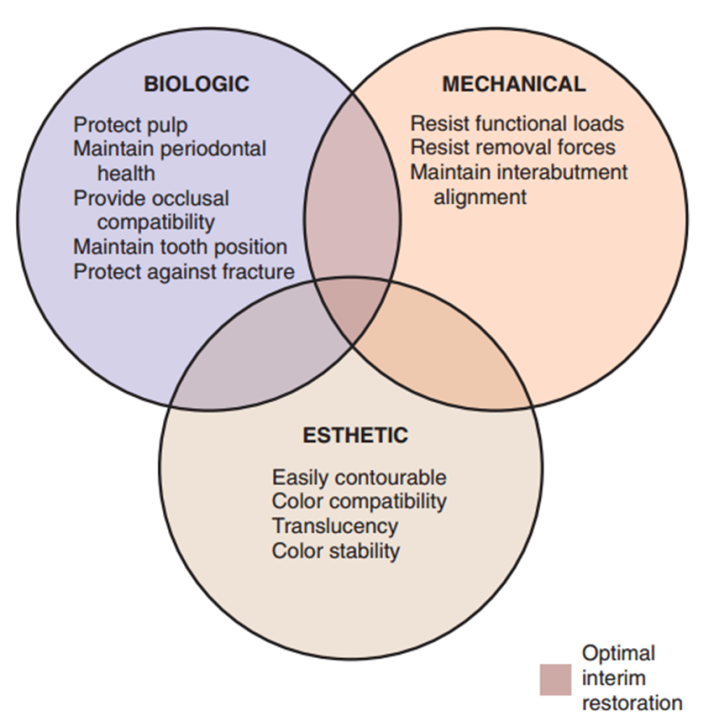
**Provisional Restorations (sheet # 9)**

**Definition:** they are Interim crowns used in the period (weeks to year …the period of the provisional restoration must extend until the periodontal tissue become healthy) between tooth preparation & the insertion of the final restoration.

**\*\***call it Provisional not Temporary … because it should be as good as the final restoration, never with low quality like the word “Temporary” may indicate

 **Requirements of Provisional Restoration**

**\***provide occlusal stability by preventing vertical (over eruption) & horizontal (mesiodistal tipping) movements of the prepared tooth.

**\***Prevents enamel fracture: In prepared teeth with Enamel Margins, like ¾ restorations, Inlays & Onlays, (usually even all other restorations have Enamel margin which is; The Finish Line)

**\***The provisional restoration usually have 1/20 the strength of the final restoration because the materials used to make it are weaker

**\*\*\***Most fractures happen at the connector area, for this reason, the connectors in the provisional restoration are usually a bit larger than the connectors in the final restoration… Sometimes if the provisional restoration is long span, that will stay for a long time in the patient’s mouth or the patient has heavy occlusal forces or parafunctional habits like bruxism, Other more-reinforced materials called “high strength acrylic materials “can be used

**\*\*\***why would a Provisional fail to withstand displacement (for example it fell the next day!)?

1 -Problems in the preparation.

2-Problems in the cementation and moisture control.

3-The occlusion is high for the patient.

4-The fitting surface of the provisional is loose

**\***easthetic means .. smooth surface, good shape, good shade & good contour

**\*Requirements of the provisional restoration’s Materials:**

1- Good working time. 2- Rapid setting time. 3- Biocompatible; non-toxic, non-allergic, not exothermic. 4- Has dimensional stability. 5- Ease of contouring & polishing. 6- Adequate strength and abrasion resistance. 7- Esthetic, translucent & color stability. 8- Good patient acceptance. 9- Non-irritating. 10-Odorless. 11-Ease of repairing 12-Clinical compatibility with luting materials.

