a piece of orthodontic band material.

Spot weld the band to crown and check the adaptation and extent.

Solder and polish the area and cement the crown.





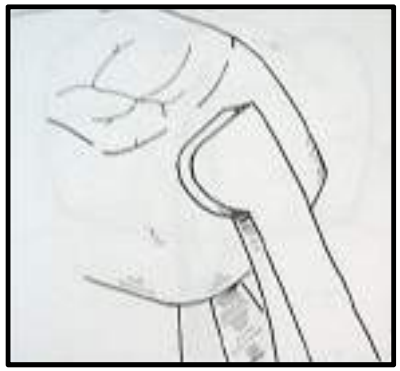
Open Contact

- If the closed contact area is not established, it will result in food packing, increased plaque retention and subsequently gingivitis
- Selection of a larger crown
- Exaggerated interproximal contour - 112 plier to establish a close contact
- Interproximal contour can also be build by addition of a solder

Special Considerations for Stainless Steel Crown

Quadrant Dentistry (*Nash 1981)*

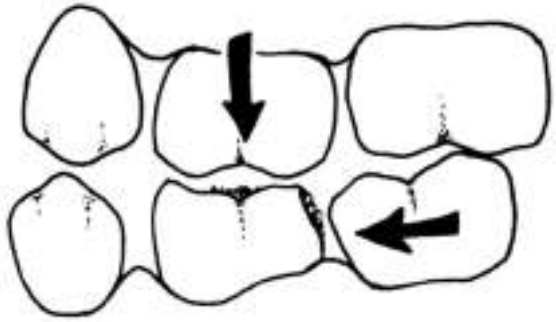
- Prepare the occlusal reduction of one tooth completely before beginning the occlusal reduction of the other tooth
- Reduce the adjacent proximal surface of the teeth being restored more (1.5mm below the gingival level)
- Check for broad contacts
- A howe no 110 plier – flatten
- Crown should be trimmed, contoured, and prepared for cementation simultaneously



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

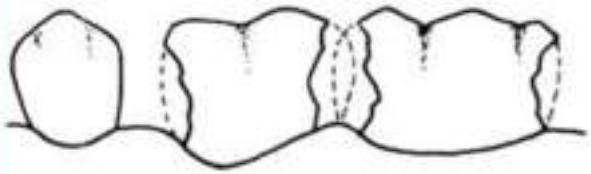
Crowns in areas of space loss

- *Mc Evoy 1977*
- When there is an extensive and long standing caries, the primary teeth shift into the interproximal contact areas
- Select *larger crown*, which will fit over the tooth's greatest convexity
- **Reduce the mesiodistal width** by grasping the marginal ridges of the crown with Howe pliers and squeezing the crown.



Adjacent stainless steel crowns

When more than one stainless steel crown needs to be done in a quadrant, the two or more crowns should be:

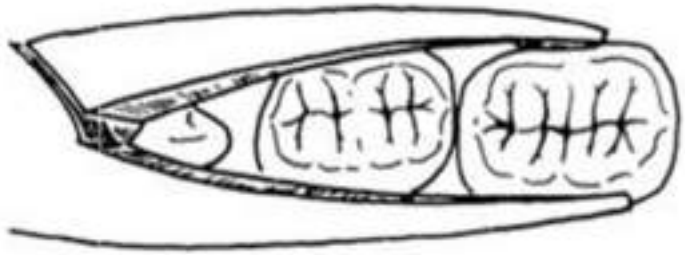


- Prepared at the same time
- Cemented at the same time
- Checked for proper broad contacts

Adjacent stainless steel crowns with arch length loss (McEvoy, 1977)

- Extensive and long-standing carious lesions can cause a shift of primary teeth into the interproximal contact areas.
- The tooth preparation must compensate for the need to use a smaller crown.
- Select the crown. Usually crowns will adjust to the tooth preparation individually but cannot be placed at the same time because of the mesial drift of the adjacent teeth.
- The crown preparations must be reduced further.

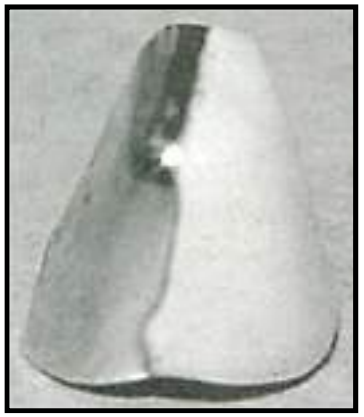
- A primary maxillary first molar from the opposite side will fit a primary mandibular first molar of the opposite side. Anatomically there is a similarity, the advantage being that the
- primary maxillary first molar crown is narrower mesiodistally.
- Flatten the contacts of the crowns as described using a No. 110 pliers.
- When the crowns are cemented, the marginal edges should be aligned. Before cement setting, use a Howe No. 110 pliers to obtain optimum alignment if necessary.



Open Faced Stainless Steel Crown

Stainless Steel Crowns With Laboratory- Added Facings

- Introduced in 1990s
- **Traditional stainless steel crown with mechanically or chemically** bonded esthetic material covering 1 or more surfaces of the crown
- Initially developed for primary anterior teeth, later for **primary molars became available**



Objective

- To provide a convenient, durable, and esthetic solution to restore severely carious primary teeth
- Easy to place, not affected by saliva or gingival hemorrhage, and require less working time than some alternative restorations

Disadvantages:

- Excessive reduction of tooth structure
- Cost
- Limitation of crimping and shades

Use of Anterior Veneered Stainless Steel Crowns by Pédiatric Dentists.
Hassan Oueis. Pediatric Dentistry,2010;32(5):413-416

Hall Technique

- Dr. Norna Hall (1994)
- Method for managing caries and hypoplastic teeth using SSC.
- It involves cementing the crown on to the tooth without use of local anesthesia, caries removal and crown reduction
- It require care full case selection, high level of clinical judgement and good patient management

Indications include teeth with:

- Proximal (Class II) lesions, cavitated or non-cavitated
- Occlusal (Class I) lesions, non-cavitated if the patient is unable to accept a fissure sealant, or conventional restoration
- Occlusal (Class I) lesions, cavitated if the patient is unable to accept partial caries removal technique, or a conventional restoration

Contra-indications include teeth with:

- Signs or symptoms of irreversible pulpitis, or dental sepsis
- Clinical or radiographic signs of pulpal involvement, or periradicular pathology
- Crowns that are so broken down they would be considered unrestorable with conventional techniques

Procedure

- Child - upright in the dental chair
- Food or debris to be removed - but no caries is removed
- Select different sizes of crowns until you find one which covers all the cusps, and approaches the contact points, with a slight feeling of "spring back". You should aim to fit the smallest size of crown which will seat.
- Be particularly careful not to fit an oversize crown to a second primary molar where the first permanent molar has still to erupt; this could increase the risk of first molar impaction later.
- If the contacts are very tight - orthodontic separator elastics

- Rinsed and dried, and the PMC dried
- PMC is filled with GIC. If the cavity was large, some glass ionomer - in the base of the cavity before cementation
- PMC is placed evenly over the tooth and the child instructed to bite down firmly
- Extruded cement - removed, and the child is asked to keep biting - until the cement sets

The Hall Technique; a randomized controlled clinical trial of a novel method of managing carious primary molars in general dental practice: acceptability of the technique and outcomes at 23 months. Nicola P Innes. BMC Oral Health, 2007;**7**(18):1-21

The success of stainless steel crowns placed with the Hall technique: A retrospective study

Kevin H. Ludwig, Margherita Fontana, LaQuia

Aim : clinical and radiographic success of stainless steel crowns (SSCs) used to restore primary molars with caries lesions, placed by means of both the traditional technique and the Hall technique.

Conclusion: Findings of this study show a similar success rate for SSCs placed with the traditional technique or the Hall technique.

Ludwig KH, Fontana M, Vinson LA, Platt JA, Dean JA. The success of stainless steel crowns placed with the Hall technique: a retrospective study. The Journal of the American Dental Association. 2014 Dec 1;145(12):1248-53

What happens to the occlusion when a crown is fitted using the Hall Technique?

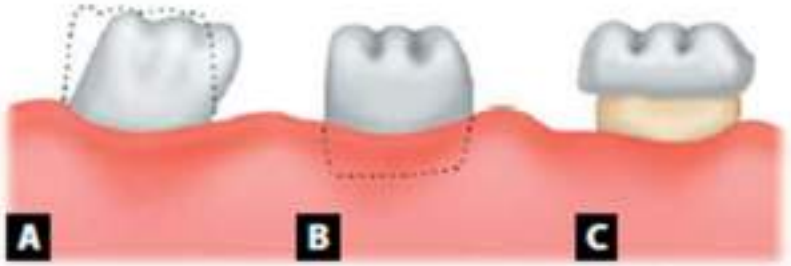
- Several studies have noted that this OVD increase resolves within a few weeks with no detriment and none have found any temporomandibular joint pain even when parents have been specifically asked about this issue.
- There was a mean increase in the OVD of 1.1 mm immediately following crown placement. This reduced to 0.3 mm after two weeks, with the dentition appearing to have equilibrated to its pre-crown state, and staying at this level.

Innes NP, Evans DJ, Bonifacio CC, Geneser M, Hesse D, Heimer M, Kanellis M, Machiulskiene V, Narbutaité J, Olegário IC, Owais A. The Hall Technique 10 years on: Questions and answers. British dental journal. 2017 Mar;222(6):478-83.

COMPLICATIONS DURING THE FABRICATION OF CROWNS

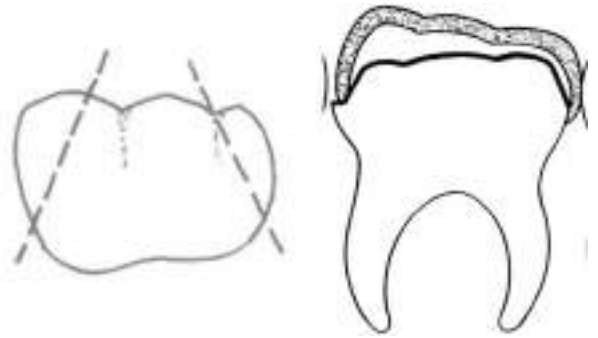
- Inter-proximal Ledge
- Crown tilt
- Poor Margins
- Inhalation or ingestion of crown

FIGURE 3.25 Ledge formation



FIGURES 3.26A TO C Improper crown adaptation with poor margin (left to right—crown tilt) (A); Over extent of crown (B); Under extent of crown (C).

