

# CROWN AND BRIDGE

Lecture: 9

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## *Try-in & Cementation*

The crown should be checked for fitness and adjustment for the occlusal surface with the opposing teeth and also the contact area should be checked and adjusted.

► Remove the provisional restoration and clean the tooth. Then insert the bridge frame and check the followings:

1. **The proximal contact area:** - The proper contact should have a slight resistance to the passage of dental floss. We should have neither too tight (heavy) contact nor too light (loose) contact.

**Too heavy contact results in: -**

- ✓ Interfere with correct seating of the restoration.
- ✓ Produce discomfort, and make it difficult for the patient to floss.
- ✓ Too much force will be exerted on the adjacent tooth.

**Too light contact results in: -**

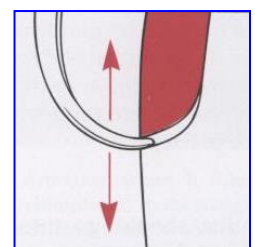
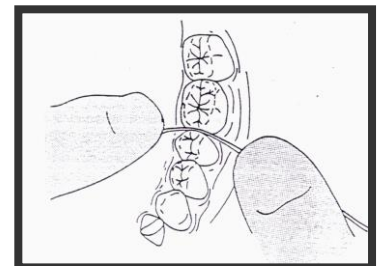
- ✓ Food impaction, which is deleterious to the gingival and annoying to the patient.
- ✓ Drifting of the adjacent teeth, which affect the occlusion of the patient.

2. **The margins of the retainer (s).**

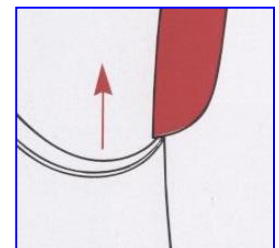
The margin is the most critical area of the restoration; we should have complete fitness between the restoration margin and finishing line of the preparation.

**The defective margin of the restoration might be:**

- Short margin (under extension), margin is short of finish line. In this case we should check: -



- ✓ If there too tight proximal contact that prevent complete seating.
- ✓ The internal surface of the retainer if it locked into parallel or slight undercut in the tooth surface that prevent complete seating, may be checked by indicator spray that applied to (coat) the internal surface of the retainer, then seat the retainer, remove the retainer and see if there is premature contact spot which is devoid the spray material.
- Long margin (over extending margin), margin beyond finish line. We should cut the excess.
- Open margin: the margin within the finish line but there is space between the restoration margin and prepared tooth. If we can burnish it. Otherwise repeat the impression.



Burnishing depends on the type of metal and the type of finish line.

The burnishable metal usually is gold. The knife edge (feather) and shoulder with bevel finish line could be burnished.

The objective of the margin finishing (burnishing) is to obtain at least one mm wide margin of metal that is closely adapted to the tooth surface at the area of finish line so that any dissolution of luting (cementing agent) is minimized.

**Two types of margin need to be considered during finishing procedure:**

- 1- Subgingival margin that can be burnished on the die using a burnisher,  
No intra oral finishing is desirable for the subgingival margin because the risk of damaging to the tooth and periodontal structure.
- 2- Supra gingival margin that can be finished directly on the tooth inside the patient mouth. Margin finishing or adaptation can be improved by using burnisher or round bur.

### 3. Occlusal Adjustment

It is done by using articulating paper in centric and eccentric relation. Remove the premature contact with stone bur and always check the metal thickness with metal gauge to avoid over thinning of the metal that could affect structural durability. The

occlusal relationship of the adjacent teeth with the opposing is used as a guide for any prematurity.

#### 4. **Shade Selection.** It depends on the followings:

A. Observer (dentist). B. Object (patient). C. Light source.

Each of these three factors is a variable and, when any one is altered, the perception of color changes.

Some guidelines for shade selection: -

Use the shade guide that matches the porcelain your technician is using.

The shade should always be matched prior to preparation of the tooth to be restored.

Ask the patient to remove all distractions before attempting to match a shade. Lipstick in particular should be removed and large bright items, such as earrings or glasses.

Be sure that the teeth are clean and unstained before shade selection.

Seat the patient in an upright position with the mouth at the operator's eye level.

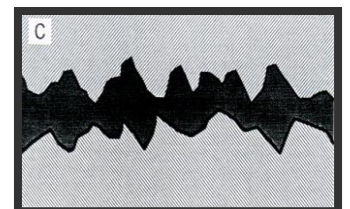
Position yourself between the patient and the light source. Observations should be made quickly (5 seconds or less) to avoid fatiguing the retina.

Try to take the shade under natural day light, avoid incandescent and fluorescent lights.

## Cementation

Dental cement doesn't contribute to the retention of the restoration. It is used only to fill the micro-spaces or small irregularities between the tooth structure and the restoration when it sets. It provides a mechanical bond (interlocking) that prevents the restoration from removal.