\* The main problems of the provisional restorations come from the properties of the materials that they are made of, for example acrylic disadvantages:

1- exothermic setting reaction.. can lead to pulp sensitivity & irreversible pulpitis

2- shrinkage upon setting, leading to open margins and engage the undercuts

**Materials used in provisional restorations:**

1. Poly methyl-methacrylate. 2. Poly R-methacrylate, 3. Epimens (not used anymore because it causes sensitivity to dentist) 4. Bis-acryl composite resin, 5. Light cure composite (Light cure, Microfilled or UDMA (Urethane Dimethacrylate))

**→** highest exothermic reaction and shrinkage … Poly methyl-methacrylate

**→**lowest exothermic reaction … light cure composite

**\***The difference (in the properties) between self-cured & heat-cured PMM:

1. Heat-cured is Stronger. 2. Heat-cured has less porosities. 3. Heat-cured is more stain resistance.

**Provisional restoration techniques can be classified according to the External Surface Form to:**

1- custom made (index) .. made by silicone or alginate or transparent vacuum sheet

2- preformed crown (not bridge) .. need relain, ex.: polycarbonate crown, cellulose crown, metal crown , calendars

**Provisional restoration techniques can be classified according to the Internal /Tissue Surface Form to:**

1- direct

2. Indirect: obtained from a model cast for the prepared tooth

Advantages: a. no contact between the free monomer and the tissue. b. no exothermic heat on the teeth. c. the marginal fit is better, because the setting is finished completely on the model of the prepared tooth.

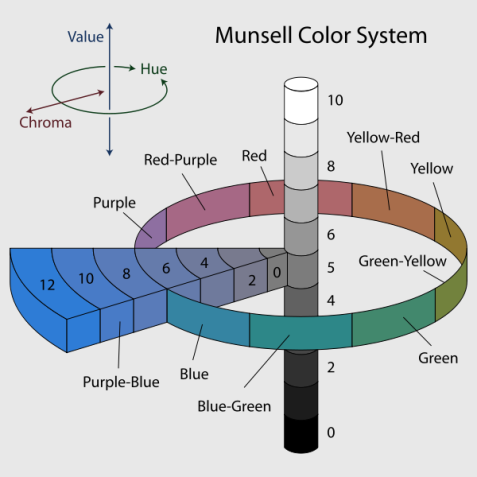
3. indirect – direct: need to reline it inside the patient’s mouth. So with this technique half of the provisional is done outside the patient’s mouth reducing some of the disadvantages of the direct technique (like the high exothermic reaction heat)

**Provisional cementation:**

temporary cement like Zinc oxide eugenol or zinc oxide non-eugenol

**Ideal properties of the cement:**

1- Ability to seal against leakage and pulp irritation. 2- Adequate strength 3- Low solubility 4- Chemical compatibility 5- Ease of use 6- Adequate working time 7- Compatibility with the final luting cement.

**Shade selection (sheet #10)**

Hue: the family of the color

Chrome: saturation of the color

Value: relative darkness or brightness of the color (0: black, 10: white)… the most important dimension that you should use in your restoration

\*The value of natural teeth: 5.5- 8.5

**Color perception** **depends on 4 factors:**

1. environment
2. light (the most important factor and the most variable one)
3. object itself
4. observable

\* to do a correct matching we turn the light off and we prefer to have a corrected fluorescent light (90% of white light)

\* light goes to the retina which has a receptors and by optic nerve the color will be transmitted to the brain and then you will see the color.

\* differences between human eyes cause variability in shade selection .. to overcome such problems in the clinic, more than one person should select the shade.

\* after 30 secs the eye will be adapted to the color so you have to do shade selection as fast as possible within 30 sec.

\* rods of the eye measure the intensity of light, scattered in the eye more than cons and that is why the eye is sensitive to the value

\* Usually the complementary color for the teeth which is yellow/yellow-red >> blue, that’s why you would paint your clinic’s wall with light blue color ….When looking to the complementary colors you do a desensitizing to your eyes.

**We have 3 sources of lights in the clinic:**

1. **incandescent light**: rich in yellow light.
2. **Fluorescent light**: rich in blue and violet light, there is a corrected fluorescent light which is close to pure light with decreased amount of blue light.
3. **Natural day light**: pure white color closes to full spectrum that we could find it:
4. in the middle of the day (between 12-3 o’clock)
5. at the northern hemisphere.
6. clear weather with no clouds.

\* Metamerism: phenomena of two different objects with different wave lengths

but appear the same under the same light, but if the light change

the color will change

how to overcome mesmerism in the clinic ?

-do the shade selection under different lighting .