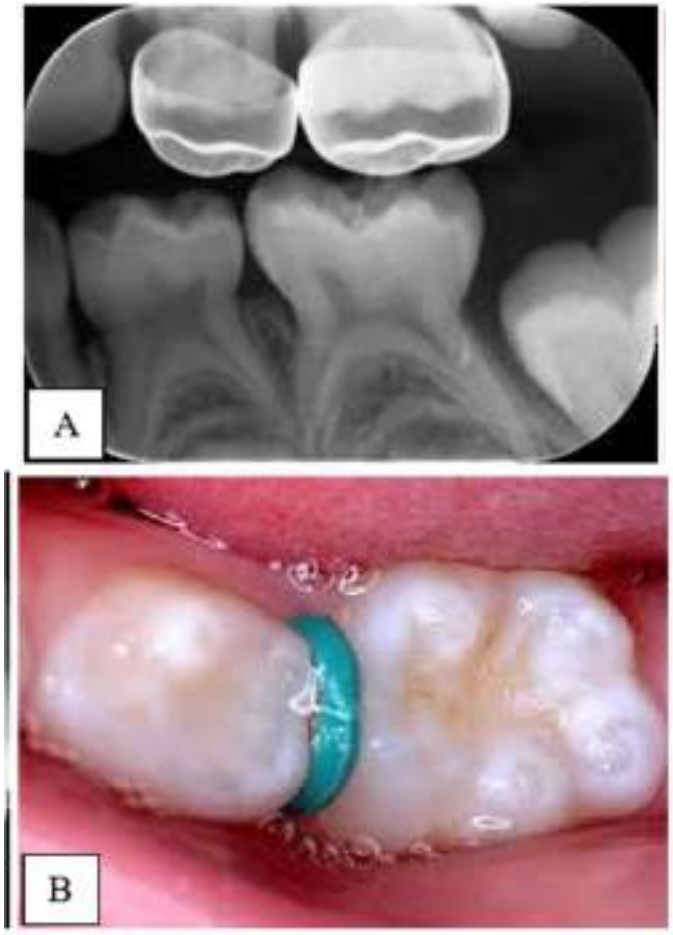
Interproximal Ledge



- A ledge - angulation of the bur is incorrect.
- Failure to remove this ledge will result in difficulty in seating the crown
- Adjacent tooth is partially erupted - interproximal
- To clean the contact area, extensive subgingival tooth reduction is required which may result in formation of a ledge or damaging the erupting tooth

Crown tilt

- Complete lingual or buccal wall may be destructed ~ finished crown tilting towards the deficient side
- Placement of restoration prior to crowning ~ support to prevent crown tilt.



Crown Tilt
a) Radiograph showing crown tilt
b) Application of orthodontic elastic in interproximal area to regain space

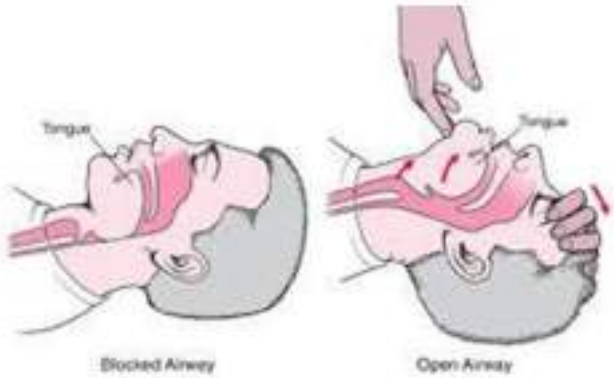
Poor margins

- When the crown is poorly adapted - marginal integrity is reduced
- Recurrent caries may occur, chances of plaque retention and subsequently gingivitis increases.

Inhalation or Ingestion of crown

- Rubber dam - prevents accidental swallowing or aspiration of a crown
- Floss attachment by means of impression compound on the occlusal of the crown is the preferred
- If the crown is in bronchi or lung, medical consultation -remove it by bronchoscopy
- Presence of cough reflex in the conscious child will reduce the chances of inhalation and ingestion of the crown

Flowchart of emergency management after airway obstruction



Assess unresponsiveness

P- Position victim in supine position with feet elevated

Call for help (office emergency team)

A-Open airway (head tilt-chin tilt technique)

B-Assess breathing (look listen feel)

Attempt to ventilate

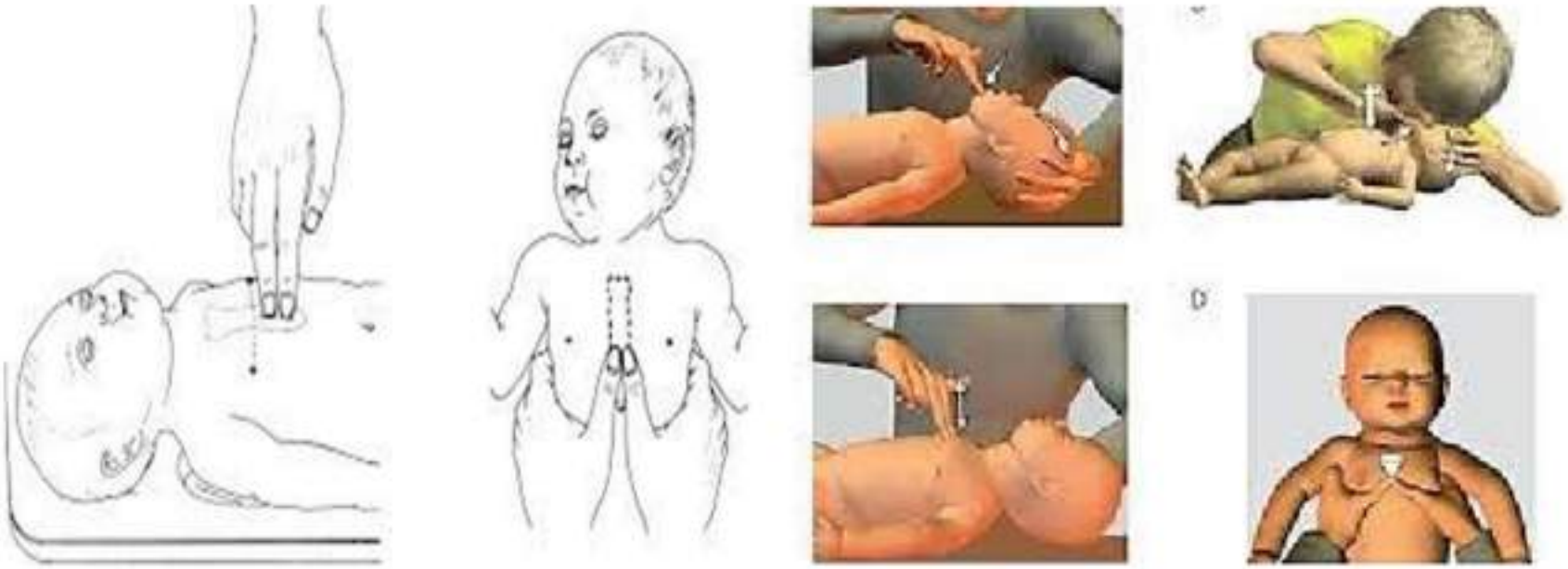
If unsuccessful reposition head and attempt to ventilate

It still unsuccessful activate emergency medical services system

Manage airway obstruction

Check pulse

Perform external chest compression if necessary



Chest compressions given to an infant

Obstructed Airway in Infants

- Back blows
- Chest Thrusts

Alexander RE (1971)~ Positioning of the patient – controversial

- Supine position decreases the risk of aspiration or swallowing while others believe this position promotes these incidents

Hodges ED (1992)

- Use of four-handed dentistry
- High-speed suction
- Ligation of a properly fitted rubber dam clamp
- Gauze throat shield

Aspiration Of A Stainless Steel Crown. A. Adewumi et al.Pediatric Dentistry, 2008;30(1):59-62

Polycarbonate Crown

The various commercial products of crowns included under polycarbonate crowns are

- Kudo crowns.
- Pedo jacket crowns.
- PedoNatural crowns
- Art glass crowns.

- Polycarbonate crowns are heat-moulded acrylic resin used to restore anterior primary teeth.
- They were popular in the 1970s, they are more esthetic than stainless steel crowns.
- The polycarbonate crowns do not resist strong abrasive forces, leading to occasional fracture or dislodgement. They have merely paved the way for the development of strip crowns. No long-term studies of poly- carbonate crowns are available.

- Polycarbonate crowns are hollow, tooth-shaped with walls about 0.3 mm thick. Polycarbonate crowns are usually available in two tooth colored shades (dark and light).
- There are 60 crown sizes available in the 3M ESPE polycarbonate molar crown range.
- Polycarbonate crowns are available in different sizes for incisors, cuspids and bicuspids.

TABLE 3.9 Polycarbonate crowns

Crown type	Sizes	Available in mm
Upper central incisors	7	7.7–10.1
Upper lateral incisors	6	5.8–7.6
Lower incisors	10	4.9–6.3
Cuspids	7	7.5–9.0
Bicuspids	10	6.2–7.5

Availability of Polycarbonate Crowns

- Available in a variety of shapes and sizes for anterior and posterior teeth.
- Available for maxillary and mandibular teeth, right and left sides, incisors through premolars.
- Polycarbonate crowns for posterior teeth are packaged separately. They are generally more difficult to use due to variations in tooth size and shape.

- It is strong yet flexible enough to contour easily.
- It bonds chemically to a self-curing acrylic resin material used to fill the shell. Although plastic crowns do not bend and draw as metal crowns do.
- They have almost perfect bonding properties.
- Any area of a plastic crown, including the incisal edge, can be extended by adding layers of acrylic

Advantages

- Crowns are made up of polycarbonate resin with microglass fibers which permit crown adjustment with pliers, good durability and strength.
- Contours and crimps similar to metal crowns.
- Aesthetic
- Good anatomic form.
- Aesthetic with universal shade which is translucent to allow shade adjustment by the type of lining material used.
- The crowns have smooth surface to minimize plaque accumulation.
- Available in wide range of sizes for incisor, canine and premolars.

Disadvantages

- Difficult to place
- Poor retention
- Prone to excessive wear
- Brittle and have high incidence of fracture
- Limited choice of shade and supplied crowns are sometimes so white that they look artificial in mouth
- Margins cannot be crimped. Un-crimped margins may not fit properly

Indications

- Full coverage restoration of primary maxillary anterior teeth with extensive caries
- Early childhood caries
- Deformities in structure of teeth
- Discoloured teeth.

Contraindications

- Deep bite
- Bruxism
- High functionality of teeth.
- Inadequate spacing is present between teeth.
- Anterior crowding.
- Evidence of abrasion in anterior teeth.

Crown selection :

According to the mesiodistal width of the selected crown.

- Select a polycarbonate crown to fit the prepared tooth.
- The gingival margins of the polycarbonate will be trimmed until the occlusal surface is even with that of the adjacent teeth.
- Useful guide for the selection of the correct size crown is to use the patient's diagnostic cast.

