

Marquette University  
**e-Publications@Marquette**

---

School of Dentistry Faculty Research and  
Publications

Dentistry, School of

---

8-1-2015

# Customized Occlusal Reduction Guide Made from a Thermoplastic Sheet

Seok-Hwan Cho

Marquette University, [seokhwan.cho@marquette.edu](mailto:seokhwan.cho@marquette.edu)

William W. Nagy

Texas A&M Health Science Center

---

Accepted version. *The Journal of Prosthetic Dentistry*, Vol. 114, No. 2 (August 2015): 307-308. [DOI](#).

© 2015 Editorial Council for the Journal of Prosthetic Dentistry. Published by Mosby, Inc. Used with permission.

NOTICE: this is the author's version of a work that was accepted for publication in *The Journal of Prosthetic Dentistry*. Changes resulting from the publishing process, such as peer review, editing, corrections, structural formatting, and other quality control mechanisms may not be reflected in this document. Changes may have been made to this work since it was submitted for publication. A definitive version was subsequently published in *The Journal of Prosthetic Dentistry*, Vol. 114, No. 2 (August 2015): 307-308. [DOI](#).

# Customized Occlusal Reduction Guide Made from A Thermoplastic Sheet

Seok-Hwan Cho

*School of Dentistry, Department of General Dental Sciences,  
Marquette University,  
Milwaukee, WI*

William W. Nagy

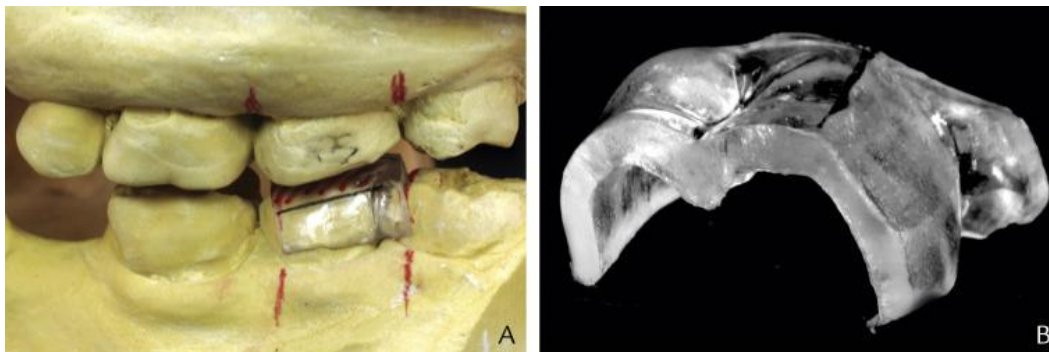
*Department of Restorative Sciences, Baylor College of Dentistry,  
Texas A&M Health Science Center,  
Dallas, TX*

Estimating linear distances is of great importance to dental practitioners. In several studies it has been shown that dental students and dentists underestimate and undersize linear measurements.<sup>[1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#) and [8](#)</sup> Clinically, this results in excessive extensions of tooth preparations that can compromise restorations. Even though resources are available for measuring the depths and distances of tooth preparations, a keen visual perception of measurements can benefit a dentist or dental student.<sup>[1](#) and [7](#)</sup>

The purpose of this article was to demonstrate a method of fabricating a customized occlusal reduction (COR) guide to help clinicians achieve accurate tooth preparations.

## Procedure

1. Duplicate diagnostic casts and vacuum form a clear 2-mm plastic sheet (Biocryl; Great Lakes Orthodontics, Ltd) over the cast in the conventional manner.
2. Mark the lines on the area of the opposing arch in the mounted casts according to the width of the prepared tooth. Cut the thermoplastic sheet along the lines and transfer that to the cast ([Fig 1A](#)).



**Figure 1.** A, Custom occlusal reduction guide made on opposing arch of diagnostic cast. Note functional cusp area of guide marked. B, Thickness of customized occlusal reduction guide is measured and adjusted. Note functional cusp area of guide that has been ground based on proposed occlusal reduction amount.

3. Analyze the occlusion and mark the functional and nonfunctional cusps. Adjust by grinding until the required reduction is attained ([Fig. 1B](#)).
4. Insert the COR guide in the opposing arch ([Fig. 2](#)). Then prepare the tooth. Continue the occlusal reduction until the contralateral side occludes with a thin articulating paper (Shimstock; Coltène/Whaledent). During tooth preparation, articulating paper can be used to identify inadequate reduction areas. The occlusal reduction is complete when the reduced surfaces fit the COR guide exactly.



**Figure 2.** Customized occlusal reduction guide inserted in mouth.

5. Make a definitive impression and fabricate a definitive cast. The accuracy of reduction can be verified with the COR guide insertion. Then fabricate the definitive restoration.

## References

- <sup>1</sup> T. Dimitrijevic, B. Kahler, G. Evans, M. Collins, A. Moule. Depth and distance perception of dentists and dental students. *Oper Dent*, 36 (2011), pp. 467–477
- <sup>2</sup> D.R. Nick, M. Clark, J. Miler, C. Ordelheide, C. Goodacre, J. Kim. The ability of dental students and faculty to estimate the total occlusal convergence of prepared teeth. *J Prosthet Dent*, 101 (2009), pp. 7–12
- <sup>3</sup> M. Ayad, A. Maghrabi, S. Rosenstiel. Assessment of convergence angles of tooth preparations for complete crowns among dental students. *J Dent*, 33 (2005), pp. 633–638
- <sup>4</sup> S. Yoon, C. Cheong, J. Preisser, S. Jun, B. Chang, R. Wright. Measurement of total occlusal convergence of 3 different tooth preparations in 4 different planes by dental students. *J Prosthet Dent*, 112 (2014), pp. 285–292
- <sup>5</sup> K. Aleisa, A. Al-Dwairi, K. Alwazzan, M. Al-Moithter, M. Al-Shammari, E. Lynch. Convergence angles of clinical tooth preparations achieved by

- dental students at King Saud University, Saudi Arabia. *J Dent Educ*, 77 (2012), pp. 1154–1158
- <sup>6</sup> M. Alhazmi, O. El-Mowafy, M. Zahran, S. Uctasli, H. Alkumry, K. Nada. Angle of convergence of posterior crown preparations made by predoctoral dental students. *J Dent Educ*, 77 (2013), pp. 1118–1121
- <sup>7</sup> W. Al-Omari, A. Al-Wahadni. Convergence angle, occlusal reduction, and finish line depth of full-crown preparations made by dental students. *Quintessence Int*, 35 (2004), pp. 287–293
- <sup>8</sup> S.M. Dunne. The limitation of visual perception in restorative dentistry. *Dental Update*, 20 (1993), pp. 198–201 203-5

**Corresponding author:** Dr Seok-Hwan Cho, Department of General Dental Sciences, Prosthodontics, Marquette University School of Dentistry, PO Box 1881, Milwaukee, WI 53201-1881