-do the shade selection more than one time in different days

**\*certain properties must be available in the dental restorations or crowns in order to mimic the natural teeth**:

1.florecence

2. opalescence

3. Translucency

\*\***The environment :**- the walls of clinics should be colored by neutral color and preferred to be pale blue .  
- the sealing should be very high value color like white to reflect most of the light

**Shade guide limitations:**

1. The shade guides are thick with 4-5 mm compared to the thin 1.5 mm porcelain.

2. The guides aren't made from florescent porcelain as the final crown .   
3 . lack metal substructures : in the lab the crown firstly made from metal which will be covered by opaque layer then dentine and enamel .   
4.they don’t cover the whole distribution .

5.diffeculty in predicting the final shade after layering.

6.They are not made from the same porcelain that you are going to use for your crown .

**guidelines** : \*  
 1. The dentist position must be between the light and the patient when taking the shade , close as possible with the same eye level to stimulate the cons ( the center of the retina ) with close distance 25cm and the light is behind you .   
2. Teeth should be clean stains is removed : polishing them at the beginning of the session .when u dehydrate the teeth the value increase ( more bright )   
3. Take the shade in multiple session to overcome mesmerism and at different lighting   
4. Cover the patient with bright color apron .  
5. Lip stick should be removed .  
6. Shade selection should done quickly (30 seconds )or you will have color adaptation problem and putting the shade guide under the lip simulating the natural teeth environment .   
7. To know the value of an object and measure the brightness : turn the vision from photopic to scotopic by close the eye slightly .

8.use the guide that matches the porcelain and to select a prober hue look to the **canine**

**commercial shade guides:**\*  
**1. VITA lumin vacuum classical :**   
-firstly do the hue matching :  
A : -most common used .  
 ( reddish – brownish) ,  
 - 5 subtypes different in( saturation ) chroma( A1 ,A2 ,A3 ,A3.5 , A4)  
B : ( reddish –yellowish )  
 - 4 subtypes ( B1 ,B2 ,B3 ,B4 ) .  
C: (grayish )   
 - 4 subsypes ( C1 , C2 , C3 , C4 ) .   
D : ( reddish- grayish ) .  
 - 3 subtypes : ( D2 ,D3 , D4 ) . the least one to be used

We start by selecting the hue like A then we detect the saturation or chroma like A1 finally the value .  
 \* if the shade selection was confusing and you couldn't detect the color perfectly , look at the canine which has the most chroma and saturation . ( has more dentine )  
\* B1 ( highest value , white ) to C4 ( lowest value , gray ).  
\*one problem of the **VITA lumin vacuum classical** that some dentists forget to choose the value !

**2.Vitapan 3D master . ( more developed ).**\*the good thing about this system that the value is the first thing to be determine , if the value is correct ,80% of the restoration will be correct .  
 \* 5 groups of different values, each group has the same value with different hue and saturation .

\* *First*, determine the value (lightness) by selecting the closest match from one of five value groups( 1-5 ) ; group 1 is so bleach and group 5 is so discolored .most of ppl is ranging between group 2 and 3 .  
*Second*, pick the hue within the value group from three choices( L , M, R ) determining if the tooth has a more yellow (L) or red (R) or in middle (M).   
*Third*, determine the chroma within the hue group : ( L 1.5 ,L 2.5 ) , (M1 ,M2 ,M3 ) , ( R 1.5 ,R2.5 ) .

e.g : in the 3D master shade guide system what does **4R2.5** means **?**color with value = 4   
the hue is R = ( Reddish ) with saturation of 2.5 ☺

eg: A3 in the classical system what does A , 3 means ?

A is the hue and 3 is the saturation .  
  
 **\*to confirm our selection , there is an instrumental color analysis:**

1- A spectrophotometer: which is a device gives us the shade when we put it at the surface of the tooth .   
such devices have a lot of problems for example they may not be able to determine the shade of curved surfaces . so more than 99% of dentists make the shade selection visually also its expensive   
2- colorimeter

3- the digital photos: one of the least accurate method to be used

**Try in and evaluation (sheet #13)**

we have two stages in the try in phase: First the metal try in stage and then the porcelain try in stage which some people call the biscuit stage.

\*To begin with we **always start** with checking the metal or the porcelain on the cast before placing it in the patient’s mouth. Because if there was a problem on the cast most probably there will be a problem in the patient’s mouth.

