TYPES OF FINISH LINES OR GINGIVAL MARGINS IN TOOTH PREPARATION – A REVIEW Part – 2

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Abstract:
The placement of finish lines has a direct bearing on the ease of fabricating a restoration and on the ultimate success of the restoration. Improper or inappropriate placement of finish lines may result in failure of the fixed prosthesis. This article reviews the various finish lines/ gingival margins in tooth preparation and their selection.

Key words: 

Introduction

The long term goal desired by a patient and the doctor is durability and longevity, this can be achieved initially by tooth preparations that are clinically sound. But another important factor that contributes to this is the selection of finish line. Preference for a particular type of finish line preparation allows ample room for various criteria like the position of the teeth contributing to esthetics (anterior or posterior), restoration material (metal or ceramic) and the bulk of the restorative materials (metal crowns with acrylic resin veneers or porcelain-fused-to metal). The indications and contraindications for each type of finish line will be reviewed. The ultimate goal in fixed and removable prosthodontics is the maintenance and preservation of the remaining dentition.

Types of finish lines:
The various types of finish lines are

1. Chamfer
2. Heavy chamfer
3. Shoulder
4. Round/ Radial shoulder
5. Slope shoulder
6. Shoulder with bevel
7. Knife edge
8. Chisel edge
9. Butt joint / no finish lines

Chamfer

The preferred gingival finish line for veneer metal restorations and the metal only portion of the metal ceramic crowns is the chamfer. This finish line has been shown experimentally to exhibit the least stress, so that the cement underlying it will have less likelihood of failure. It can be cut with the tip of a round-end tapered diamond, while the axial reduction is being done with the side of that instrument. However, a torpedo diamond is less likely to
produce a butt joint. The margin of the cast restoration that fits against it combines an acute edge with a nearby bulk of metal.

Chamfers can be placed comfortably with ease, however chamfer should not be wider than the width of half the bur. The reason why is that a ledge of unsupported enamel can be left behind. The second tip to be kept in mind is to use the bur along the path of placement. Tilting of the bur could result in an undercut or overreduction when it is angulated towards the tooth. Some others recommend the use of bur with non-cutting tip, but this again could result in excess axial reduction.

**Heavy chamfer**

A heavy chamfer is used to provide a 90-degree cavosurface angle with a large-radius rounded internal angle. It is created with a round-end tapered diamond. In the hands of an unskilled operator, this instrument can create an undesirable fragile "lip" of enamel at the cavosurface. The heavy chamfer provides better support for a ceramic crown than does a conventional chamfer, but it is not as good as a shoulder. A bevel can be added to the heavy chamfer for use with a metal restoration.

**Shoulder**

The shoulder has long been the finish line of choice for the all-ceramic crowns and facial part of metal ceramic crowns. The wide ledge provides resistance to occlusal forces and minimizes stresses that might lead to fracture of the porcelain. It produces the space for healthy restoration contours and maximum esthetics. However, it does require the destruction of more tooth structure than any other finish line. The sharp, 90-degree internal line angle associated with the classic variety of this finish line concentrates stress in the tooth and is prone to coronal fracture. Creating an acute angle can likely cause it to chip. The shoulder generally is not used as a finish line for cast metal restorations. When shoulder is underprepared, it leads to poor esthetics and axial contour.

**Radial shoulder**

The radial shoulder is a modified form of shoulder finish line. The initial instrumentation of the ledge is accomplished with the same flat-end tapered diamond used for the classic shoulder. A small-radius rounded internal angle is instrumented by an end-cutting paralleled carbide finishing bur, and finishing is completed with a specially modified bin-angle chisel. The cavosurface angle is 90 degrees, and shoulder width is only slightly lessened by the rounded internal angle. Stress concentration is less in the tooth structure than with a classic shoulder, and support for ceramic restoration walls is good. Destruction of tooth structure required for this configuration is not significantly less than that required for a classic shoulder.

**Slope shoulder**

The slope shoulder is obtained when an angle of 120° is given instead of 90° in case of a conventional shoulder. It promotes esthetics by allowing sufficient bulk of ceramic and a thin metal framework. It also removes the unsupported enamel rods.

**Shoulder with bevel**

The shoulder with a bevel is used as a finish line in a variety of situations. A bevel of 45° is
given. It is utilized as the gingival finish line on the proximal box of inlays and onlays, and for the occlusal shoulder of onlays and mandibular three-quarter crowns. This design can also be used for the facial finish line of metal-ceramic restorations where gingival esthetics are not critical. It can be used in those situations where a shoulder or a ledge is already present, either because of destruction by caries or the presence of previous restorations. It is also a good finish line for preparations with extremely short walls, since it facilitates axial walls that are nearly parallel. By adding a bevel to an existing shoulder, it is possible to create an acute edge of metal at the margin.

The shoulder with a bevel should not be used routinely for full veneer restorations because the axial reduction required to obtain it is unnecessarily destructive of tooth structure. Some variation of a shoulder, with or without a bevel, may afford some resistance against distortion during porcelain firing.

Advantages of using shoulder with bevel-

1. Cast metal margins can be bent or burnished.
2. Removes the unsupported enamel, thereby protects the unprepared tooth portion from chipping.
3. Reduces marginal discrepancy by 70%.

**Knife edge**

The ultimate in finish lines that permit an acute margin of metal is the knife edge. It is also more susceptible to distortion in the mouth when the casting is subjected to occlusal forces. The use of the knife edge can result in overcontoured restorations because the lab technician attempts so in order to obtain adequate bulk by adding to the external axial contours (beyond the original contours) of the restoration. In spite of its drawbacks, it is sometimes necessary to use the knife edge. It may have to be used on the lingual surface of mandibular posterior teeth, on teeth with very convex axial surfaces, and on the surface toward which a tooth may have tilted.

**Chisel edge**

A variation of the feather edge, the chisel edge margin is formed when a large angle is present between the axial surface and the unprepared tooth surface. They can be used in tooth with long clinical crowns. These finish lines were of help during the days rigid modelling compound using copper band were used, as they did not form any ledge onto which copper band would catch.

The finish line used for the bucco-occlusal margin of maxillary partial veneer and MOD onlay restorations is worthy of attention. It too must meet the requirement of providing an acute edge with a nearby bulk of metal. The enamel must also be protected by a finishing bevel that will leave the tooth structure at the cavosurface angle with sufficient bulk to resist fracture and chipping. A contra-bevel may also be used where function is heavy and esthetic requirements are minimal.

**Butt joint/ No finish line**

There are a few situations in which no bevel is required, but this can only be accomplished on a cusp that is bulky enough to allow the acute edge of metal and still be able to finish the enamel at the cavosurface angle.
References


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