

Finish Lines in Fixed Partial Dentures

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ABSTRACT:

Treatment with tooth-supported fixed dental prostheses (FDPs) is still one of the most common ways to replace damaged teeth, and it has a high long-term clinical success rate. Tooth abutments can be prepared to receive fixed dental prostheses with different types of finish lines.

In any tooth preparation, the finish line design is critical because it affects not only the sealing difference but also the appearance of the tooth, disparity in seating. aesthetics, periodontal fitness and biological width.

Keywords: aesthetics, supragingival, knife edge

INTRODUCTION:

Traditionally, clinicians build a finish line on the tooth on which the prosthetic reconstruction lies while preparing dental abutments for FDPs (Orkin, Reddy and Bradshaw, 1987; Lanning *et al.*, 2003). This can be found supragingivally or subgingival, with the latter causing gingival

inflammation more often (Chiquet, Katsaros and Kleetsas, 2015)^(Creugere, Snoek and Vogels, 1988; Gracis *et al.*, 2001) These finish lines can be divided into two categories: horizontal finish lines, like curvy lines, 6 or vertical lines, such as feather or knife-edge margins, with a smooth chamfer and straight shoulder. The biologically focused preparation technique (BOPT), an alternative for dental preparation without a finish line, may be used for FDPs (Loi and Di Felice, 2013). To establish a new prosthetic junction, the clinician eliminates the emergence of the anatomic crown, which correlates with the cemento-enamel junction (CEJ).

One of the factors that influences crown marginal adaptation is the type of finish line. The round shoulder and deep chamfer are the two most popular finish lines suggested in the literature for metal free crowns (Tinschert *et al.*, 2007; Hilgert, Neisser and Bottino, 2010), with the bevel being contraindicated for ceramic restorations. Some scholars have emphasised the significance of assessing the impact of the finish line on the race. Various preparation designs have distinct finish lines. Although, the length of the finish line could have an effect on the marginal recurrent caries which subsequently affect the success of the prosthesis, however, the length of the various finish lines designs have never been quantitatively estimated by the researchers (Ls, Abdullah and Ibraheem, 2018). Our research experience has prompted us in pursuing this survey (Hemalatha and Dhanraj, 2016)(Ramya, Pandurangan and Ganapathy, 2019)(Anjum, Ganapathy and Kumar, 2019; Inchara, Ganapathy and Kumar, 2019)(Philip, Ganapathy and Ariga, 2012)(Gupta and Dhanraj, 2009; Mohamed Usman *et al.*, 2013; Indhulekha, Ganapathy and Jain, 2018)(Ganapathy *et al.*, 2013)(Menon and Ganapathy, 2019).

Functions of finish lines:

- i. Finish line configuration offers an estimate of tooth loss, with the feather edge being the most conservative and the shoulder being the least conservative.
- ii. Finish line architecture aids in determining an impression material's ability to record surface detail.
- iii. A distinct finish line aids ditching
- iv. A distinct finish line aids remargination for proper wax marginal adaptation

CLASSIFICATION OF FINISH LINES

1. Marginal width less than 0.3mm: knife edge or feather edge
2. Marginal width upto 0.3mm: Chamfer
3. Marginal width more than 0.3mm: Shoulder

CRITERIA FOR A SATISFACTORY FINISH LINE DESIGN

I. Marginal adaptation that is acceptable: Sealing difference equals seating discrepancy times sine of marginal metal angle, according to David F Pascoe. A marginal 0 metal angle of 90 is

generated by the shoulder finish line. As a result, sealing disparity is the same as seating discrepancy. Since beveling lowers the median metal angle, seating is reduced.

Beveling minimises seating difference by reducing the marginal metal angle (Salem, 1988; Donovan and Chee, 2004).

ii. Surface that is tissue resistant

iii. Appropriate contour: conservative finish lines such as the feather edge and knife edge result in overcontoured restorations, which cause periodontal problems such as gingival recession, unattractive black triangular holes, and alveolar bone loss.

iv. Sufficient strength: the finish line configuration should be strong enough to restore materials.(Alla, 2013)

SELECTION CRITERIA FOR FINISH LINE DESIGN

i. The chosen finish line design must have a predictable degree of marginal honesty.

ii. Place smooth materials in the sulcus to prevent plaque buildup.

iii. Maintain a pleasing appearance.