And then you check inside the patient’s mouth.

* **Checking the cast:**

we need good light and good magnification

|  |  |  |
| --- | --- | --- |
| Remedy | Cause | Error |
| Return to the lab. | Finish line chipped (the cast is made of gypsum materials which have specific hardness and can be chipped upon removal and replacement of the metal leading to in accuracies) | Damaged dies (smashed, broken) |
| Return to the lab so the technician would apply it and recreate the prosthesis. | Technician not aware of technique or forgot to apply | No die spacer |
| Identify under magnification and remove with small round bur if it was small and away from the finish line. | Air bubbles trapped during investment.  (improper mixing, improper vibration) | Casting blebs (nodule) on fitting surface |

\*Die spacer: is like a varnish material placed on the surface of your die except on the finish line (1mm above the finish line) to give space for the cement

What do we check in metal try in?

1. Marginal integrity (no open margins, no positive ledge, no negative ledge.)… by probe
2. Stability (the metal does not rock) … place the restoration then we apply pressure on various areas and it should not rock or rotate.
3. Clearance for the porcelain (Substructure design): if the metal was already in contact with the opposing teeth there will be no space for the porcelain

\*\*metal touching the opposing teeth, what are the faults?

1. No enough occlusal reduction (dentist).
2. Very thick metal (technician); Thickness should only be 0.3-0.5 mm depending on your metal.
3. Metal is not fully seated. (This is the first thing we check.)

\*\* **We also check the connectors** (since no porcelain is covering them yet):

1. We check for bubbles, nodules.
2. Adequate thickness (not too thin).
3. Area for hygiene. (After we put porcelain).

* **Porcelain try in:**

start with clearing the remnants of the cement on the preparation from the provisional crown step to allow the crown to sit properly.

Sometimes the crown wouldn’t sit properly due to problems in the fitting surface. This shouldn’t happen if you did a metal try in before. But if you didn’t this could occur.

To know exactly where the interference area is we use pressure indicating paste (disclosing paste, spray). We apply it on the fitting surface and we place it then we inspect it, if there were touching areas this means it’s a pressure area that should be relieved.

\*What we check:

1. Proximal contacts: The first to be checked, because the first thing that could prevent the seating of your prosthesis is the contact.
2. Marginal integrity.
3. Occlusion.
4. Esthetics.
5. Pontic design and connectors.

→Proximal contact should look like normal teeth contact in tightness and location and it should allow an unwaxed dental floss to snap easily.

first check it with floss then we apply pressure indicating paste or use articulating paper …relieving should be gradual (small amounts)

>> check with floss, mark with articulating paper, grind and polish with a rubber wheel or mounted stone.

\*\* Why do tight contacts happen?

1. When we don’t use provisional crowns and tipping of the adjacent tooth occurs.
2. Imprecise die location.
3. Abrasion of the adjacent stone on the working cast.

\*\* Why do open contacts happen?

Imprecise die location (movement)

>>In the case of open contact we return the crown to the lab for addition.

If gold crown: gold solder is added.

If porcelain crown: porcelain is added then fired.

→Marginal integrity should have no gaps, and should follow the tooth contour with no ledges … checked by probe

* If from the restoration towards the tooth we found a step we call it a negative ledge.
* If from the tooth towards the restoration we found a step we call it a positive ledge. (In a restoration we call it overhang).

… in subgigival margins … check it by radiograph

Poor fit: when we have a gap larger than 50 micron.

\*\* 50 microns= the tip of a sharp probe.

If more than 50 microns we will have an open margin which will lead to microleakage, caries and so on…

|  |  |  |
| --- | --- | --- |
| remedy | Cause | Error |
| Remake the crown. | Poor impression, poor die trimming (ditching),  Difficulty in identifying finish line (unclear finish line; eg. Feather edge) | Under –extended crown margin  (negative ledge) |
| Trimming (if there was no open margin) | Poor  impression, poor die trimming, extra wax or porcelain | Over-extended crown margin  (Positive ledge) |

\*\*Main cause for both errors is poor impression.

→ **Esthetics**

Checked in the patient mouth

* Morphology and contour… modify it by diamond bur
* Shade … higher value shades can be turned into lower value shades while lower value shades can’t be turned into higher value shades.

