CROWN AND BRIDGE

Lect:13 **د. محمد قاسم**

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: -

a- Interfere with correct seating of the restoration.

b- Produce discomfort and make it difficult for the patient to floss.

C- Too much force will be exerted on the adjacent tooth.

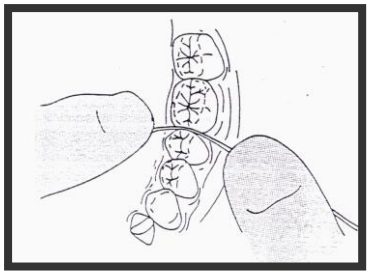
Too light contact results in: -

a- Food impaction, which is deleterious to the gingival and annoying to the patient.

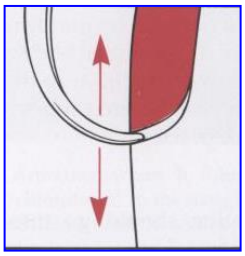
b- Drifting of the adjacent teeth, which affect the occlusion of the patient.

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:

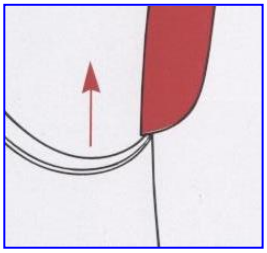


1- Short margin (under extension), margin is short of finish line. In this case we should check: -

a- If there is too tight proximal contact that prevent complete seating.

b-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.

2- Long margin (over extending margin), margin beyond finish line. We should cut the excess.



3- 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

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. Using the occlusal relation of the adjacent teeth with the opposing as a guide for any prematurity.

Shade Selection. It depends on the followings:

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. 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 prevent the restoration from removal.

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

1- 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

2- Micromechanical bonding.

The deep micro-spaces or irregularities on the tooth surface produced by acid etching, and on the metals by electrolyting 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.

3- Molecular adhesion.

Involves physical forces like Van der Waals and chemical bonds (ionic, covalent) between the molecules of two different substances. Polycarboxylates 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. Despite its limited biocompatibility in terms of pulp irritation, zinc phosphate has a long history, and its limitations are well documented.

This factor is important for cast restorations, which should be designed for long-term service. Zinc phosphate cement is probably still the luting agent of choice for otherwise normal, conservatively prepared teeth. Cavity varnish can be used to protect against pulp irritation from phosphoric acid and appears to have little effect on the amount of retention of the cemented restorations.

Zinc Polycarboxylate Cement. This agent is recommended on retentive preparations when minimal pulp irritation is important (e.g., in children with large pulp chambers).

Glass Ionomer Cement. This has become a popular cement for luting cast restorations. It has good working properties, and because of its fluoride content, it may prevent recurrent caries.

Resin-modified Glass Ionomer Luting Agents. Currently among the most popular luting agents, resin-modified glass ionomer luting agents have low solubility, and low microleakage. The popularity of these materials is mainly due to the perceived benefit of reduced post cementation sensitivity.

Adhesive Resin. Long-term evaluations of these materials are not yet available, so they cannot be recommended for routine use. Laboratory testing yields high retention strength values, but there is concern that stresses caused by polymerization shrinkage, magnified in thin film led to marginal leakage. Adhesive resin may be indicated when a casting has become displaced through lack of retention.

Resin Luting Agents.

Resin luting agents are available in a wide range of formulations. These can be categorized on the basis of polymerization method (chemical-cure, light-cure, or dual-cure) and the presence of dentin bonding mechanisms. Metal restorations require a chemically cured system, whereas a light- or dual-cure is appropriate with ceramics. Resins formulated for cementing conventional castings must have lower film thickness than materials designed for ceramics or orthodontic brackets. However, this

may be achieved at the expense of filler particle content and will adversely affect other properties such as polymerization shrinkage. Manipulative techniques vary widely, depending on the brand of resin cement.

Plain ZnOE is not used for permanent cementation because:

1- It has poor oral durability due to continuous eugenol loss.

2- it possesses low compressive strength, so we use it for temporary cementation.

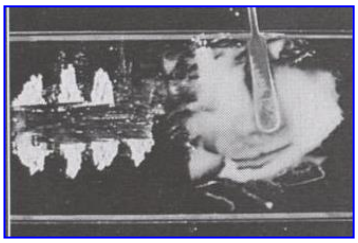
Cementation Procedure For ZPC:

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

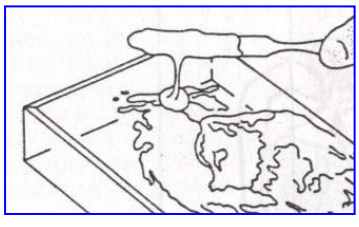
2. We apply two layers of varnish on the preparation except the margin.



3. Then start mixing cement.

   ZPC 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 are any internal preparation features such as grooves or boxes, apply some cement on these areas of preparation.



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 casting crown restoration because the cement will dissolve in oral fluid so caries will develop under the restoration and it will be lost in future.

Cementation Procedures for Ceramic Veneers and Inlays

These restorations rely on resin bonding for retention and strength. The cementation steps are critical to the restoration's success; careless handling of the resin luting agent may be a key factor in their prognosis. Bonding is achieved by performing the following steps:

1. Etching the fitting surface of the ceramic with hydrofluoric acid
2. Applying a silane coupling agent to the ceramic
3. Etching the enamel with phosphoric acid
4. Applying a resin bonding agent to etched enamel and silane
5. Seating the restoration with a composite resin luting agent

SELECTION OF RESIN LUTING AGENT

Composite resin luting agents are available in a range of formulations. For veneers, a light-cured material can be used. For inlays, a chemical- or dual-cure material is preferred to ensure maximum polymerization of the resin in the less accessible proximal areas. Dual-cured resin provides better marginal adaptation at the critical gingival margin area. The shade of veneers can be modified by the shade of the luting agent. To facilitate shade selection, color-matched try-in pastes are available from some manufacturers.