Preparation of tooth

- Reduction of mesial and distal surfaces and avoid ledge formation below the gingival margin
- Reduction of incisal edge by 1 mm
- Reduction of labial surface and lingual surface by 0.5 mm leaving a featheredge margin

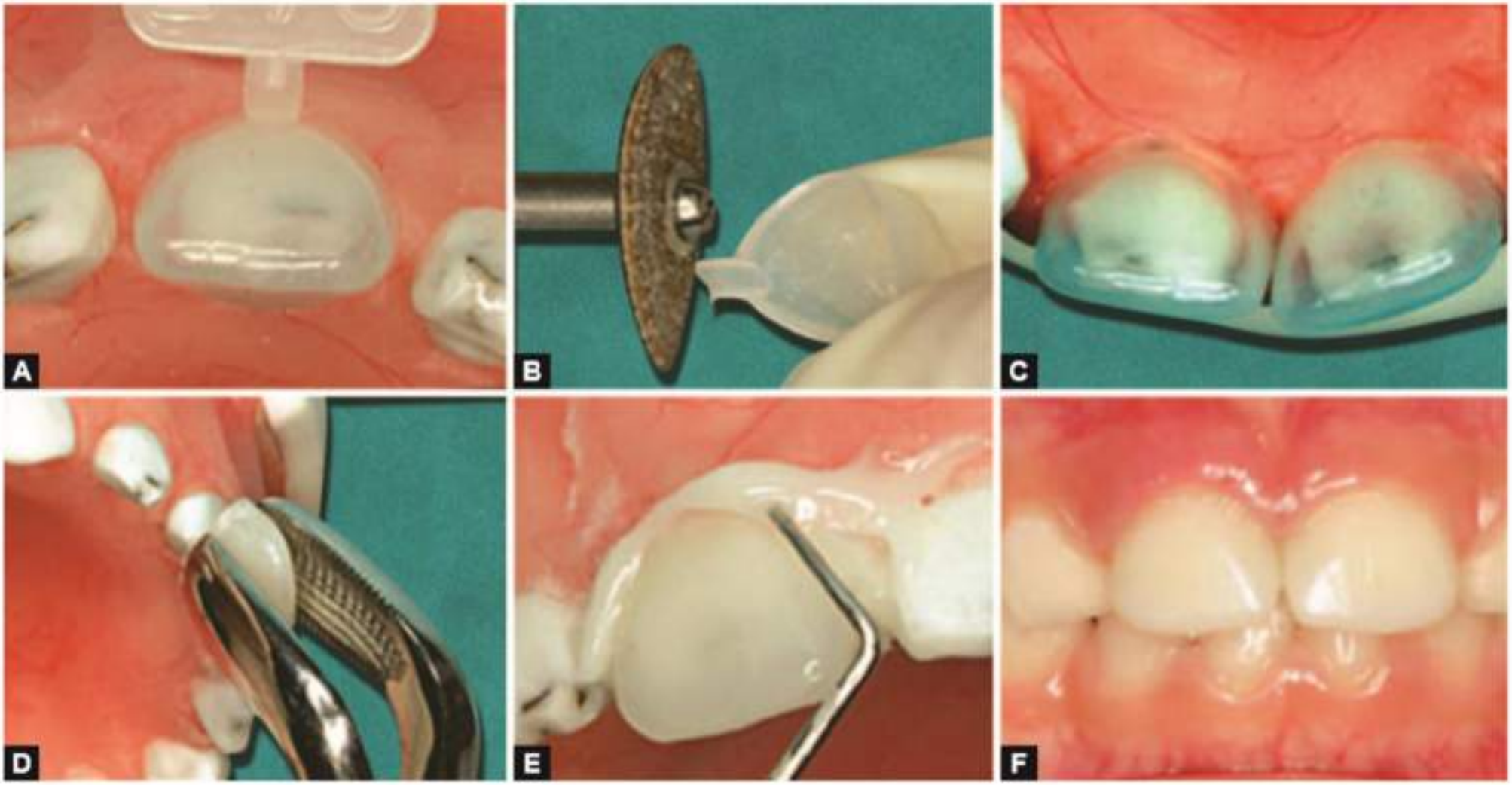
Crown Adjustment

- Using an acrylic bur, greenstone or white stone, adjust the gingival contours of the crown.
- Remember that the axial walls extend down toward the gingiva on the buccal and lingual surfaces, and are shorter in the interproximal areas.
- It may be necessary to slightly adjust the internal surfaces of the crown as well in order for it to seat fully on the preparation.

- Reseat the crown periodically to check the contouring of the margins.
- Trim until occlusal surface is close to that of the adjacent teeth. If the proximal contacts are not closed, acrylic may be added to these areas later in the procedure. Be sure that the margins of the polycarbonate crown cover the finish line of the prepared tooth.
- While adjusting the crown, it is helpful to keep the “handle” attached to the buccal cusp tip. This will aid in trying the crown on and off. Remove the handle once adjustments are made.

Crown Cementation

- After the final fit is done, the crown is relined using a self-cure acrylic resin.
- The advantage of this type of relining technique is that the resin chemically bonds to the polycarbonate crowns. By priming the inside of the relined crown, it can be bonded to the tooth using composite resin or glass ionomer cement.

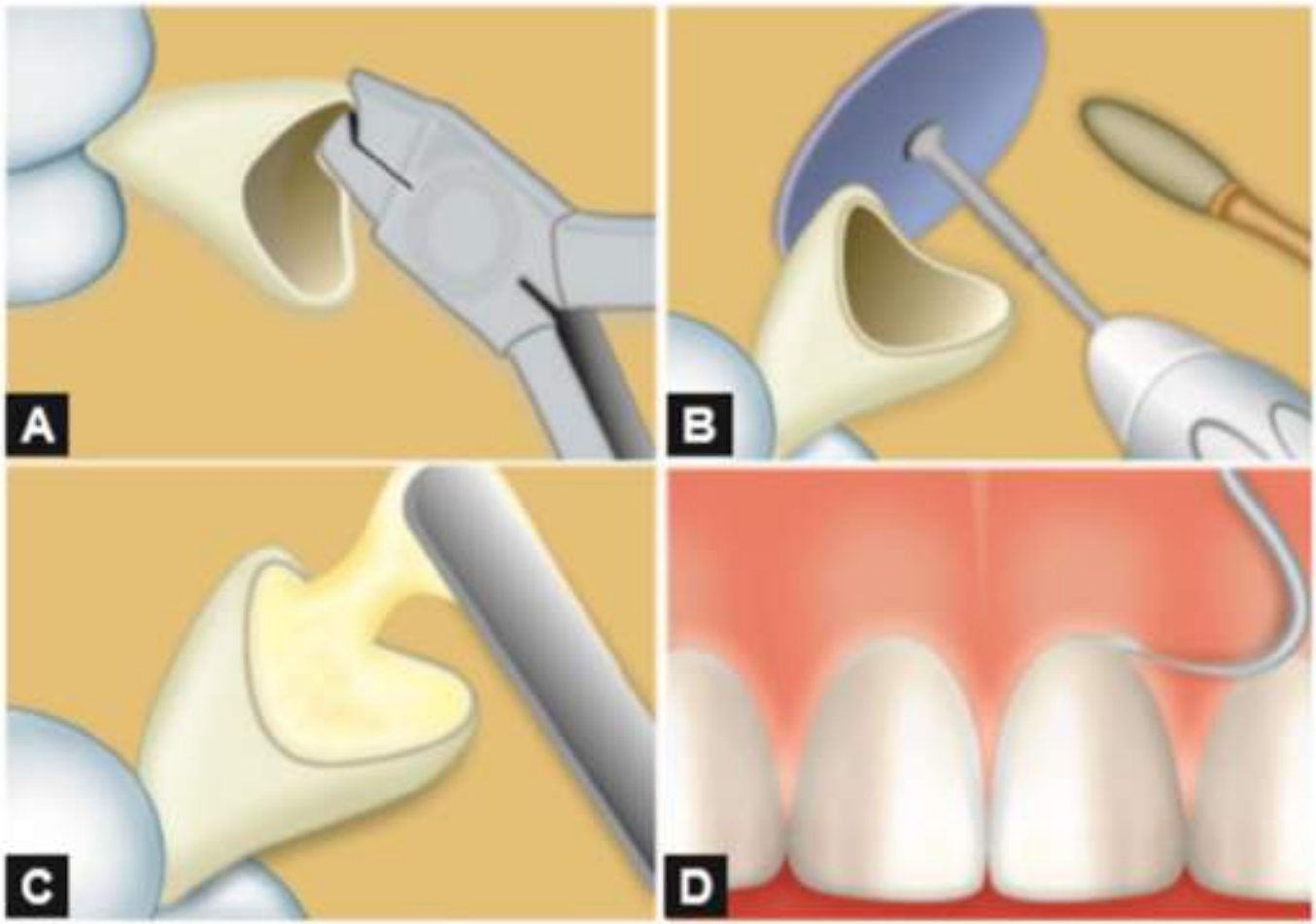

A
B
C
D
E
F

- Many clinicians have had retention problems with polycarbonate crown restorations. Failure of the cementation materials to bond to either the polycarbonate crown or the tooth is a reason for failure.
- Various methods of cementation have been described Zinc phosphate cement can be placed directly into the crown and then placed on the dry, prepared tooth. The excess is trimmed and the margins are finished in the mouth.
- Acrylic and composite cements can be used in a similar method; they are also placed in the crown and cemented directly on the dry, prepared tooth, and also present the problem of finishing in the mouth.

- A more complex, but precise, method uses acrylic resin as an **intermediary or " wash."**
- The acrylic resin is placed in the crown and then placed over the prepared, lubricated tooth. After the initial set, the crown is removed from the tooth and cured in warm water. The crown is trimmed, polished, and cemented with zinc phosphate or polycarboxylate cement. Filled resins have also been used in a similar technique.

Modified Polycarbonate Crowns

- The crowns are made of a polycarbonate resin incorporating microglass fibers which not only permit crown adjustment with pliers but also give these crowns good durability and strength.
- They are a time saver as they are easy to trim with dental burs or crown scissors, and can then be easily adjusted with pliers
- Provides good durability and strength
- Smooth surface finish for patient comfort and to help minimize plaque build-up
- They have good anatomic form and esthetics


A
B
C
D

An investigation of bonding systems for the polycarbonate crown restoration

Curtis E. Wiggins, DDS
Angelo A. Caputo, PhD
Joseph R. Jedrychowski, DDS, MSEd, Los Angeles

- Tensile retentive strengths for six polycarbonate crown cementation systems were examined with use of extracted human teeth prepared with and without retentive grooves.
- From the results of this study, use of unfilled intermediary resins followed by polycarboxylate or zinc phosphate cements is recommended. Retentive grooves did not contribute to overall retention.

Wiggins CE, Caputo AA, Jedrychowski JR. An investigation of bonding systems for the polycarbonate crown restoration. Journal of the American Dental Association (1939). 1978 May;96(5):823.

ASDC J Dent Child. 1976 Sep-Oct;43(5):333-9.

The retentive ability of various cementing agents for polycarbonate crowns.

Kopel HM, Batterman SC.

- A composite resin shows the highest retentive values A polmethacrylate resin, when used as a cement, also shows high values, probably due to its ability to unite chemically with polycarbonated acrylic and to its low film thickness.
- Composite resins of low viscosity, low film thickness, and high compressive and tensile strengths proved also to provide good retentive values and would contribute insolubility to a greater degree than the unfilled resin.
- Polycarboxylate, zinc phosphate, and reinforced zinc oxide-eugenol cements are not to be recommended as agents for cementing polycarbonate crowns.

Kopel HM, Batterman SC. The retentive ability of various cementing agents for polycarbonate crowns. ASDC journal of dentistry for children. 1976;43(5):333.