\* Sometimes in all ceramic crowns we can manipulate the shade using the shade of the underlying cement. It doesn’t work with thick crowns, but it can be applied in veneers.

→ Occlusion:

we let the patient bite before placing the crown and we inspect the occlusion of the adjacent teeth and sometimes the contralateral side. Then we place the crown and let the patient bite again if the occlusion differs this means that our crown is high

If the porcelain was glazed the articulating paper won’t mark it because it’s too smooth. So it’s better to do this step with crown unglazed and then send it back for glazing.

\*\*High occlusion results in:

Pain, mobility, fracture of the crown.

* Identified using:

1. Articulating paper.
2. Shim stock.
3. If the patient bites and the adjacent teeth are not touching then crown is high.

Also the patient’s proprioception help us, he can guide us to where the problem is.

\*\* Under occluded crown causes many problems as well:

Overeruption, interference, the patient can’t eat on that side…

>> In anterior teeth we also start with ICP then lateral movements.

→ **Pontic design:**

Should be verified as the design we sent to the lab.

Saddle design is very difficult to clean.

We also have: modified ridge lap, bullet shape, conical shape and so on…

The patient should be able to pass super floss or an interdental brush.

\*\*Unglazed porcelain leads to increased wear to the opposing tooth and can be chipped and cracked.

\*\*If minimal modification of a bridge on a single cusp was made we can finish it using rubber wheels or other stuff and not glaze it again. Because too much glazing is not good also it can lead to unnatural appearance

**Cementation (sheet #14)**

>>Important points during cementation:

1-good isolation

2-know the type of cement you are using and how to mix it

3-remove excess cement

4-orla hygiene instructions: the crowns are treated like natural teeth , it should be flossed and brushed , but because bridges have pontic area and can't be cleaned easily we introduce patients to:

* 1. super floss (it can access the area under the bridge and under the pontic)
  2. interdental brush: clean the embrasures

>> Type of cements:

**1-**provisoinal cements (soft cements):

-zinc oxide eugenol or zinc oxide non eugenol

-weaker than permanent cement (in properties) , made this way to allow you to remove your provisional

**2-**permenent cements (hard cements)

We can classify them into different categories according to different criteria :

- conventional cements : example :zinc phosphate cement : gold standard of conventional cement , used for more than 100 years this means it’s a good cement .

>>**conventional cements** can be further classified into:

**1**-acid based: most cements we use are acid base reaction like zinc phosphate and zinc polycarboxylate

2-resin based: these cements contain resin so undergo polymerization (like composite) could be self-cure, light cure, self-etch, cold cure, etc..

-Mechanism of retention for conventional cements is mechanical cause these are non-adhesive cements (some conventional cements have adhesive properties like glass ionomer and zinc polycarboxylate, with the glass ionomer having stronger adhesive properties than z.polycarboxylate )

So mechanism of retention could be: non adhesive, micro mechanical bonding or molecular adhesion when we start listing the non-adhesive cements the 1st one to mention is **zinc phosphate.**

-micro mechanical bonding reminds us of composite so the resin cements are the cements that are retained this way.

-molecular adhesion (ionic interaction): like glass ionomer

-so conventional cements are non-adhesive cements, however the polycarboxylate cement and the GI cement have some adhesive properties.

To increase retention of a crown on a prepared tooth :

1-we can add grooves on the preparation itself

2- sand blasting of the crown which is the method that increases retentive value of the crown the most .

3-tin plating : since gold is an inert mineral plating will add a layer that can interact chemically with resin cements

4-silanization of crowns made of glass ceramics like EMPRESS or veneers by using saline coupling agents.

5-you should know the appropriate type of cement to use and the justification of using it

6-the powder :liquid ratio and type of mixing the cement are also important factors , mixing time, working time , and setting time of the cement are also important .

**Zinc phosphate cement**

-the gold standard of conventional cements

-have no adhesive properties

-has been used longer than any other cement

-the liquid part of the cement is phosphoric acid (very acidic , PH is 2 )

-the cement is acidic due to the presence of phosphoric acid but within 24 hours the cement PH goes back to neutral , so this cement have initial acidity that become almost neutral within 24 hours .

