**fissure sealant**: It is a material placed in the pits and fissures of the tooth in order to **prevent** or **arrest** the development of caries.

🡪 **So the idea if fissure sealant:** is to change the anatomy to prevent the accumulation of the bacteria and MO that cause caries.

**Types of sealants**:

1. Resin based sealant "conventional sealant”.
2. Glass Ionomer sealant (More recent).

**Resin Based sealant:**

-They are composed of Bis-GMA " bis phenol A" and Bis -Methacrylate.

Resin composed of cross-linked MMA, more or less it is an **unfilled composite**.

-Mainly; it prevents the caries by the **mechanical means,** while other types "GI" do that by other means "**chemical ones".**

The polymerization could be initiated either: **chemically "Auto cure" or by light "Light cure".**

This sealant could be either:
1) **Clear**:

 This type has multiple advantages; **you can see the recurrent caries** and **can spread it more easily** due to its **decreased viscosity** when compared to other types".

2) **Opaque**: "the one used in our clinics"

 It has some advantages; mainly you **can see it** so you can know if you sealed the whole fissure or not, while it’s main disadvantage is the i**nability to see the recurrent caries**.

-**Properties of Resin-Based sealants:**

Physical ones:
1/ Inert, nontoxic.
2/ Low viscosity.
3/adequate Strength.

Clinical ones:
1/ Long shelf life.
2/ easy to handle and apply.
3/ long working time.
4/ Short setting time.

**GI sealant:**

-It is recommended for erupting high-decay-risk teeth, those teeth are hard to be isolated so the use of the GI is easier.

E.g.: distal aspect of 6 covered partially with operculum.

-GI since it’s easier to be applied; it is indicated also for **high-decay-risk fully erupted teeth , when the cooperation of the child is compromised.**

**-Advantages:**

1) Binds to enamel without acid etching, so it is less moisture sensitive, but you have to know that isolation is a must, do not apply it in a moist area.

2) Provides acceptable caries prevention; the ability of fluoride releasing has a major role in this process by remineralizing the tooth structure.

3) This sealant is rechargeable, which means that when the child brushes his teeth using a fluoridated toothpaste the sealant will absorb the fluoride and release later on.

-**Disadvantages:**

Less retention than resin based sealant; and this due to the fact that GI binds chemically to enamel, while the resin based one binds through micro-mechanical means.

**Note:**

 It is important to seal due to the fact that the pits and fissures form **12.5%** of the total tooth surface area, and as you know **80-90%** of caries occur there.

In permanent teeth; pits and fissures account for **80-90%** of the caries while in the primary ones they account for only **44%** of caries and the rest **56%** occur in the interproximal surfaces; due to the facts that they are wide and broad and the pits and fissures are shallow in the primary teeth.

-You have to know that sealants should be part of the whole preventive measures including:
1) Patient education 2) Effective Oral hygiene practices. 3) Regular load of fluoride.
4) Regular dental visits.

**Risk factors**: the key factor of determining the caries risk of the pt.

1. The caries experience of the pt :
if the pt already have caries in his mouth, we consider this pt to be a high risk patient
2. Fluoride:
* Dose the pt live in fluoridated area
* Does the pt. use fluoridated tooth paste, so when the pt. is not exposed to supplement amount of tooth paste, so I have to consider this pt high risk for developing decay.
1. Fissure anatomy: if the fissure is too deep then this pt is at high risk
2. Oral hygiene: if the patient has plaque index of 2 or 3 then this patient is at high risk of developing caries.
* **Patient selection: which patient we have to apply fissure sealant:**
1. Patient with dental decay; either history of dental decay- for example the pt has multiple fillings - or active decay.
2. Patient that don’t have dental decay; but they are at high risk of developing decay.

Ex: such as patient has all factors that might develop caries; their habit, high sugar intake, signs of erosion due to high intake of lemon juice, so he is at high risk of developing caries.

1. Medically compromised patents; such as patient with special needs, cardiac problem or diabetic patient.

Caries risk may change at any time of life of the patient, in the past, they used to say that sealant should be placed only within 3 years of eruption; due to the e fact that in 1st 3 years of eruption the tooth is at high risk because enamel is not mature enough. But this doesn’t mean that sealant mustn’t be applied later in patient life.

**Do you have to seal primary teeth?**

* Many primary teeth may be judged at risk.
* In the past they said that primary tooth enamel **doesn't etched well**; so it doesn't bond properly so we shouldn't use it on primary teeth.
* After a time, clinical studies reporting that success of fissure sealant on primary molars **are rare**.
* But in these case we have to look to the study itself, does the clinician who applies a sealant are skilled enough to deal with children? **Also the cooperation and isolation is critical as well**. Because the failure of fissure sealant might not due to the fact that the primary molars don’t etched well, it may be due to poor isolation or the patient cooperation is no ideal.
* So this idea is wrong because in vitro experiments approved that enamel is etched well and the failure of fissure sealant due other cause not that one.

**So we have to seal the primary teeth in the patients who have a high risk of developing caries.**

-To decide whether to seal the primary tooth or not, there’s many factors that you have to consider:

1. Age of the patient, in 9 years old patient the surface of the E will be eroded so why to put a seal
2. Caries risk
3. Fissure anatomy

**How can we improved fissure sealant? Or what are the factors that generate the success of fissure sealant?**

1. Proper isolation, using either rubber dam or cotton rolls , or 4 handed dentistry
2. Tooth cleaning ; because cleaning removes all plaque remnant from fissures
3. enameloplasty using very small fissure bur to prepare all fissures then apply fissure sealant. later they decided that this doesn't increase the retention , but it’s increase the determinantal effect cuz if the fissure sealant goes away ; we will have cavitated tooth structure that we will the risk of developing decay ; so this is No more recommended .

**Are fissure sealant effective or not?**

-Sealant placed on occlusal surface of permanent teeth in adolescence reduce caries up to **48 months** when compared to none sealed teeth .

So they are definitely effective of reduce caries risk.

**Note**:

**Any caries extended to the dentine should not be sealed, but enamel caries might be sealed and its better even to seal enamel caries.** That’s due to the fact that enamel is not a vital tissue and bacteria can’t gain nutrient from it and if you seal it tightly then you will get rid of these bacteria But if you sealed the dentinal caries, although I block the outward comes of nutrient, the pulp and dentine contain nutrients and the bacteria can survive and extend so the decay will grow under the sealant.

So any fissure sealant just to be limited to enamel if it was therapeutic.