3M ESPE POLYCARBONATE CROWNS - INTRO KIT, C180

Write a review

3M ESPE

- Micro glass fibre reinforced
- Contours and crimps similar to metal crowns

Bulk prices available. Want more than 30 units? For customized prices - click here

Package Contents: Set with 180 Crowns, 2 Crowns of each size: mold guides for 60 crown sizes

₹17374

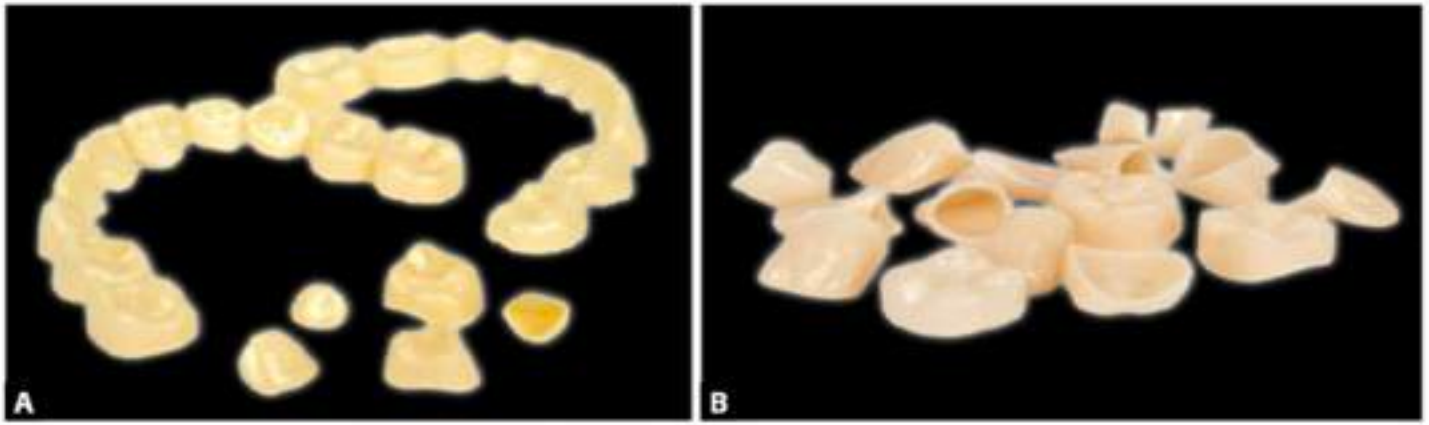
Select quantity in the product table to see effective price, savings & points

Buy in bulk and save more!

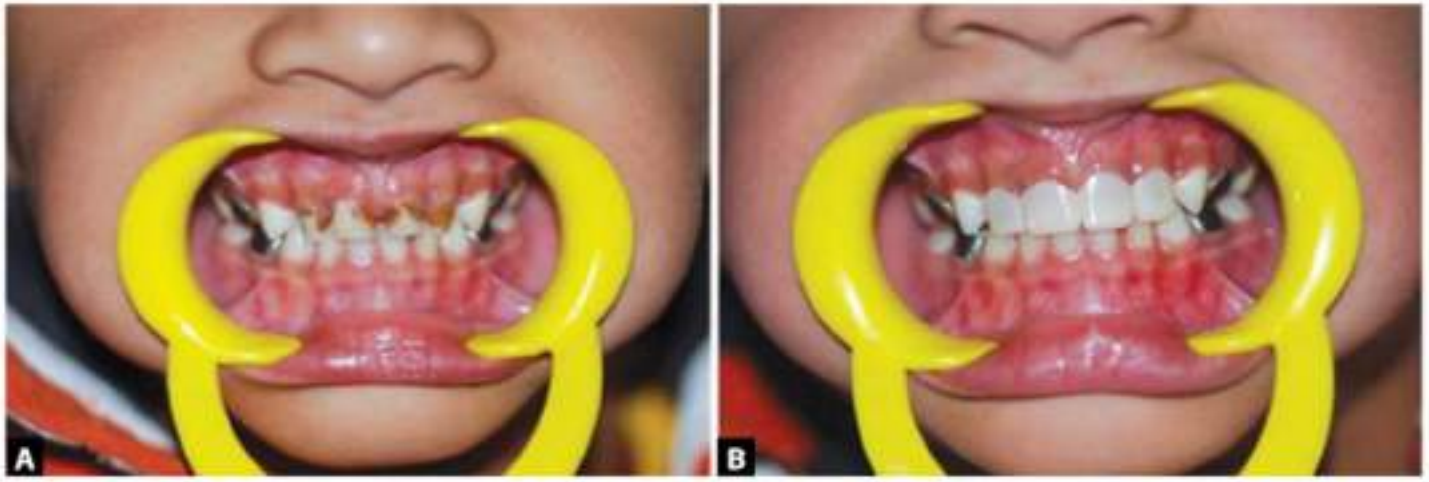
Quantity	Unit Price	PB Cash

Kudos crowns

- Newer generation polycarbonate crowns.
- It is easy to use and handle along with considerably reducing the chairside working time and at the same time overcomes the difficulties reported so far pertaining to placement and retention.
- User friendly and aesthetically acceptable.



FIGURES 3.41A AND B Kudos crowns for primary teeth



FIGURES 3.42A AND B Kudos crown [*Source:* Karthik *et al. (www.kudoscw.hk.in/images)*]

Advantages

- Esthetically acceptable.
- Less chairside time.
- Improved retention.
- Flexible.
- Better adaptability.

Disadvantages

- Chances of breakage.
- Dislodgement.
- Discoloration.

Technique of Crown Placement

- After initial examination select proper size of the crown which snugly fits mesiodistally
- After a trial fit the crown is checked for its proper fit, marginal adaptability, overall coverage and mesiodistal width.
- Necessary adjustments are made either using crown scissors or with a trimming bur or stone. Care must be taken to seat the crowns on to the prepared margins.

- After the final fit is done the crown is relined using a cold cure acrylic material and placed it over the prepared tooth and removed till it starts to set.
- This type of relining technique is done so that cold cure acrylic chemically bonds to the polycarbonate crowns.
- After complete setting of the material, the margins are trimmed and finished and the crown is cemented using a luting cement or composites.
- The firmness of the crown allows it to serve as a provisional crown up to several months

PedoNatural Crown

- The PedoNatural Crown is not a composite restoration and is never used with composites. All components of the PedoNatural Crown are hydrophilic [moisture tolerant].
- The PedoNatural Crown is a polycarbonate crown unlike any other polycarbonate application previously available in pediatric dentistry. These are ultrathin crown form that is: anatomically correct, flexible, easy to fit, extremely strong, durable and automatically correctable polycarbonate crown form.

- PedoNatural Crowns provide the clinician with a superior esthetic alternative to the composite, strip crown or composite veneered stainless steel crown.
- These crowns can be easily used in crowded situations as well as Class III occlusions. Self-adhesive resin cements are available in several shades. For anterior PedoNatural Crowns the translucent shade works best. For posterior crowns the translucent shade will also look great but in addition shade A-1 gives an excellent result

The PedoNatural Crown Consists of Three Components

1. Ultra-thin polycarbonate crown form
2. 2. Hybrid acrylic fill material
3. 3. Glass ionomer cement.

Availability of Crown

- Available for both anterior and posterior primary teeth.
- The PedoNatural Crown is anatomically correct for each primary tooth. .
- There are 5 sizes for each posterior tooth, 3 sizes for the maxillary central incisors and 2 sizes each for the maxillary lateral incisors and cuspids.
- The cost of an individual PedoNatural Crown form is $9.45.

Advantages

- Greater durability than composite strip crowns.
- Preveneered crowns.
- No need to use composite strip crowns and have the hassle of moisture contamination with etching and bonding.
- Ease of application over any other esthetic full crown restoration.
- No need to use bulky and unsightly resin veneered stainless steel crowns which are difficult to place and usually chip.
- Not as technique sensitive as composite strip crowns as the fabricated crown is cemented with self adhesive resin cement rather than bonding.

- Take about the same amount of time to place as stainless steel crowns, composite strip crowns and preveneered crowns and less than open faced stainless steel crowns.
- Cost effective.
- Superior marginal integrity.
- Excellent retention.
- High tensile strength.
- Trimmable.
- Crimpable.

- Anatomically correct shape and size.
- Flexible.
- Easy to fit.
- Extremely strong and durable.
- Superior marginal integrity.
- Excellent retention.
- High tensile strength.

Disadvantages

- They are not recommended in patients with heavy bruxism.
- Greater tooth reduction is required.

Procedure

•Anesthetize the tooth.

•Isolate the tooth with rubber dam isolation.

• Select crown by measuring mesiodistal diameter of tooth preparation. Identify the tab in crown to verify correct size. After selection of appropriate crown remove the tab with sharp scissor and trim it with slow speed hand piece.

•Begin tooth preparation with incisal or occlusal reduction for minimum of 2 mm Proximal slice/reduction is done to break the contact point to create adequate clearance for crown placement.

•Remove all remaining decay and perform any necessary pulp tissue treatment. Reduce the labial surface a minimum of 2 mm and place all the margins subgingivally.

- Place the crown over tooth and mark and trim the excess.
- Later crimp all the gingival margin of the crown using crimping pliers and check for final fit of crown.
- Check for snug fit of crown. The fully seated crown should be below the occlusal plane for posteriors.
- Fill the crown with self adhesives resin
- Seat the crown in position over tooth and hold it for few minutes
- Remove excess material from gingival sulcus and light cure the material

FIGURE 3.44 PedoNatural crown placement for primary molar

Pedo Jacket Crowns

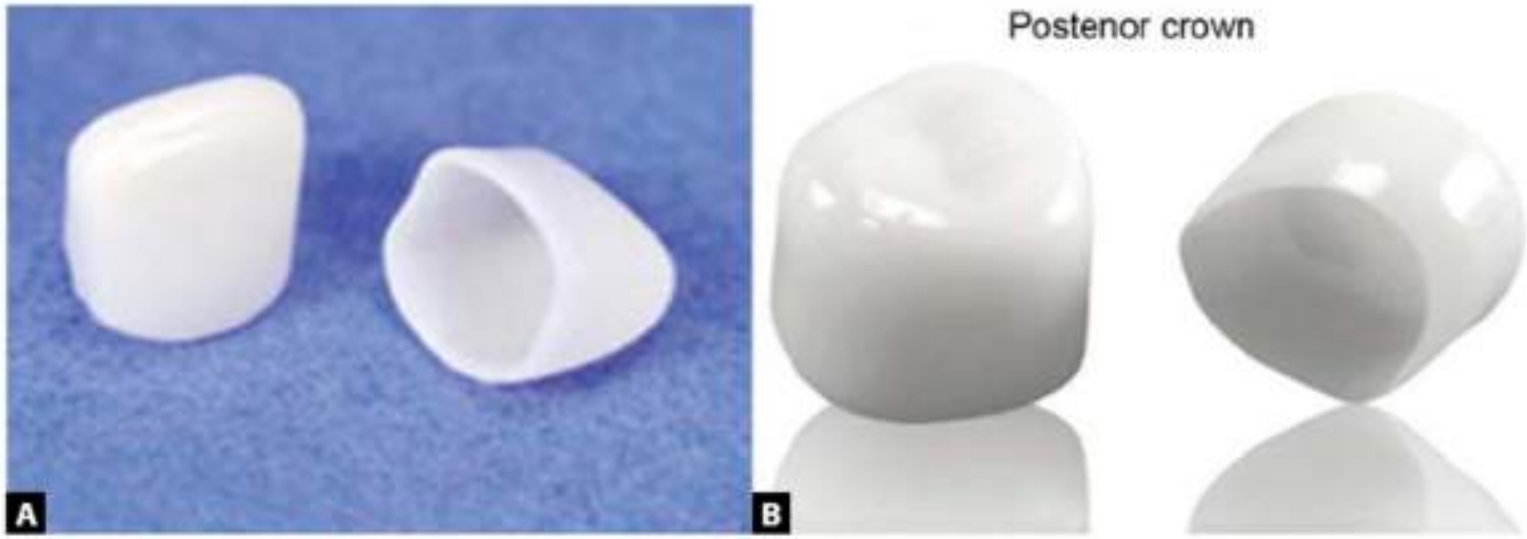
- An alternate crown form for grossly decayed or traumatized primary incisors that is commercially available is the Pedo Jacket.
- Pedo Jacket crowns are marketed by Success Essentials Space Maintainers Laboratory (Van Nuys, CA 91409-4184, USA)
- The “jacket” consists of a copolyester material in the natural primary tooth colour shade A2. The crown is flexible and its length can be adjusted and trimmed with scissors.