-some people don’t prefer using this cement on vital teeth because the initial acidity can cause irritation .

-some articles prefer using varnishes or bonding agents on the prepared vital teeth before applying this cement just to protect from the acidity.

-the film thickness of this cement is very thin (the lowest film thickness)

-high compressive strength, resistance to water dissolution

-disadvantage: low tensile strength so we might face a problem of debonding .

(\*\*\*the only cement that has high tensile strength is the resin cement)

-have no chemical binding properties so the retention of this cement is mainly dependent on geometry of the preparation.

-25% of the cement serves to retain the crown , the other functions of the cement is to fill the spaces between the crown and the preparation to prevent leakage.

-it doesn’t have any resistance to acid dissolution

-recommendations : can be used for crowns and posts (metal posts, cast or pre-fabricated posts )

-fiber posts can't be cemented except with resin cements

-how to mix the zinc phosphate cement ?

Mixing is very special in that is :

-mixed on a glass slab (cold slab)

the cements react by exothermic reaction so cold slab will delay the setting of the cement.

I want to delay the setting time in order to have time to work with the cement and to incorporate more powder in the mix , because the more powder you add the better properties you get and the less the acidity of the mix since the acidity is due to the liquid so I need to add more powder but if the setting was fast I will not have the chance to add more powder so I need to delay the setting .

-incremental mixing (the only cement) , you should be able to know by looking at pictures representing increments of powder being mixed that this is zinc phosphate cement.

**Zinc polycarboxylate cement :**

-has very weak properties

-some say it can be used as long term provisional cement

-still classified as conventional cements despite its weak properties

-its acidic but its PH can drop only to 4 not to 2 like the zinc phosphate cement so it doesn’t cause much pulp irritation , polyacrylic acid cements also don’t cause irritation because they are less acidic and they are large molecules and don’t enter the tubules .

-no cement stays acidic all undergo neutralization

-advantages:

1.reasonable working time

2.good compressive strength but not as good as zinc phosphate cement

3.some sort of adhesion to enamel and dentine thus reduces the micro leakage and increases the retention.

4.adequate resistance to water dissolution still less than zinc phosphate cements

Disadvantages :

1-low tensile strength

2-no resistance to acid dissolution

-recommendations : can be used to all types of preparations and some prefer to use it on vital teeth instead of zinc phosphate cement but there is no evidence that its better on vital teeth.

-\*\*some times when you have a provisional crown that will stay for a year you use the zinc polycarboxylate cement

-during mixing this cement its viscous at the beginning but once you put it in the crown and you press on its not viscous any more.

**Glass ionomer cement :**

-adheres to tooth structure by bonding to hydroxylapatite crystals (its mineral contents)

-liquid of GI is either polyacrylic acid or water

-disadvantages :

1-senstive to humidity (water) it can absorb or lose water and in both cases the physical properties of the cement is affected , GI have three setting levels and it is especially sensitive to water during the 1st stage (initial phase ) this is why we cover the GI restoration the 1st 7 minutes with Vaseline or bonding agent

2-low tensile strength

3-not resistance to acid dissolution

4-intial acidity, but undergoes neutralization faster

5-some times its associated with post-operative sensitivity because it absorbs water from dentinal tubules

-recommendations : can be used with all types of crowns and all posts except fiber posts , also recommended with high risk of caries (because of fluoride release )

**Resin modified Glass ionomer :**

-hyperid cement (combination of resin cements and GI cement so it have properties of both)

-can be used with all types of crowns

-available in different forms.

-advantages on GI:

1-higher tensile strength

2-less sensitive to moisture … so it's introduced to overcome the moisture sensitivity and low tensile strength of GI

-advantages :

1-good compressive and tensile strength

2-resisstance to water dissolution

3-flouride release

-because it contains resin that could absorb water some times its not used with all ceramic crowns , because they are not very strong crowns because absorption of water will cause expansion underneath a relatively weak crown.