The mechanisms that hold a restoration on a prepared tooth can be divided into: -



#### ❖ **Non-adhesive (mechanical) luting.**

The non-adhesive luting agent holds the restoration in place by engaging small irregularities on the surfaces of both tooth and restoration. Zinc phosphate cement is an example.

The nearly parallel opposing walls of a correctly prepared tooth make it impossible to remove the restoration without crushing minute projections of cement extending into recesses in the surface

❖ **Micromechanical bonding.**

The deep micro-spaces or irregularities on the tooth surface produced by acid etching and on the metals by electrolyte etching or chemical etching. Resin cement is an example. It can provide effective micromechanical bonding. The tensile strength of such bonds can sometimes exceed the cohesive strength of enamel.

❖ **Molecular adhesion.**

Involves physical forces like van der waals and chemical bonds (ionic, covalent) between the molecules of tow different substances. Poly-carboxylates and Glass ionomers are examples.

**Function of Cement:**

- 1- To secure a lasting retention of the restoration to the prepared tooth.
- 2- To seal the gap against penetration of fluid and bacteria from oral cavity.
- 3- To act as an insulating barrier against the thermal and galvanic activity.

**Properties of Ideal Luting Agent:**

1. Should have good working and setting property.
2. Adequate strength.
3. Compressible into a thin layer.
4. Should provide good sealing. And must be non-toxic to the pulp.
5. Should adhere well to the inner surface of the restoration.
6. Low viscosity and solubility.

In fact, we have different types of cement that are used as luting agents:

**Zinc Phosphate Cement**

It is the traditional luting agent that have proven itself after years of work, it has compressive strength of 14000-16000 PSI, with low PH at the time of cementing (about 3.5) which might irritate the pulp.

### **Zinc Silico-phosphate Cement**

Has compressive strength of 22000 PSI but it has highly acidic PH and affect the health of the pulp (irritant).

### **Poly-Carboxylate Cement**

Adhere to enamel, dentine and stainless steel but not to gold alloy.

The setting PH is (4.8) but because of the large size of poly-acrylic acid molecule, it has less effect on the pulp, high bond strength to enamel (1300 PSI) but its binding to dentine is considerably less 480 PSI.

### **Glass Ionomer Cement**

Has compressive strength of 18600 PSI and it bonds to enamel and dentine (to enamel more), it releases fluoride after setting which is indication of an ability to inhibit secondary caries.

### **Composite Resin Cements**

Resin cements are composites composed of a resin matrix, and a filler of fine inorganic particles. They differ from restorative composites primarily in their lower filler content and lower viscosity. Resin cements are virtually insoluble and are much stronger than conventional cements.

Excessive film thickness and setting shrinkage are the short comes of resin cements.

**Plain Zn-oxide** is not used for permanent cementation because:

- 1- It has poor oral durability due to continuous eugenol loss.
- 2- Also it possesses low compressive strength, so we use it for temporary cementation.

The selection of cement for placement of cast restoration is not clear cut discussion.

## **Cementation Procedure for Zinc phosphate cement:**

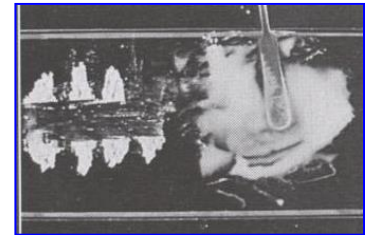
We prepare the tooth inside patient mouth, before start mixing the cement:

1. Remove the temporary crown, cleaning of restoration from any residues of cement, etc:

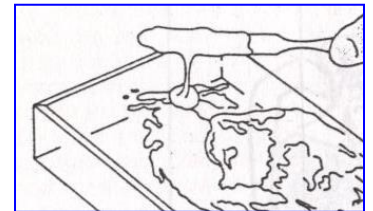
Then dry the area of the prep. And with cotton roll isolate the area of work from any salivary contamination to assure complete dryness during cementation procedure.

2. We apply two layers of varnish on the preparation except the margin.
3. Then start mixing cement.

ZnPC is mixed on a cool cement slab, the cement is divided into increments and it should be done over a wide area of the cement slab, mixing is done with a circular motion to dissipate heat, when the cement reach a creamy mix it should string out of the cement spatula, at this stage the cement is ready for working with.



4. Apply a coating of the cement to the inside of clean dry casting restoration, if there is any internal prep. Features such as grooves or boxes apply some cement on these areas of prep.



5. Seat the casting crown on the tooth with pressure and ask the patient to apply force to the occlusal surface of the casting by biting on wooden stick or cotton roll for 3-4 minutes to ensure complete seating.
6. After setting remove any excess cement from the inter-proximal area, and clean it with air water spray.

Note: don't try to cement poorly fit causing crown restoration because the cement will dissolve in oral fluid so caries will develop under the restoration and it will be lost in future.