- Only flexible or soft crown option available.
- The tooth preparation is similar to that of strip crowns but often requires less tooth reduction.
- It includes caries removal and preparation of the tooth to conform to the inner surface of the crown leaving undercuts or parallel surfaces.
- The crown is then fitted onto the tooth and trimmed with scissors to adjust the length as necessary.
- The copolyester crown shell must be primed with a plastic primer material provided by the manufacturer.

- The exact chemical composition of the Pedo Jacket crown or crown primer has not been made available by the manufacturer.
- The prepared tooth is then conditioned with acid etch and a bonding agent is recommended.
- The crown is then filled with composite resin or a resin-modified glass ionomer if moisture and hemorrhage control cannot be achieved.
- Once the crown is seated on the tooth, it is polymerized and the crown form is left on the tooth.

- Pedo Jacket crowns are similar in cost to composite resin strip crowns ($403.85 Pedo Jacket Anterior Crown starter kit #450-200 by Success Essentials Space Maintainer Laboratory, Van Nuys, CA 91409-4184, USA, 2014)
- Often the remaining composite resin or resin-modified glass ionomer remains intact on the primary tooth. With the copolyester shell completely lost, the remaining restorative material appears as a strip crown, which can be left on the tooth without requiring additional treatment intervention.

Advantages	Disadvantages
Good aesthetics	1) Can tear margins with rotary instruments
Flexible and easy to adapt	2) Can wear
Clinically efficient as the crowns do not have to be stripped off at the end of the procedure	3) Crown can separate from cement
Can act as temporary restorations when used with RMGI	4) Difficult to place in crowded dentitions
If the crown debonds, the residual RMGI cement appears as a strip crown	5) Cannot heat sterilize crowns
Meant for maxillary anteriors but adaptable to other teeth (mandibular anteriors, cuspids)	
Easy access to pulp chamber in case of later pulp involvement	
Easy repair of defects	

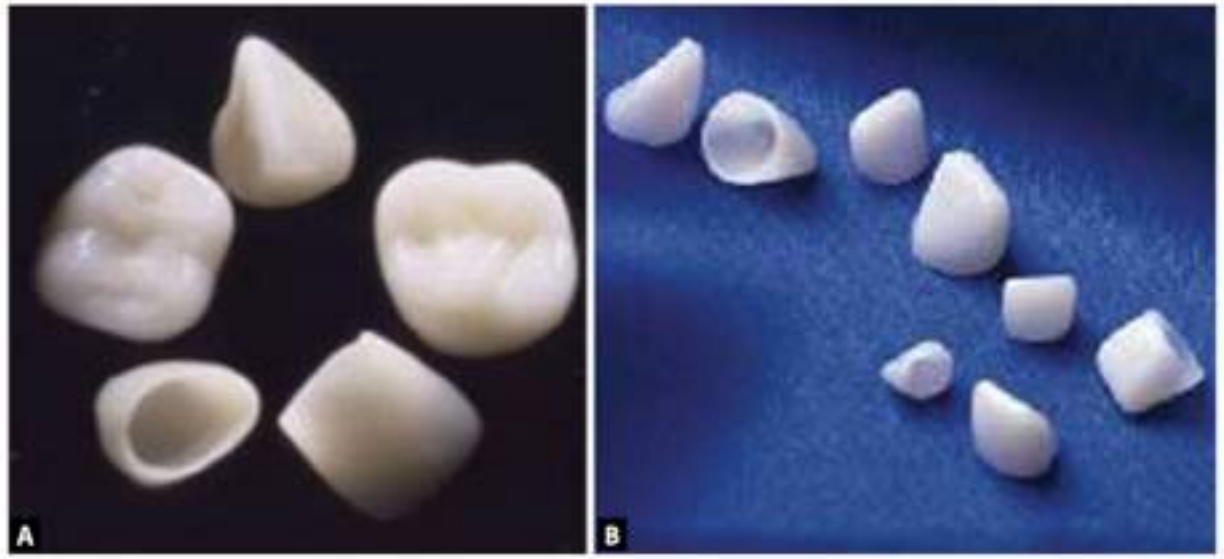


FIGURES 3.45A AND B Pedo Jacket crown (anterior and posterior)

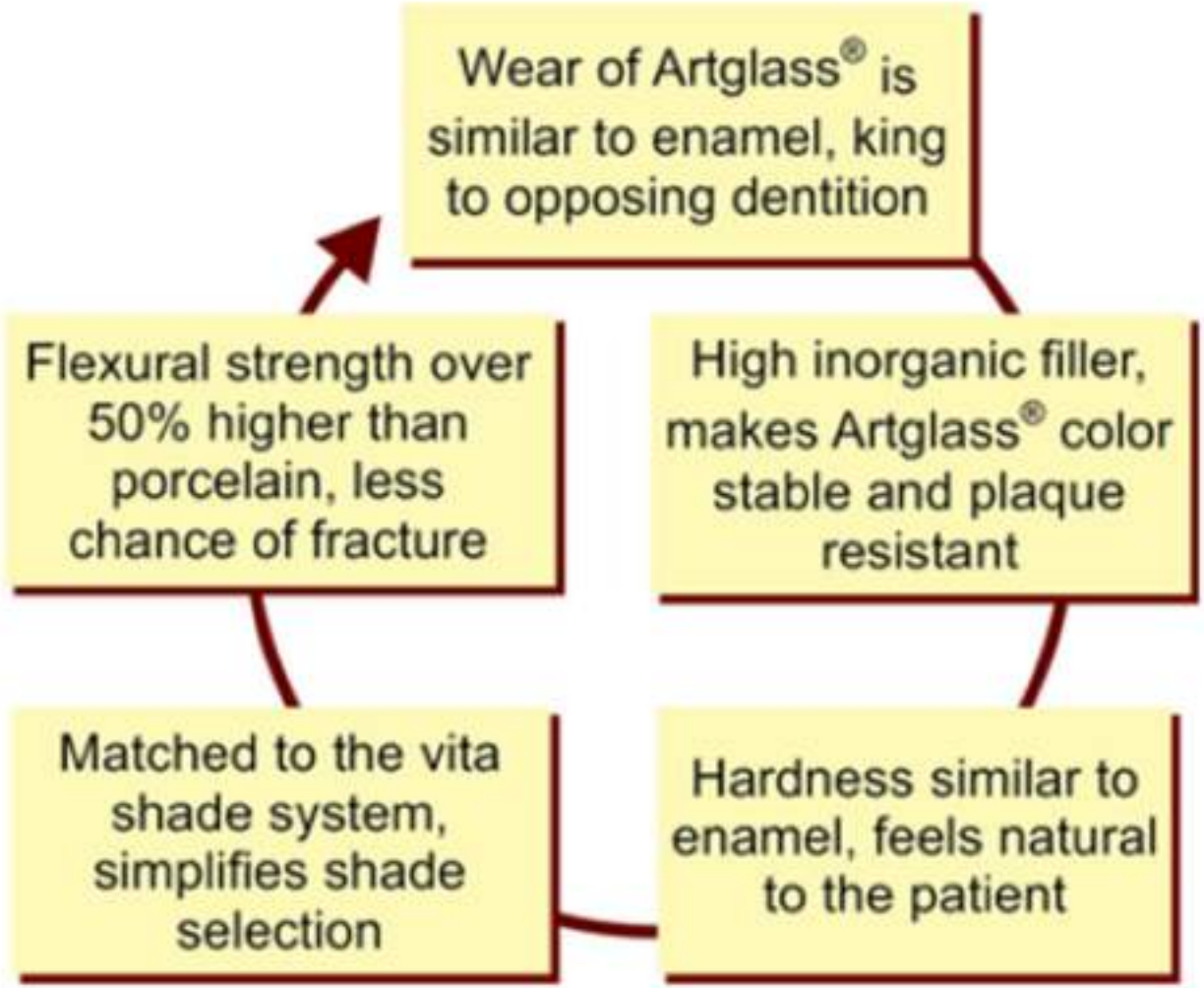
ARTGLASS CROWNS/ GLASTECH CROWNS

- These are forms of full coronal restorations with esthetic value for the deciduous dentition. Glastech presents the most esthetic crowns available for pediatric dentistry, which is made up of artglass.
- Artglass is a polymer glass, which provides the natural feel, bond ability associated with composite but the esthetics and longevity of porcelain.

- Amorphous organic polymers are known in the chemical literature as "organic glasses". The total filler content of Artglass is only 75 percent (55% microglass and 20% silica filler) but when the matrix is cured, the amorphous, highly cross-linked organic glass forms, which is called polymer glass.



FLOW CHART 3.3 Properties of Art glass crowns



Preveneered Stainless Steel Crowns

Cheng Classic Crown

Dura Crown

Nu Smile Signature Crown

Kinder Crown

Preveneered Stainless Steel Crowns

A restoration growing in popularity is the preveneered stainless steel crown (PVSSC). Currently, at least 4, manufacturers fabricate this product:

- Cheng Crowns, Cheng Laboratory, Frazer ;
- NuSmile Crowns, Orthodontic Technologies, Houston, Texas;
- Kinder Krowns, Mayclin Laboratory, Minneapolis, and
- Dura Crowns, Space Maintainers Laboratory, Chatsworth, California, fabricate this product.

- **Waggoner and Cohen (1995)** from their study concluded that the Whiter Biter veneered crowns is significantly better able to resist a shearing force on the veneer than the other crowns tested (Cheng, Kinder and NuSmile crown).
- **Wickersham GT, Seale NS, Frysh H (1998)** in their studies have evaluated the durability and colour stability of the veneered facing. Coloma et al. showed that all commercially available veneered facings are capable of staining and colour changes.
- **Rona et al. (2011)** [7] evaluated the success of posterior Nusmile and Kinder Krowns and determined the level of parental satisfaction with this treatment option. They concluded that these crowns combine the durability of conventional stainless steel crowns with improved esthetics and are proposed as a suitable alternative where esthetic demand is increased.

Examples of crowns included under preveneered SSC's are:-

- Nusmile Primary crowns
- Flex white faced pediatric crowns
- Pedo Pearls
- Cheng crowns
- Whiter Biter crowns
- Pedo Compu crowns
- High Density Polyethylene Venereed crowns for children
- Dura Crowns.

