**Restorations on posterior primary teeth**

-Correct diagnosis of caries in primary teeth is the 1st step toward a successful restoration.

-Diagnosis depends on having a good source of light, an explorer,a mirror and a **bitewing** which is especially important when talking about primary teeth

-if we detected caries clinically , or if there is an open margin then the radiograph of choice is periapical to make sure whether the pulp is involved or not.
-if we saw enamel caries on a radiograph then we can apply fluoride, teach the patient how to floss and give him OH instructions to arrest the caries within the enamel and follow up the patient. However, if your patient is one of those how never come back then you might end up with opening the cavity and restore that tooth, so your treatment will depend on the patient

- drying the teeth is also part of the process of correct diagnosis then notice the difference in terms of porosity and decalcification of enamel.

- if there is a broken marginal ridge, it is most likely that the pulp is involved, but still we should take a PA radiograph so we can see the extent of the carious lesion and the roots if they are resorbed or not.
- in the setting where you are preparing a class II cavity, get into the habit of looking at the adjacent surface, as it resides in the same environment and it could get demineralised

- While in the dental clinic, remember not to stick the explorer in an open carious lesion, this behaviour would elicit pain and a negative attitude towards dental treatment. The explorer is of limited use in diagnosing caries, as good light drying the teeth and a bitewing should be enough. An explorer should be used to remove plaque on teeth and in deep fissures.

4 factors determine the success of a particular restoration:

1. knowledge of the limitation of the primary dentition in terms of morphology, dental anatomy and patient's behaviour.
2. properties of the restorative material.
3. the dentist's ability and skills to handle a particular restorative material.
4. durability of the material and the expected life span of the tooth.

Types of restorative materials :
1. amalgam.
2. composite resins.
3. compomer, polyacid modified composite resins.
4. conventional GI.

5. RMGI.
6. s/s crowns.

**1- Amalgam:**

\* Amalgam use has been decreased over the years due to it's toxicity.
when talking about amalgam considerations to the marginal integrity, cavity design, and technique sensitivity should be taken into account.

\*Amalgam toxicity on the dentist and the patient is most when amalgam is being removed from a cavity. This should be done with water and under high suction to prevent mercury vapour inhalation.

\*studies have shown that this release of mercury during these procedures is actually lower than the threshold that is considered to be safe. Hence amalgam in this setting when handled correctly is still considered a safe material to use.

\*Marginal integrity in amalgam is improved with time, due to corrosion products, actually **amalgam is the only restorative material that increases marginal integrity with time**, and low copper seals faster than high copper amalgam.

\*there is what is known conventional amalgam this is low copper amalgam and it contains the gamma II phase. And the high copper amalgam which contains the beta phase. The beta phase requires more time " 2 years" to provide the same marginal integrity of the gamma II phase but still there is improvement of the marginal integrity whether conventional or high copper amalgam was used.
\*Amalgam is not suitable for small shallow carious lesions, because we have to remove sound tooth structure to achieve the needed cavity form.
a class II cavity is especially difficult to achieve, because the box design is challenging and the isthmus area is very important. A wide box with a narrow isthmus area leads to fracture at the isthmus. And a wide isthmus area will weaken the tooth and the cusps.

\* age of the patient: this translates to the cooperation of the patient. They found that when an amalgam restoration is placed in a patient who is 3 years old or younger the restoration tend to remain for an average of a year **which isn't very successful in light of the life span of the tooth.**

**\*** the type of the tooth also affects the success of the restoration and it was found that class I and II restorations in the D's had shorter survival times than when placed in the E's , most common causes of amalgam failure is when placed in the D's and due to operator errors

Recommendations
amalgam is still safe and effective.

It's indicated in class I on primary and permanent posterior teeth, if sufficient bulk and proper cavity design are obtained.

Class II on primary and on permanent posterior teeth that does't extend beyond the line angle.

Class V on primary and permanent molars.

\*\*in class II the proximal line angles do not extend proximally in primary teeth.

**2- composite:**

The main advantage of composite is aesthetics.

Indications :
1- PRR.
2- occlusal restorations that are also extending into dentin.
3- class II cavities, with the proximal line angles not extending too far proximally because it will fracture but as for permanent teeth, 1/3-1/2 the intercuspal width.