FEATHER EDGE

I. ADVANTAGE: Most conservative

II. DISADVANTAGE: Over contoured restorations. Not recommended now

KNIFE EDGE

I. It is most conservative type of f.l. 0

ii. It gives >135 cavosurface angle.

iii. Pointed end tapered fissure bur is used

The indications are

- Large pulp chambered tooth
- Finish line on cementum
- MOD onlay

The benefits of this finish lines are

- Easy to prepare
- Most conservative
- Burnishable type of finish line
- Ideal for marginal adaptation

The main drawbacks of this finish lines are

- Indistinct margin i
- Over contoured restoration

- Marginal distortion
- Difficult to wax and cast

SHOULDER FINISH LINE:

A tooth preparation finish line along which the gingival floor crosses the lateral axial surfaces at a right angle. To plan the shoulder finish line, flat-end tapered diamond end cutting diamonds are used (Herman, 1973). This is indicated in both ceramic crowns and porcelain-fused-to-metal labial margins.

The advantages of shoulder lines are

- Aesthetically pleasing
- Aesthetically pleasing crown contour
- Adequate bulk

The disadvantages are

- Difficult to plan
- Conservative
- Risk of pulp leakage
- Poor marginal integrity
- Insufficient sliding joint fit

Sloped shoulder, radial shoulder, and shoulder with bevel are examples of shoulder types.

Sloped shoulder: A tooth preparation finish line at which the gingival base crosses the exterior axial surfaces at a point of 0 to 120 degrees. It is marked on the metal ceramic crown's facial margin.

Shoulder finish line with rounded gingivo axial 0 line angle and 90 cavosurface angle (radial shoulder) (Croll, 1989; Parker and Harry Parker, 2004).

Radial shoulder: Shoulder finish line with 90 cavosurface angle and rounded gingivo axial 0 line angle. Radial shoulder on all ceramic preparations integrates ceramic reinforcement with radial shoulder stress relief (Pilo *et al.*, 1988).

Shoulder with bevel: it is used in facial margin of metal-ceramic crowns, proximal box of inlays and onlays and occlusal shoulder of onlays and mandibular three fourth crowns.

Finish line alignment is determined by the following factors:

Aesthetics: Suits with a subgingival finish line for patients with a high lip line and equigingival and supragingival suits for patients with a low lip line.

Biological width: The combined dimension of epithelial attachment (0.97mm) and connective tissue attachment (1.07mm) coronal to the alveolar bone crest is the biological diameter. It is measured by bone sounding (Croll, 1990).

Gingivitis, periodontal pocket formation, regression, and tooth-restoration interface view are all caused by a biological width breach.

Surgical recontouring of alveolar bone is one of the treatments for biological thickness. Orthodontic extrusion with supracrestal fiberotomy is performed on a weekly basis.

Different types of finish lines are used depending on where the margins are placed.

- supragingival finish line
- equigingival finish line c
- subgingival finish line

Supragingival finish line is used in low lip line cases.

Advantages are as under:

- Easy preparation
- Easy to finish
- Easy to duplicate
- Easy to verify fit of restoration
- Easy maintenance

In a study on sheep, Marcum et al discovered that margins at the crest produced less inflammation than those above or below it (Gardner and Michael Gardner, 1982). It's safest to stop using a subgingival finish line unless needed. Its indications are the following: I. Aesthetics II. Subgingival caries III.Erosion IV. Abfraction V. Dentinal hypersensitivity Indications: I. Aesthetics II. Subgingival caries III.Erosion IV. Abfraction V. Dentinal hypersensitivity

Tooth-restoration interface latency is the rationale for subgingival finish lines. Type of tooth preparation that maximises resistance and retention To make a big change to the contours

The following are the positioning guidelines for subgingival margins.

- Free Gingival Margin (FGM)
- The crest of the alveolar bone (ABC)

I. Finish line 0.5mm apical to FGM while sulcus diameter is 1.5mm.

ii. When sulcus depth (d) is >1.5mm,finish line is ½ sulcus depth, apical to FGM. iii. When sulcus depth is >2mm,crown lengthening is done. Subgingival finish line exposure is carried out by mechanical, chemical, rotary gingival curettage and surgical methods.

Lehman et al, in his study refers that the finishing line should follow a smooth curvature that remains relatively shallow interproximally to avoid a deep V-shaped notch, which could result in a split between the labial and lingual aspects of the All ceramic crown (Walton and Leven, 1955). Christensen (1966) evaluated the fit of subgingival and supragingival margins with a group of dentists and stated that the least acceptable marginal discrepancy in visually accessible surfaces was 39 microns (Christensen, 1966). Lofstrom and Barakat (1989) used a scanning electron microscope to measure the supragingival margins of crowns that were considered clinically well-fitting by several dentists and reported marginal discrepancy values in a range of 7 to 65 microns (Lofstrom and Barakat, 1989). In-vitro studies (Sulaiman 1997) have revealed gaps of 64 to 83 microns in CAD/CAM generated all-ceramic single tooth restorations, seemingly above the limit suggested by Christensen (Christensen, 2006).

CONCLUSION

The most widely used finish line was found to be the shoulder finish line. However, studies have shown that chamfer margins have improved the biomechanical performance of the crown. This might be due to the strong unity seen in the chamfer margin.

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