Advantages

- Aesthetically pleasing.
- Less moisture sensitive.
- Durable.
- Less chairside time.
- Easy to place.
- Full coronal coverage.
- Parent satisfaction

Disadvantages

- Possible loss of esthetic facing wide mesiodistally
- There is limited dentist's choice on the resin shade
- The labial section of the margin cannot be crimped otherwise the bonded resin can detach.
- Crown forms cannot be sterilized under heat pressure because heat would destroy the resin.
- Proper marginal seal is not obtained.
- Expensive (3 times than SSC).

General Steps of Preveneered Crown Placement

- The first step is to estimate the crown size needed. This is best done prior to tooth preparation.
- Next step is occlusal reduction. Minimum of 2 mm of occlusal reduction must be accomplished. This can be done with a high speed tapered diamond, football diamond or with simple straight fissure carbide.
- Circumferential reduction should be done with tapered fissure bur. Care must be taken to remove enough tooth structure to allow for the bulk of the crown. Preparation should be a feather edge and extend slightly subgingival.

- Upon try-in, the crown should fit passively with no resistance to the fully seated position. Snap fit of these crowns should not be achieved since forcing can produce micro fractures of the veneer and ultimately loss of veneer.
- Prepare and adjust the tooth rather than adjusting the crown to fit the tooth.
- Occlusion must be checked as a "high" restoration would lead to premature fracture of the facing.
- Cementation of crown can be done with a glass ionomer cement.

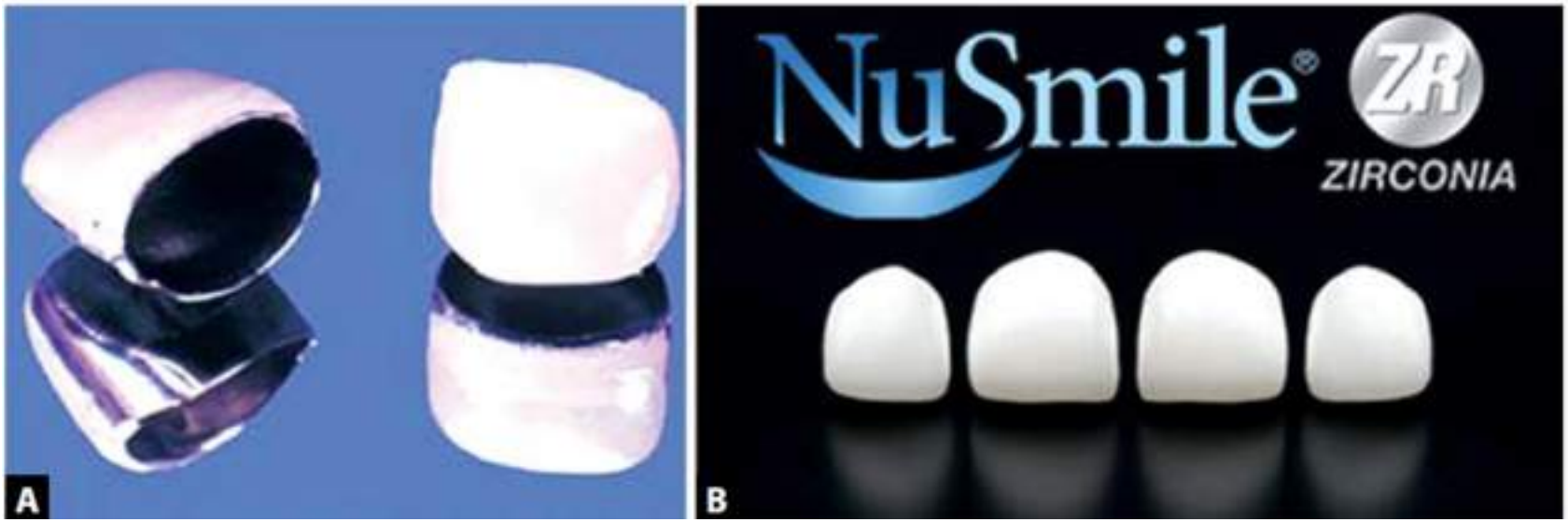
FIGURES 3.52A AND B Canine NuSmile crown

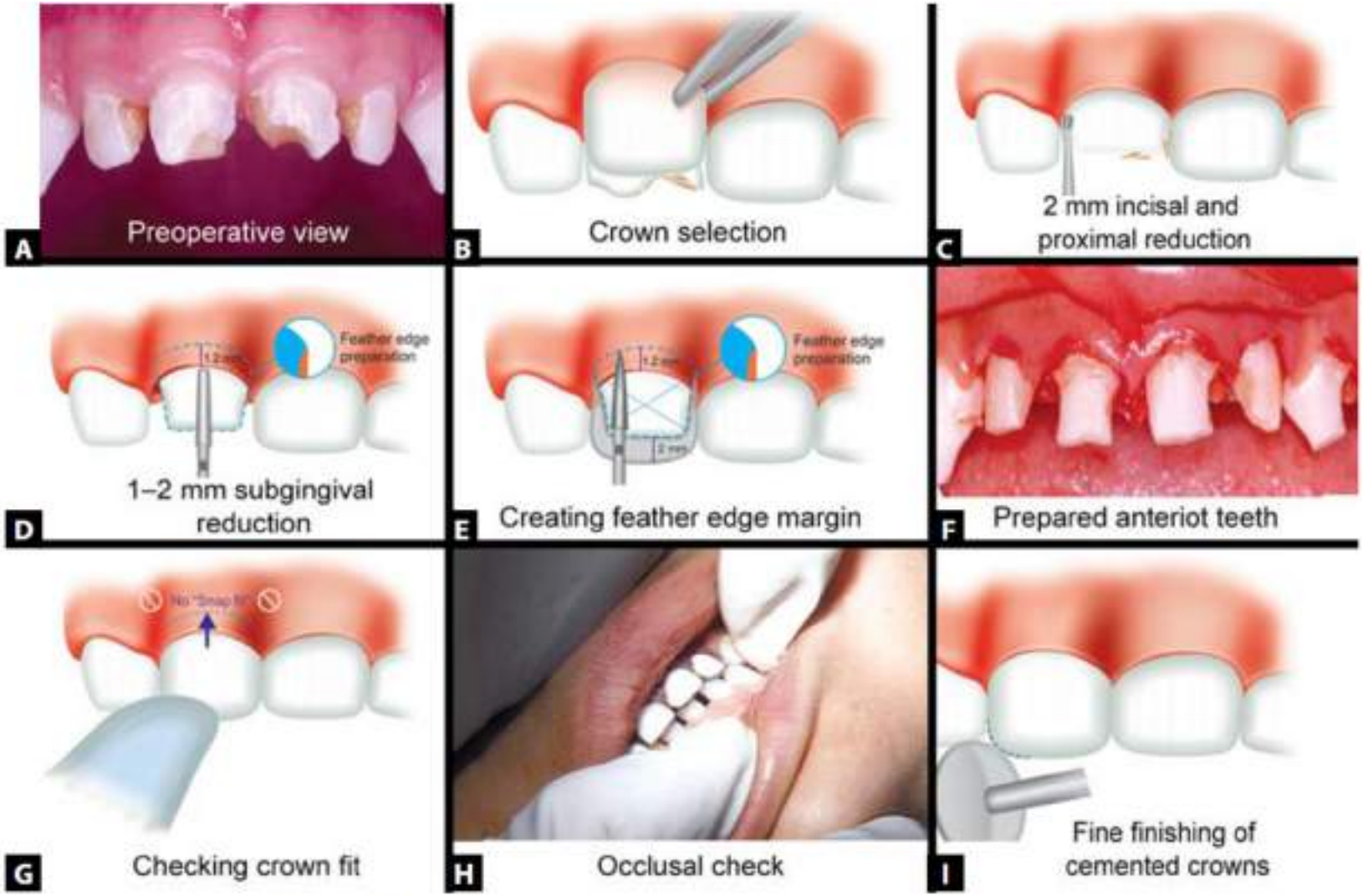
FIGURES 3.53A and B Primary molar NuSmile crown. B. Nusmile posterior crown after cementation
(Courtesy: www.dentaleconomics.com)

NuSmile Crown is Available in Two Forms

- **Nusmile signature** ~ They are anatomically correct stainless steel crowns with a natural looking, tooth coloured coating. These are widely used, dependable, easy restorative option to traditional stainless steel and composite strip crowns.
- **Nusmile ZR.** ~ Houston, Texas-NuSmile pediatric crowns has introduced Nusmile ZR. These are perfect balance of art and science. These are made from zirconia ceramic. Superior esthetic, durability, easy to place compared to composite restoration and strip crowns.

FIGURES 3.49 A AND B (A) NuSmile anterior primary crowns; (B) labial and lingual view





FIGURES 3.51A to I NuSmile crown placement procedure for incisor

NUSMILE ZR ANTERIOR CROWN CENTRAL, LATERAL AND UNIVERSAL KIT

Write a review

NuSmile

- Superior esthetics
- Anatomically contoured

See more product details

Bulk prices available. Want more than 2 units? For customized prices - click here

Pincode Check Check for Cash on Delivery

Free delivery available across all pincodes

Regular product - Ships usually within 2-4 days

	Package Contents	No. of units	Color	Type	Price	Qty
NuSmile ZR Anterior Evaluation Light Kit	1 Each of (A1R	16 Crowns	Light	Evaluation Kit	~~₹51949~~ ₹36741	− 0 +
NuSmile ZR Anterior Professional Extra Light kit	1 each of (A0R	84 Crowns	Extra Light	Professional Kit	~~₹212520~~ ₹203582	− 0 +

Flex White Faced Pediatric Crown

- Flex white-faced stainless steel pediatric crowns are made of new material that can be crimped on facial and lingual, and can also be squeezed on the mesial and distal to allow for better adaptation without the fear of compromising the bond strength.
- Available as left, right, upper and lower size
  - 1 to 6.
  - Kit includes 1 of each size = 24 crowns
  - 470-501-24 flex crowns costs for $ 396.
  - Single crown cost—$ 12.50

TABLE 3.10 Features of flex crown

Sizes	1–6
Color/Shades	White-faced
Quantity	24
Product brief	Pediatric crowns
Special features	Available in upper right and left centrals and laterals, sizes 1–6. Kit includes 1 of each size

Features and Benefits

- Squeeze-able on the mesial and distal
- Crimpable on the facial and lingual
- May be trimmed with scissors or green stone
- 1 mm shorter than standard SSC crowns
- Matches natural dentition
- Pediatric white shade
- Saves chair time
- No changes in bond strength after crimping or squeezing.

Pedo Pearls
(Aluminum Crowns With Facing)

- Pedo pearl crown is a metal crown form similar to the stainless steel crown but it is completely coated with tooth colored epoxy paint.
- The crowns are made from aluminum instead of stainless steel because the epoxy coating adapt better to aluminum. This technology develops in 1980. Aluminum crown forms are frequently used as temporary crowns in the permanent dentition
- These crowns are constructed of heavy gauge aluminum and coated with (FDA food grade powder) an organic enamel that is both flexible and durable.

Advantages

- **Cost:** The price of a pedo pearl crown is much less than the cost of any other esthetical metal crown on the market. They fit all economic situations and have an infinite shelf life.
- **Inventory:** The anterior pedo pearl crowns have universal anatomy. This drastically reduces inventory and therefore saves the dentist money and can be used on either side.
- **Crown coating:** The pedo pearl crown coating will not chip or peel. The dentist can cut and crimp the crown without damaging the coating.
- **Natural look:** Pedo pearl crowns are not bulky and fit easily to the tooth. This avoids a “chicklets in the mouth” appearance.