Contraindications:

1. if tooth isolation cannot be achieved.
2. Large multi surface restorations bcuz there won’t be too much enamel to bind with composite.
3. Patients with high caries risk and poor oral hygiene and demeneralized tooth.
so in a patient with high caries risk GI is actually more suitable than composite because of fluoride release.

**3- GI:**there is a conventional and modified GI.it can be used as a transitional sealant that is when the resin fissure sealant is contraindicated in cases when :

1. the patient is uncooperative.

2. the tooth is partially erupted.

Note: if neither one of the two sealants cannot be used a varnish can be applied.

\*It also can be used as a cement for luting s/s crowns and bands for space maintainers, where it could be the ideal cement because of fluoride release.

Can be used as a cavity liner, a cavity base. And a restoration.

There are 3 modalities of GI:

1. Conventional OR traditional GI which is present in our clinics " gettac filled and gettac silver"
2. RMGI higher strength than conventional.
3. high viscosity GI with finer grains, which has improved strength and abrasion resistance and can also be condensable like amalgam, all of this is also combined with fluoride release as in CGI.
- uses of GI :

\***ITR** (interim therapeutic restoration) not used as a final restoration it’s a temporary procedure to control caries for pt who visit the clinic for the first time using excavator to remove caries then put GI , it’s benefit :it’s an introduction to dental trt ,decrease the load of bacteria in pt mouth, decrease pain and sensitivity from eating,drinking …etc after that u bring the pt and continue the trt.

\***ART**(atraumatic restorations) which is done in rear areas where there is no access to a dental clinic. Hand instruments are used with GI that is mixable, this has started in Thailand and then it became a treatment for children that do not have access to the dental clinics.

\*GI can be used in class I in primary teeth only, and it has less shrinkage than composite and it has better integrity due to bonding to both enamel and dentine(the only truly adhesive dental material) and we don’t need resistance or retention form like amalgam so it conserve tooth structure and it has a good seal don’t need sealer underneath it like some other materials
\*in class II especially in the D's, RMGI is ideal because it has greater strength than CGI which in studies have been shown to be ideal in small to medium sized cavities.we use closed or opened sandwitch technique.
\*in terms of research, CGI has shorter longevity than RMGI and composite resins in primary molars. So RMGI is preferred to CGI in terms of durability and strength.

**4- s/s crowns**:
\* prefabricated crowns that are adapted to the tooth ,depend on the tooth anatomy not the prep. Or the luting cement
\*a simple preparation is done after selection of the crown. By opening the contact from mesial and distal side and some of occlusual reduction
\*it is ideal because it provides full coverage and it is extremely durable, and prevents any caries initiation on the tooth surface.
\*for patients who are less than 12 years of age, the success rate of s/s crown is twice as long as amalgam.
\*so if the tooth is going to be in the mouth for more than 3 years a s/s crown is ideal but teeth that are expected to exfoliate in less than 2 years amalgam/RMGI are preferred.
disadvantages:
it is expensive, 1 crown = 3jd's
cooperation is extremely important, because the crown is going to be fitted/seated and removed over and over.
Indications:
1. high caries risk bcuz of its good sealing (cover the whole tooth)
2. multisurface cavities with extensive caries where other restorations wiil not last
3. pulpotomized teeth.
4. GA patients( avoid second visits )
**The best restoration for pulpotomized teeth is s/s crowns**.
\*s/s crowns are indicated for 6's, E's and D's.

\*whole crown technique is a modification by placing ss crown on teeth (doing nothing (like removing caries or prep.) just select the right size –cementing-let the child bite down and if its high 1 mm it wiil fit properly later (1 week) there is no need for any modification .the idea here is sealing so if the child come very young(cant give anesthesia, not cooperative.. ) ,no spontaneous pain,good health, no pulpotomy it’s a good option showing high success rate but we need to make sure that there is a health layer of dentine between the enamel caries and underlying surface ,no interradicular radiolucency…etc by good diagnosis ….its a biological way of trt .

**summary**:
1. small occlusal carious lesion: composite, compomer.
2. 2 surface/class II: amalgam if not extending beyond the proximal line angles, except the D's esp in children who are young RMGI or crowns are suitable.
3. extensive caries more than 2 surfaces: s/s crowns.
4. do careful examination, if the diagnosis was incorrect then this is a failure from the beginning.
5. New restorative materials are being developed, but again s/s crowns showed the best results.