

Finish Lines in Fixed Prosthodontics: Tradition, Innovation, and the Search for Evidence

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For decades, preparation finish lines in fixed prosthodontics appeared to represent settled science. Chamfer finish lines were widely taught in dental education as the preferred design for complete crowns, particularly for metal and metal–ceramic restorations, owing to their favorable balance between tooth conservation, clear margin definition, and mechanical support. Deep chamfer or shoulder with rounded internal angle finish lines became associated with all-ceramic restorations, while feather-edge or knife-edge preparations were frequently discouraged because of concerns regarding overcontouring, marginal distortion, and inadequate restoration thickness. Yet in recent years, vertical preparation concepts—including feather-edge preparations and the Biologically Oriented Preparation Technique (BOPT)—have re-entered mainstream prosthodontic discussion. Their resurgence raises an important question: have clinical data changed our understanding of optimal finish lines, or have materials and technology simply altered what is technically possible?

The preparation principles outlined in foundational prosthodontic textbooks, particularly those by Rosenstiel and colleagues,¹ established the classical concepts governing finish-line design of tooth preparations and marginal design of fixed restorations. These sources emphasized that finish lines

should provide sufficient restorative material thickness while preserving tooth structure and enabling precise marginal adaptation. Chamfer preparations became particularly attractive because they created a distinct finish line with rounded internal geometry, minimizing stress concentration while maintaining conservative reduction. Chamfer margins became the standard recommendation for full metal and many metal–ceramic restorations, whereas deeper chamfer or rounded shoulder designs were later advocated for glass ceramics.

Importantly, the dominance of chamfer margins was not based solely on tradition. Goodacre and colleagues² highlighted biological and mechanical principles governing tooth preparation, emphasizing retention, resistance form, structural durability, and periodontal health preservation. Their work helped reinforce the idea that conservative, well-defined margins offered predictable outcomes. However, despite decades of clinical use, robust comparative evidence demonstrating superiority of one finish line over another remained surprisingly limited.

The emergence of high-strength zirconia ceramics and CAD/CAM manufacturing challenged long-standing assumptions. Conventional ceramics required substantial bulk and therefore favored deep chamfer-type preparations. Monolithic zirconia altered these requirements because of its superior flexural

strength and fracture resistance. Consequently, more conservative preparations became feasible.

Among the early investigators questioning traditional dogma, Poggio and coworkers³ deserve particular attention. In their retrospective evaluation, they reported favorable outcomes for zirconia crowns fabricated on knife-edge preparations, challenging long-standing assumptions regarding the inadequacy of vertical margins. This investigation provided an important conceptual shift: preparation design previously considered unacceptable might perform adequately when combined with contemporary restorative materials.

This biomechanical reconsideration coincided with the introduction of Biologically Oriented Preparation Technique (BOPT) by Loi and Di Felice in 2013.⁴ BOPT proposed eliminating the horizontal finish line entirely, combined with rotary curettage or gingivage, allowing soft tissues to heal and adapt to prosthetically guided emergence profiles. The concept represented a departure from purely mechanical thinking toward biologically driven prosthodontics. Subsequent observational studies reported favorable periodontal behavior, gingival thickening, and stable soft tissue levels around restorations fabricated using BOPT principles. Later investigations reported encouraging medium-term outcomes.

Unlike conventional preparations, vertical preparations create a finish area rather than a distinct finish line, increasing dependence on provisional restorations and communication between clinician and laboratory. Both analog⁴ and digital⁵ protocols have been proposed to facilitate transfer of the provisional restoration margin and emergence profile to the definitive restoration.

Yet enthusiasm for vertical preparations should be tempered by critical appraisal. Much of the supporting evidence originates

from retrospective cohorts, case series, and studies with limited follow-up. Randomized controlled trials directly comparing vertical and conventional horizontal finish lines remain scarce. Consequently, many contemporary clinical preferences continue to rely on expert opinion and observational evidence rather than high-level comparative trials. Therefore, despite growing clinical adoption, definitive evidence demonstrating superiority of either philosophy remains lacking.

Thus, perhaps the most striking observation in the finish-line debate is that profound changes in clinical philosophy have occurred in the absence of equally profound changes in evidence quality. Prosthodontics has transitioned from “chamfer as universal standard” toward individualized margin selection, driven by restorative material properties, esthetic demands, periodontal considerations, and digital workflows.

The contemporary clinician therefore faces a paradox. Traditional chamfer preparations remain supported by decades of predictable clinical success. Vertical preparations offer hard tissue preservation, minimal invasiveness, and potentially favorable soft tissue behavior when combined with zirconia restorations and careful prosthetic execution. Yet neither philosophy possesses overwhelming long-term comparative evidence.

Perhaps the central lesson from the finish-line debate is that prosthodontic philosophies often evolve faster than comparative evidence. Chamfer margins remain supported by decades of predictable clinical performance, whereas vertical preparations offer appealing biologic and minimally invasive advantages in the era of zirconia and digital dentistry. Until robust long-term comparative trials emerge, finish-line selection will likely remain less a question of universal superiority and more an exercise in clinical judgment, material science, and individualized patient care.

REFERENCES

1. Rosenstiel SF, Land MF, Fujimoto J. *Contemporary Fixed Prosthodontics*. 5th ed. Elsevier; 2015.
2. Goodacre CJ, Campagni WV, Aquilino SA. Tooth preparations for complete crowns: an art form based on scientific principles. *J Prosthet Dent*. 2001;85:363–376. doi: 10.1067/mpr.2001.114685.
3. Poggio CE, Dosoli R, Ercoli C. A retrospective analysis of 102 zirconia single crowns with knife-edge margins. *J Prosthet Dent*. 2012;107:316–21. doi: 10.1016/S0022-3913(12)60083-3.
4. Loi I, Di Felice A. Biologically oriented preparation technique (BOPT): a new approach for prosthetic restoration of periodontally healthy teeth. *Eur J Esthet Dent*. 2013;8:10–23.
5. Ntovas P, Loubrinis G, Bichacho N, Papazoglou E. A Digital Protocol for Management of the Restorative Margin and Emergence Profile of Vertically Prepared Teeth. *Int J Prosthodont*. 2024; 37:711-715. doi:10.11607/ijp.8599.