- **Flexible packaging:** Pedo pearl crowns come in three kits for the dentist; the anterior kit, the posterior kit, and the complete arch kit. Crowns are also sold in refill packages of three crowns for all of sizes.
- **Maintenance:** Pedo pearl crowns, if needed, can be touched-up or repaired easily. A self-cured or dual-cured composite is recommended.
- Easy to cut and crimp, without chipping or peeling.
- Composite can be added.

Disadvantages

- They are relatively soft thus creating a problem for long-term durability.
- In areas of heavy occlusion, the white coating will wear off .
- Less durability.

Complete arch kit contains: 75 maxillary crowns combined contents of both anterior and posterior kits.
Pedo pearl kit-Anterior-36 number-$ 348, posterior kit-36 number-$ 322
Complete arch kit-72-$ 513.80 each crown costs $ 5.50.

Anterior Kit

- Item number: 2001PP
- 36 maxillary anterior crowns
- Centrals (sizes 1 to 4)
- Laterals (sizes 2 to 5)
- Cuspids (sizes 1 to 4)

All with universal anatomy.

FIGURE 3.55 Pedo Pearls kit box

TABLE 3.11 Pedo Pearls available sizes

Centrals*	Laterals	Cuspids
PPC1-Size U1 (6.4 mm)	PPL1-Size U1 (4.6 mm)	PPCU1-Size U1 (6.2 mm)
PPC2-Size U2 (6.8 mm)	PPL2-Size U2 (5.0 mm)	PPCU2-Size U2 (6.8 mm)
PPC3-Size U3 (7.2 mm)	PPL3-Size U3 (5.4 mm)	PPCU3-Size U3 (7.2 mm)
PPC4-Size U4 (7.6 mm)	PPL4-Size U4 (5.8 mm)	PPCU4-Size U4 (7.8 mm)
	PPL5-Size U5 (6.0 mm)	

**Size U1 laterals are not included in kits*

1st Molars	2nd Molars
PP1ML3-Size L3 (7.4 mm)	PP2ML3-Size L3 (9.4 mm)
PP1ML4-Size L4 (7.8 mm)	PP2ML4-Size L4 (9.8 mm)
PP1ML5-Size L5 (8.2 mm)	PP2ML5-Size L5 (10.2 mm)
PP1MR3-Size R3 (7.4 mm)	PP2MR3-Size R3 (9.4 mm)
PP1MR4-Size R4 (7.8 mm)	PP2MR4-Size R4 (9.8 mm)
PP1MR5-Size R5 (8.2 mm)	PP2MR5-Size R5 (10.2 mm)

FIGURES 3.56A TO C Pedo Pearls (anterior and posterior); A. Anteriro pedo pearl crown; B. Posterior pedo pearls crowns

Cheng crowns

- Cheng Crowns from Peter Cheng Orthodontic Laboratories, Inc. made its public debut in 1987 to provide an esthetic alternative to stainless steel crown.
- Crowns faced with a high quality composite, mesh-based with a light cured composite. There are no long-term clinical trials to assess the durability of these crowns.

FIGURES 3.57A AND B (A) Cheng crown; (B) Zirconia checng crown

- **Master primary anterior starter kit:** 96 crowns, centrals and laterals, left and right, sizes 1 to 6 (2 of each), sizes 2 to 5 (5 of each)$1500.00.
- **Basic primary anterior starter kit:** 16 crowns, centrals and laterals, left and right, sizes 2 to 5 (one of each size) $280.00.
- Second primary molar crowns starter kit: 12 crowns, upper and lower, left and right, sizes 3 to 5 (one of each size) $400.00.
- Primary molar crowns for left and right upper and lower area available as sizes 2 to 7.

FIGURE 3.59 Cheng crowns for anterior and posterior teeth

Instructions to Determine the Correct Size of Cheng Crown to use

- Tooth preparation and crown placement is similar to SSC
- First check the crown size on patient with a plain 3M, Unitek stainless steel crown
- When a correct size crown has been found, replace with corresponding size Cheng Crown to fit the patient
- This will deter unnecessary loading and eliminate the need for sterilization.

Whiter biter crowns

- It is preveneered SSC. 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.
- The coating can be a very thin layer that will remain adhered to the crown during the manipulation. Coating does not peel or chip under normal use and mastication. These crowns are no longer used now.
- Roberts *et al.* (2001) found 32 percent of the crown loosing some of the esthetic white facing.

Pedo Compu-crown

- These are stainless steel pediatric anterior crowns faced with a high quality composite, mesh-based with a light cured composite crowns. These crowns are color stable, plaque resistant, match natural pediatric shades. Available as white colored crowns
- Available for the right and left central and lateral as well as cuspids.

FIGURE 1.60 Pedo anterior Compu-crown

Composite Strip Crowns For Anterior And Posterior Teeth

- One of the problems facing the dental practitioner is the restoration of primary anterior teeth with caries and fractures.
- Restoration of extensively destroyed anterior teeth with durable, esthetic and retentive material is challenging.
- Esthetic results of open faced crowns are somewhat compromised. Strip crown is very aesthetic when prepared correctly.
- The use of Pedodontic celluloid forms is indicated for anterior primary teeth having severe dental caries. Composite strip crowns are composite filled celluloid crowns forms.

- The crowns help to 'seal' the underlying tooth from acid attacks and reduce the chance of developing further decay on the tooth. The tooth surface is prepared to specific dimensions and then the crown is carefully fitted over the existing tooth.
- **Junatavee et al (1998)** presented a case of fractured anterior teeth where intracanal short post was used followed by placement of composite strip crowns.
- **Kupietzky et al (2002)** in his study concluded that the bonded resin composite strip crown is perhaps the most esthetic of all the restorations available to the clinician for the treatment of severely decayed primary incisors, and are also the most technique-sensitive crowns which may be difficult to place.

Indications

- Interproximal caries excess or multi surface caries on primary anterior teeth.
- Following pulp therapy to primary anterior teeth.
- Restoration of fractured anterior teeth.
- Incisors with hypoplastic defects, amelogenesis imperfecta.
- Discoloured incisors.
- Congenitally malformed primary incisor.

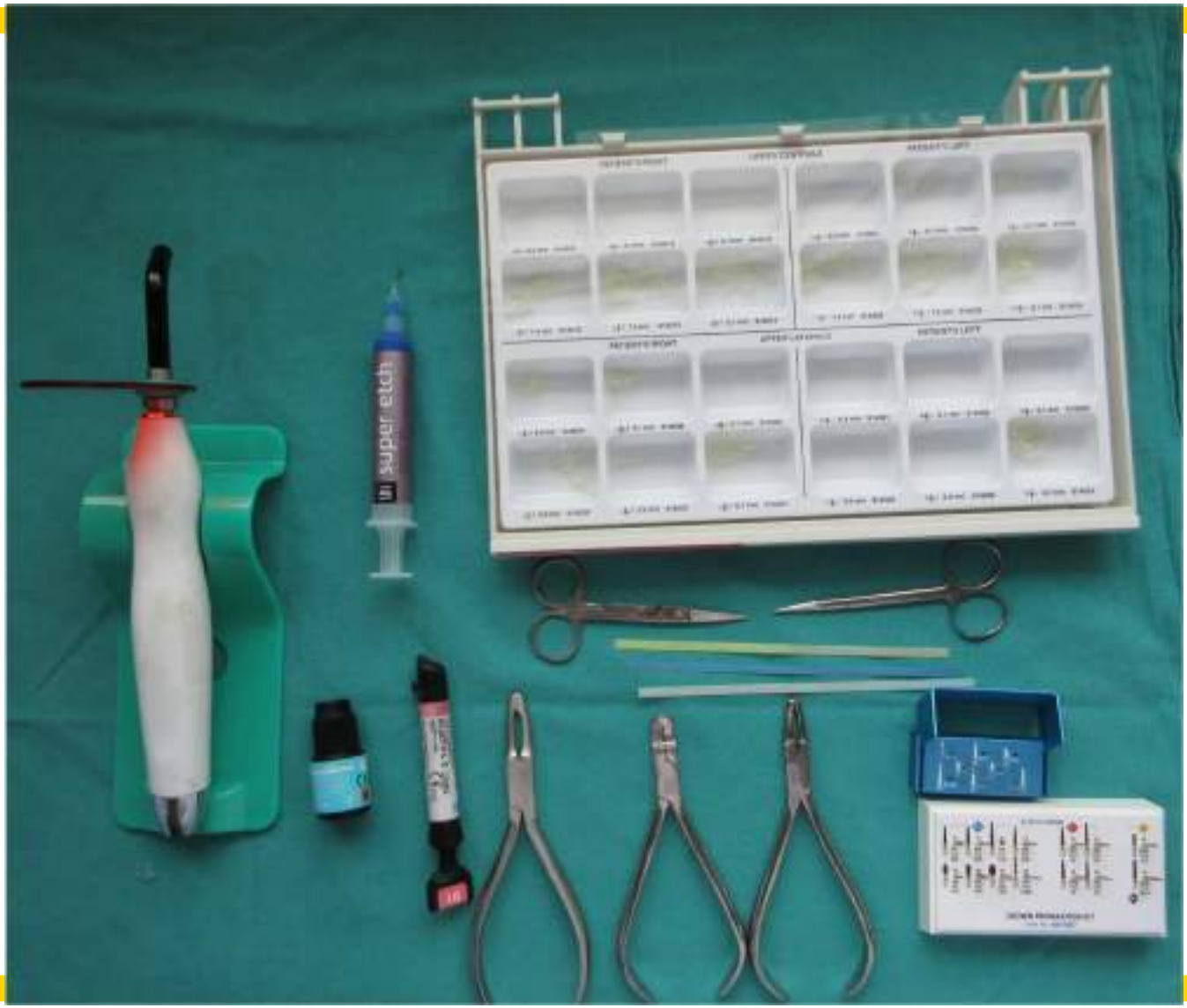
Contraindication

- Insufficient tooth structure for retention.
- Deep overbite.
- Bruxism.
- Periodontal diseases.

Advantages

- Parent/patient pleasing.
- Simple to fit and trim.
- Removal is fast and easy.
- Easily matches natural dentition.
- Leaves smooth shiny surface.
- Easy shade control with composite.
- Superior esthetic quality.

- Crystal clear and thin celluloid crowns.
- Easy to repair.
- Crowns are cost-effect
- Functionally, allows occlusal wear.
- Automatically contours restorative material to match natural dentition.
- Strips off easily leaving a smooth surface.
- Ideal for chemical or light-cured composites.


super etch

Procedure of Crown Placement

Tooth Preparation

Administer appropriate anaesthesia.

Reduce the interproximal surfaces by 0.5 to 1 mm with a tapered diamond bur to produce knife edge cervical margin identical to that of stainless steel crown preparation.

Reduce incisal edge approximately 1 to 1.5 mm using fine tapered diamond

(169 L) bur.

Reduce the facial surface by at least I mm and lingual surface by at least 0.5 mm. Create knife edge gingival margin. Round all line angle.

Create small cervical undercut with inverted cone bur (No. 35) or No. 330 bur on labial gingival margin for retention of composite restoration as it acts as mechanical lock to aid in retention.