-can be used with ceramo-metalic crowns , zircon crowns , but not with glass ceramic crowns

-even with GI water absorption and expansion might occur

-usually glass ceramic crowns are cemented using resin cements

**Resin based cements**   
-like composite, are composed of resin matrix and an inorganic filler, and the resin matrix could be one of a variety of monomers or molecules like bis-GMA , HEMA, methylyacrylate

-filer content is less than composite because I want to use it as a luting agent I don’t want it to be viscous and thick , and it's not a restoration subjected to occlusal forces , Its only needed in a film thickness to give adhesive properties and good physical properties so the filer content should be less to have less viscosity

-the resin modified GI is used in conjugation with dentine bonding agents ,some are self-cure resin cements ,light cure, dual cure resin cements and some are self-etch cements.

-you etch then bond your preparation when using theses cements (like composite)

-has a high tensile strength and very good properties in bonding to dentine.

\*\*\* 4 things in prosthodonticas can't be cemented with conventional cements & can only be cemented with resin cements:

1. maryland bridge or adhesive bridge or resin bonded bridge : a bridge with 2 wings and rests on adjacent teeth of the pontic placed palataly and the resin used with this bridge are resin cements
2. composite onlays and inlays \ceramic onlays & inlays : also cemented with resin cements
3. fiber posts
4. veneers

-resin cements can be used with metals and porcelain , how can they bond to porcelain ??

We etch and bond the tooth structure just like we do with composite and the crown itself should be etched using hydrofluoric acid (we don’t etch the ceramics with phosphoric etch) , etching of the ceramics will affect the silica part of the ceramics ( the ceramics contain fillers and glassy matrix which contain silica ) and the effect of etching the ceramic is the formation of micro pores , we will also use saline coupling agent to increase adhesion.

-advantages of resin cements:

1. Good compressive strength &high tensile strength
2. resistance to water ,&relatively resistance to acid
3. can enhance the strength of ceramic restoration: meaning that the crown when not cemented is not as strong as when you add the cement to it , same principle as the undermined enamel we leave it in the cavity when we are doing composite restoration because the composite will bind to the tooth structure and will enhance the restoration.

- disadvantages of the resin cements is that:

1. they have variable film thickness , & the excess material is difficult to take out when its set

..usually when we use conventional cements like polycarboxylate you remove the excess once its set and it comes out easily , but this is not the case with resin cements what we do with these cements is that we do light curing for few seconds then remove the excess then finish the curing.

1. must be bound to tooth structure

\*\*\*what are the indications of resin cements ?

poor retentive preparation , but sometimes with a poor preparation no cement can give good retention

\*\*\*\*important notes :

-any cement should be manipulated according to manufacture recommendation

-each cement has specific advantage and disadvantage

-none of the cements can overcome the poor preparation

-no cement is ideal cement

**\*\*\*\* How do we cement ??**

-never attend the clinic to cement the crown if your patient is having signs and symptoms

-remove excess cement , and remove remaining provisional cement because for example eugenol in the provisional cement will inhibit the resin cement

-cleaning the crown could be in ultrasonic path, acetone, alcohol then leave the crown to dry on the bench , do good isolation (cotton roll , saliva ejector)

-some times with vital teeth you can give local anesthesia because teeth are sensitive when you remove provisional

-mix according to manufacture recommendations

-apply the material inside the crown and put extra cement because having excess cement means good cementation

-press at the beginning with your hands (on the crown) doesn't ask the patient to bite on it

-remove excess cement if conventional is used once your cement is fully set; use floss to remove excess interproximally

-resin cements: remove excess before complete setting

-some times we use provisional cements on final crowns just in case you needed to make some adjustment on the crown

-post cementation is more difficult cause you need the cement to go in the canal so we use lentulo spiral we use it on the hand piece to deliver cement inside canal, or we can use special tips to inject the cement inside the canal (we can use resin or conventional cement )

-post space is very small so if you add too much cement it might get trapped inside canal and the post will not go inside the canal because it doesn’t fit any more

-some times posts have bends to have the excess cement out

-inlays and onlays : if the material you are cementing is ceramic them you have to etch it with hydrofluoric acid then apply saline coupling agent , if composite then you sand blast it and apply saline coupling agent on it but you don’t use hydrofluoric acid with composite , if its gold we can do tin plating to increase retention then we do sand plasting but we can't etch the gold and use acids on it

-hydrofluoric acid is not used with composite because I don’t want the silica in composite to be affected