Principles of Cavity Preparation

Objectives of Cavity preparation :-
1- Remove all defects and provide necessary protection to the pulp
2- Extend the restoration as conservatively as possible
3- Form the tooth preparation so that under the force of mastication the tooth or the restoration or both will not fracture and the restoration will not be displaced, and
4- Allow for the esthetic and functional placement of a restorative material.

Principles of Cavity Preparation (conventional cavity preparation)
1- Establishing out line from
2- Obtaining retention from
3- Obtaining resistance from
4- Obtaining convenience from
5- Removing the remaining caries lesion
6- Finishing enamel walls
7- Performing toilet of the cavity

1- Establishing out line form.
out line form: is the shape of a cavity which is dictated by the anatomical form of the tooth and based on the blacks principles of extension for prevention, where
a- all margins should be placed on sound and strong tooth structure.
b- all margins must be include full extent of caries or decalcified enamel and all continues non-coalesced pits and fissure must be eliminated.
c- all margins must be placed in area of less caries susceptibility and easily cleansed. areas to prevent recurrent of caries.
d- the out line form may have been affected by resistance and retention form.

Fig-1-outline form A-CI, B-CII
2- **Retention from**
That shape of a cavity which is prevents the displacement of the restoration. Basically this obtained by:

a- the walls of cavity should be parallel or converge occlusally (5°).
b- the floor of the cavity should be flat.
c- the smaller out line form the less displacing force on it.

There are several other methods of obtaining retention for restoration such as: dovetails, pits, grooves and pin.

![Image](image.png)

**FIG - 2** - Retention form - Flat floor (A) will help prevent restoration movement, whereas rounded pulpal floor (B) may allow a rocking action of restoration and also producing a wedging force, which may result in shearing of tooth structure; affecting resistant of tooth to fracture.

3- **Resistance from**
A form of cavity that prevents fracture of both tooth and restoration.

I- **Prevention of tooth fracture** :-

a- width of the cavity not more than 1/4 of the inter cuspal distance (prevent cusp fracture).
b- removal of unsupported enamel, a weak portion of the tooth should be removed and replaced by a restorative material.
c- flat pulpal floor.
d- rounded internal line angles.
e- M and D cavity walls must be parallel or diverge occlusally.
f- beveling of gingival cavo surface line angle in class II.(CII)

II - **Prevention of restoration fracture** :-

a- reduce the surface area of the restoration. the width of the cavity done about 1/4 intercuspal distance. the amalgam is brittle and if there is more surface area there will be more force and this will lead to fracture of the amalgam.
b- flat pulpal floor.
c- beveling of the axiopulpal line ingle in cII. so the stress will be diffuse.
d- isthmus us area is 1/4 inter cuspal distance in cII.
e- the restoration must be of adequate thickness, this by Increasing the depth of
the cavity so increasing the amalgam thickness because it is brittle material
(amalgam thickness should be at least 1.5mm and preferably 2mm) .
f- the restoration must be of a marginal design that will allow it to bear the force
of mastication without fracture or deformation of the restoration so the
Cavosurface line angle should be as near to right angle 90-110° . (Fig3-A)
- if the angle less than 90-110° it make unsupported enamel . (Fig3-B)
- if the angle greater than 110° it makes thin amalgam margin which leads
to fracture of the amalgam at that margin .(Fig3-C)

4- Convenience form :-
That shape of cavity that allows adequate observation , access ability and ease of
operation in preparing and restoring the cavity . so we may do widening to
improve the accessibility and usage of the instruments .

5- Removal of caries :-
If caries is minimal , caries is removed during step of cavity preparation , if deep
, we remove the carious lesion by large round bur rotating at low speed . ,the
walls must be tendered caries free .

6- Finishing of enamel walls .
It has been shown that better marginal adaptation is obtainable when the enamel
is smooth and all week fragmented prisms have been removed so we get :-
   1- best marginal seal 2- maximal strength of both enamel and restoration .

7- Toilet of cavity :
All debris and particles have been washed away , the cavity is dried with cotton
wool and thus is ready to be restored .