Principles of tooth preparation

4- Preservation of periodontal tissue:-
   A)Whenever possible the margin of the preparation (finishing line) should be placed supragingivally.

   Margin placement:
   Finishing line can be placed either:
   1. Supragingival:
      Placing the margin above the gingival tissue for the following reasons:
      a- can easily prepared and finished.
      b- To provide good vision for the dentist during preparation.
      c- impression can be easily made.
      d- the patient can keep the area clean easily.
      e-most of the time such position is situated on hard enamel.
      f-Less destructive.
   2. Subgingival:
      Placing the margin below the gingival tissue for the following reasons:
      a- When the esthetic is a factor.
      b- When we need extra retention.
      c- When we have carries or filling at the area of finish line.
      These factors influence the supragingival position
   3. Placing the margin with in the level of the gingiva.

B) The casting should have proper contact, Embrasure form, Occlusion and a healthy occluso-gingival contour.

5- Marginal Integrity:-
   The restoration can survive in the biological environment of the oral cavity only if the margins are closely adapted to the CSL of the prep. The configuration of the F.L. determine the shape and the bulk of the rest. Margin that affect both marginal adaptation and the degree of seating of the rest. The restoration margins should have the following requirements:
   a- They must fit as closely as possible against the finishing line of preparation.
   b- They must have sufficient strength.
   c- Whenever possible they should be placed in an area where the dentist can finish and clean them properly.
**Finishing line of the preparation (f.l.):**

It’s the final margin that separates between the prepared and the unprepared tooth structure. The f.l. Should be smoothly continuous from one surface to the other, because it will interfere with seating of the crown if it’s poorly done. The margin between prepared and unprepared tooth structure is very critical area, as most failure might starts from this margin.

**Types of finishing line (f.l.):**

There are four types of margins that could be used: depending on the type of the crown:

1. **Featheredge (or knife-edge) margin.**
2. **Chamfer f.l.**
3. **Shoulder f.l.**
   i. Butt shoulder.
   ii. Shoulder with Bevel (modification of shoulder f.l.)
   iii. Radial shoulder.

**[1] Featheredge or knife edge f.l. :**

We use pointed end tapered fissure bur to provide this type of margin.

It’s the most conservative type of f.l. i.e. the least amount of tooth structure is removed. But the margin is weak. It form >135° cavo surface line angle(C.S.L)

**Advantages:**

1. It’s the most conservative type of f.l.
2. It’s easy to prepared.
3. It is burnishable type of f.l.

**Burnishing:**

*it is further adaptation of the margin of metal (crown) to the tooth structure.*

**Disadvantages:**

1. Difficult to identified.
2. Thin margin.that difficult to accurately Wax and cast.
3. More susceptible. to distortion.

It’s mainly used for:
1- Full Metal Crown (All the surface).
2- Lingual and proximal surfaces of full veneer crown, three quarter crown and post crown.

2] Chamfer f.l.:

It is well defined f.l. somewhat like K.F.L. except the cut is made deep, it form 130—160 CSA.(round end diamond), provide adequate space at the cervical region so we can make the contour of the crown restoration within the contour of natural tooth. (t.f.d.b. with round end). It is thick, the gold margin is unburnishable.

Properties:
1. Well define F.L.
2. Provide more room for a bulk of metal.
3. It is slightly more difficult to burnish.
4. It indicated for area to be cover by gold (metal) margin.

It is mainly used for:
1- Full Metal Crown (All the surfaces).
2- Lingual and proximal surfaces of full veneer crown, three quarter crown and post crown.

Round end tapered fissure bur is used to obtain this margin.
Heavy Chamfer;
It provide 90 C.S.L with a large radius internal angle, it provide better support for ceramic crown. It can be used with PFM crown and All Ceramic crown.

(A) Butt shoulder:
It’s the least conservative type of f.l. because we need to removed excessive amount of tooth structure to obtain it. Axial walls meet the F.L. at right angle 90. Flat end T.F.B.is used to obtain this F.L. It is used when bulk is required for strength or esthetic. that is why it almost used with jacket crown (all around) since jacket crown is made either of porcelain or acrylic resin (brittle materials) that require enough thickness which is necessary to withstand the force of occlusion without fracture, also this thickness provides better shade of the material and so better esthetics to provider f.l.

Advantages:
1. Britle material need sufficient thick section to withstand occlusal force.
2. This thickness is necessary to provide more translucent porcelain to simulate the appearance of natural tooth.
3. Wide ledge provide resistance to occlusal forces &minimize stress that -----to fracture
4. It provide the space for healthy rest. Contour & esthetic

Radial Shoulder:
Modification of S.F.L. ,it is S.F.L. with rounded internal line angles ,this will reduce the shoulder slightly & minmize stress concentration on tooth structure.
(B) Shoulder with bevel F.L.:

It is modification of S.F.L. by adding bevel to the shoulder to produce a f. l. like knife edge, the bevel is 45 deg. Angle.

Objectives:

1. The bevel provides a burnishable margin for the metal that may extend subgingivally. (The thinner it is the more adaptable to the tooth surface)
2. provide enough space for shape and contour
3. To reduce marginal discrepancies.
4. Removing unsupported tooth structure (enamel).
5. It indicated when we use a combination of metal with facing material (acrylic or porcelain) such as full veneer crown. Shoulder with Bevel is used on the labial surface of full veneer crown and is recommended for extremely short walls.

Factors affecting selection of F.L.
1. Type of the restoration
2. Materials used in construction
3. The amount of occlusal force (stress) the restoration will bear