Further tooth reduction can be done to allow placement of selected crown form over the tooth if the previous reduction was inadequate.

Minimal enamel reduction is desirable since retention of the restoration is based on the quality and quantity of enamel surface area exposed to acid etching procedure.

Remove existing carious lesions with a spoon excavator or round bur.

In cases of black coloured arrested caries, a masking agent may be used.

Crown Placement

Trim the selected crown form to remove excess crown form material cervically with crown and bridge scissors.

Trial check for fitting of crown form on prepared tooth. Trimmed crown form should fit 1 mm below gingival margin with comparable height to adjacent teeth.

Consider the maxillary lateral incisors length of 0.5 to 1 mm shorter than that of central incisors during crown form placement.

Punch a small hole with sharp explorer at incisal edge or at palatal surface of trimmed crown form to create vent for flow of excess composite material while placement.

Place an appropriate pulp liner to all exposed dentin under dry field before etching.

Etch the prepared tooth with acid etchant for 15 to 20 seconds. Rinse and dry the tooth followed bonding agent application and curing.

Composite materials used to fill crown form are hybrid composite, compomers (sparingly), flowable composites, or combination of an anterior/posterior composite for strength perspective.

Fill the crown forms with selected composite shade material to approximately two thirds of length and seat on to tooth and check for correct position. Excess material should flow from gingival margin and vent hole. Remove the excess composite material from gingival area with explorer.

Light cure the celluloid crowns to polymerize the composite material. Curing should be done both labially and lingually.

After proper curing remove the celluloid crown form by using a composite finishing bur or curved scalpel blade to cut the material on the lingual surface and peel the form from the tooth or use explorer to remove.

Crown form removal should began from palatal side to avoid scratches on labial surface.

Remove rubber dam and check for occlusion.

Little finishing can be required on the facial or gingival area. Abrasive disc are used for final polishing of required areas.

Solutions to problems encountered during strip crown placement

Tearing the celluloid crown form when trimming.

Keep scissors exclusively for strip crown preparation.

Difficulty in stripping off crown form.

Remove excess composite from gingival margin before cutting.

Scientific Article AAPD 2005

Long-term Photographic and Radiographic Assessment of Bonded Resin Composite Strip Crowns for Primary Incisors: Results After 3 Years

Ari Kupietzky, DMD, MSc[1] William F. Waggoner, DDS, MS[2] Jon Galea, DDS[3]

CONCLUSION

Showed 80% of composite strip crowns were completely retained after 3 years, and 20% were partially retained, with none being completely lost.

International Journal of Paediatric Dentistry 2006; **16**: 49–54

Clinical performance of resin-bonded composite strip crowns in primary incisors: a retrospective study

D. RAM & A. B. FUKS
Department of Pediatric Dentistry, The Hebrew University Hadassah School of Dental Medicine, Jerusalem, Israel

CONCLUSION

The high success rate of resin-bonded composite strip crowns with a 2-year follow-up . The **retention rate is lower** in teeth with decay in three or more surfaces.

Zirconia Crowns

- First introduced less than five years ago by two companies, Tuff Kid Crowns in Florida and EZ-Pedo Crowns located in California, these crowns represent arguably the most aesthetic full coverage options for badly decayed primary teeth.
- The Tuff Kid Crowns are no longer available, but besides the Zirconia crowns made by EZ-Pedo, there are two other United States companies that offer Zirconia primary crowns. They are Kinder Krowns and Nu Smile Crowns.

- Kinder Krowns and Nu Smile have offered resin-based composite preveneered crowns for primary teeth for over two decades, but now they are marketing Zirconia crowns in addition to preveneered. All three companies offer Zirconia primary crowns for both incisors and molars

Indications

- Large carious lesions that compromise the strength of the tooth
- Multiple or large proximal caries
- Following pulpal therapy and on hypoplastic teeth

Advantages

- Thermostable
- Low heat conductivity
- Low thermal expansion
- Biocompatible
- High strength, hardness and abrasion

Disadvantages

- Cannot be crimped or contoured to fit a crown preparation.
- Similar to a preveneered crown, when placing a Zirconia crown, the preparation must be made to fit the crown rather than the crown fitting the prep. This may take a lot of trial and error in preparation.
- Crowns must fit passively they cannot be forcefully pushed onto a tooth.

Armamentarium

- Explorer, Dental floss, Rubber dam kit
- Burs – Wheel, Chamfer bur, Tapered fissure

Incisally
1.5 to 2 mm

Supragingivally
chamfer margin
Reduce 0.5 – 1mm

Subgingivally
2mm without ledge formation

Procedure

The first step is to estimate the crown size needed. This is best done prior to tooth preparation.

Next step is occlusal reduction. Minimum of 2 mm of occlusal reduction must be accomplished. This can be done with a high speed tapered diamond, football diamond or with simple straight fissure carbide.

Circumferential reduction should be done with tapered fissure bur creating a circumferential chamfer. Care must be taken to remove enough tooth structure to allow for the bulk of the crown.

Upon try-in, the crown should fit passively with no resistance to the fully seated position

Prepare and adjust the tooth rather than adjusting the crown to fit the tooth.

Occlusion must be checked as a "high" restoration would lead to premature fracture of the facing.

Cementation of crown can be done with a glass ionomer cement.

- Both EZ-Pedo and Kinder Krowns say their crowns may be tried in and cemented with a glass ionomer, resin modified glass ionomer or resin cement.
- Crowns tried in but not used may be autoclaved for future use.
- The manufacturers for the Nu Smile Zirconia crowns, however, have more stringent handling requirements. According to published research, it appears that when phosphate groups in saliva come in contact with Zirconia surfaces, the phosphate greatly decreases the adhesion activity to the luting cement.

- It is extremely difficult to remove this phosphate contamination clinically. Hence, the Nu Smile Zirconia crown kit comes with what Nu Smile refers to as try-in crowns. These try-in crowns are shaded slightly pink in color so they will not accidentally be cemented into the child's mouth.
- There is a try-in crown for each size crown. Preps are made to fit the try-in crown, and then the appropriate-sized crown is removed from the crown box and cemented without ever having been tried in the mouth.

- All of the crowns of each size have precisely the same internal dimensions, so all will fit exactly the same as the try-in crown. Nu Smile also recommends, for best retention, that crowns be cemented with a resin-modified glass ionomer or a bioceramic cement such as Ceramir by Doxa Company.
- The try-in crowns may be autoclaved endlessly.

Disadvantages

- These crowns can't be crimped
- Can cause occlusal wear of antagonist tooth
- Expensive

ORIGINAL ARTICLE

Fracture resistance of different primary anterior esthetic crowns

Manar Zaki Al Shobber *, Thamer A. Alkhadra

Department of Pediatric Dentistry and Orthodontics, College of Dentistry, King Saud University, Riyadh, Saudi Arabia

Received 12 June 2017; revised 25 July 2017; accepted 30 July 2017

Zirconia crowns showed the highest fracture resistance with **NuSmile zirconia crowns to being able to resist fracture** even under intense pressure of load.

NUSMILE ZR ANTERIOR CROWN CENTRAL, LATERAL AND UNIVERSAL KIT

Write a review

NuSmile

- Superior esthetics
- Anatomically contoured

See more product details

Bulk prices available. Want more than 2 units? For customized prices - click here

₹ Pincode Check Check for Cash on Delivery

FREE Free delivery available across all pincodes

Regular product - Ships usually within 2-4 days ?

	Package Contents	No. of units	Color	Type	Price	Qty
NuSmile ZR Anterior Evaluation Light Kit	1 Each of (A1R	16 Crowns	Light	Evaluation Kit	~~₹51949~~ ₹36741	− 0 +
NuSmile ZR Anterior Professional Extra Light kit	1 each of (A0R	84 Crowns	Extra Light	Professional Kit	~~₹212520~~ ₹203582	− 0 +

Commercially available crowns……

3M ESPE Strip Crown
Rs. 160/- per unit

3M ESPE Polycarbonate Crown
Rs. 95/- per unit

3M Signature Crowns
Rs. 1800/- per unit

Kids-e-Crown
Rs. 1300/- per unit

NuSmile ZR Crown
Rs. 1700/- per unit

Specific Indications

Criteria	Strip Crown/ Polycarbonate	Preveneered SSC	Aluminium Veneered Crowns	Zirconia Crowns
Adequate tooth structure remaining	✓	✓	✓	✓
Haemorrhage is difficult to control	Moisture Control as resin is involved	✓	Moisture control as resin is used for cementation	✓
Uncooperative child	Isolation issues	Time Consuming	Single Fit	Time Consuming
Child prone to trauma	Less strength	Chipping of veneer	Soft crown	✓

Contraindications

Criteria	Strip Crown	Polycarbonate	Preveneered SSC / Aluminium Veneered Crowns	Zirconia Crowns
Crowding of anterior		✗	✗	✗
Gingival inflammation present	✗	✗		
Severe bruxism	✗	✗		✗

Fiberglass dental crowns

A dental crown composed of fiber mesh sheets of fiberglass, aramid, carbon or quartz fibers embedded within dentally acceptable resin. The combination of both materials synergistically add unsurpassed strength and enhanced cosmetic value to the dental crown for a much lower price due to the cheaper costs of the material and manufacturing process.

Reports show the average human bite yields

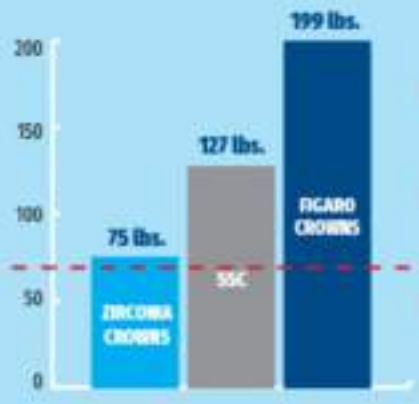
72 lbs.

OF FORCE

during chewing

(ball bearing)

Ball Bearing Test Results



- Zirconia Crowns Cracked at 75 lbs.
- SSC Dented at 127 lbs.
- Figaro Crowns Withstood 199 lbs.

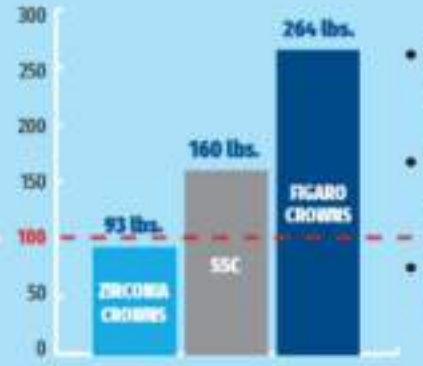
The human bite has been documented at well over

100 lbs.

OF FORCE

(compression)

Compression Test Results



- Zirconia Crowns Shattered at 93 lbs.
- SSC Smashed at 160 lbs.
- Figaro Crowns Endured 264 lbs.

Conclusion

- Many restorative options exist for treating primary anterior teeth. Several modifications and newer aesthetic crowns have been presented to overcome the disadvantages of stainless steel crowns. These crowns were introduced to meet the increasing aesthetic demands of patient as well as their parents.
- The dentist treating children should must be crimped to regain its retentive recognize the durability, preventive aspect, and cost-effectiveness of the crown as a restorative choice for the primary dentition.

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Thank you!