

**PRECISE RELIABLE
PREPARATION CONCEPT**

jota
+ SWITZERLAND



PRECISE RELIABLE

PREPARATION CONCEPT

The shape of the prepared teeth and the amount of tooth structure removed are essential factors for the mechanical, biological, and aesthetic success of fixed ceramic restorations [3,4]. The growing demand for esthetical results and CAD-CAM production leads to more challenges for dentists to form high-quality tooth preparation. The preparation design for ceramics often requires the elimination of all undercuts, defined restoration thickness, and a shape that promotes retention and resistance.

Preparing teeth for fixed prostheses is one of the most failed dental procedures [5]. Most failures in ceramic can be avoided by understanding the properties of the material and accordingly preparing the tooth and handling the laboratory procedures [6].

A **precise, reliable preparation concept (PRP)** proposes an intuitive, easy-to-operate, and restoration parameterization-based approach to modeling tooth preparation. PRP concept design was developed to help dentists **quickly define the thickness** of restoration in the different tooth levels, which can **reduce the complexity** of the tooth preparation process and **improve its quality and efficiency**.

This concept included six different types of diamond burs :

- Depth markers for anterior teeth
- Depth markers for posterior teeth
- Depth markers for incisal edges, lingual & occlusal surfaces
- Multi-radius burs for posterior teeth
- Multi-radius burs for anterior teeth
- Multi-radius margin refinement burs

The basic procedure of **PRP concept** consists of different depth markers which set the thickness of the preparation for the different types of crowns. The marking burs create grooves on the various tooth surfaces, and then the dentist reduces the

dental hard tissue with conical multi-radius burs to this level. In the finishing stage, the red diamonds are used for smoothing all preparation surfaces, and the special marginal burs finish only the shoulders.

anterior teeth preparation



posterior teeth preparation



depth-markers

bulk preparation

margin refinement

DEPTH MARKERS BURS

POSTERIOR & ANTERIOR TEETH

INCISAL EDGES, LINGUAL & OCCLUSAL SURFACES

One of the essential preparation rules is an **adequate occlusal reduction**. Inadequate occlusal preparation is as harmful as over-preparation. The insufficient occlusal reduction will provide limited space for ceramic, leading to weak areas prone to fracture [7,8]. Using **depth markers** for incisal edges, lingual & occlusal surfaces will avoid this problem.

The depth markers are available in cylindrical and conical shapes and 0.9 mm and 1.7 mm thicknesses for the different tooth groups. **828 burs** with diameter **017** are used for posterior teeth preparation and diameter **009** for small teeth and premolars, respectively. The conical shape **828T** has a cone from 8 grads and can also be used for onlay and inlay preparations.



	1 mm for maxillary anterior lingual and axial, monolithic opaque zirconia	828TW.FGS.017	828W.FGL.009	828W.FGL.017
				
		806313501524010	806315501524010	806315500524010
	1,5 mm for monolithic opaque zirconia	828TG.FGS.017	828G.FG.009	828G.FG.017
				
		806313501524015	806314501524015	806314500524015
	1,8 mm for monolithic translucent zirconia	828TO.FGS.017	828O.FG.009	828O.FG.017
				
		806313501524018	806314501524018	806314500524018
	2,0 mm for e.max, layered porcelain, monolithic porcelain, incisal reduction	828TY.FGS.017	828Y.FG.009	828Y.FG.017
				
		806313501524020	806314501524020	806314500524020
	2,2 mm for layered porcelain, 0.7 mm Core + 1.5 mm Veneer	828TB.FGS.017	828B.FG.009	828B.FG.017
				
		806313501524022	806314501524022	806314500524022
	2,4 mm for layered porcelain, incisal re- duction	828TR.FGS.017	828R.FG.009	828R.FG.017
				
		806313501524024	806314501524024	806314500524024

DEPTH MARKERS BURS

POSTERIOR & ANTERIOR TEETH

VESTIBULAR SURFACE

Depth markers for anterior teeth have three tiers and posterior two tiers, respectively. A guided pin helps to position the bur on the tooth. The **WD560** burs are used for depth marking of the veneers. The **WD834** and **WD510** burs are used for depth limiting of different crowns.

Depth markers for labial surfaces of posterior and anterior teeth are an accurate method for **quantifying tooth tissue reduction** for a fixed prosthodontic preparation.

Proper tooth tissue reduction makes it easier for a laboratory technician to create **esthetic restorations with natural color and translucency**. The best reduction can be achieved by placing depth grooves into the surface to be reduced and then reducing the tooth following the grooves [3].

Another problem that depth markers solve is the **convergence angle**. Nuha et al. [2] analyzed the quality of models prepared by senior dental students. The

results showed that the average convergence angle was 39.98° and the average buccal and lingual convergence angle was 44.1° , which deviated significantly from the ideal convergence angle of between 4° and 10° proposed by Petal et al. [1]. The abovementioned problems result in difficulties in the operation for the dentists, which leads to low accuracy and efficiency of the preparation and seriously affects the restoration quality with fixed prostheses [4]. Depth markers have **pre-defined angles and depths in the different tooth levels**, which help dentists to achieve the correct convergence easily.

Over-preparation is another mistake that dentists often tend to make [6]. Over-preparation reduces the retention of the restorations and inherent strength of the remaining tooth and can cause damage to the pulp [7]. The rule is that only as much tooth structure as required should be removed. Depth markers for different crowns **prevent over-preparation** of the tooth.

ANTERIOR TEETH

veneer preparation

WD560.FG.018



806314560524018

Depth 0.15/0.15/0.15 mm

WD560.FG.021



806314560524021

Depth 0.28/0.28/0.28 mm

minimal

standard

extensive

WD834.FG.025



806314834524025

Depth 0.3/0.5/0.7 mm

WD834.FG.031



806314834524031

Depth 0.5/0.7/0.9 mm

WD834.FG.035



806314834524035

Depth 0.8/1.0/1.2 mm

Depth 0.8
Depth 1.0
Depth 1.2

ANTERIOR TEETH

minimal

standard

extensive

layered

WD510.FG.026

WD510.FG.030

WD510.FG.034

WD510.FG.046



806314510524026

Depth 0.3/0.5/0.7 mm



806314510524030

Depth 0.5/0.7/0.9 mm



806314510524034

Depth 0.8/1.0/1.2 mm



806314510524046

Depth 1.0/1.2/1.5 mm



POSTERIOR TEETH

**high strength
monolithic**

WD511.FG.036



806314511524036
Depth 0.5/1.0 mm

**low strength
monolithic**

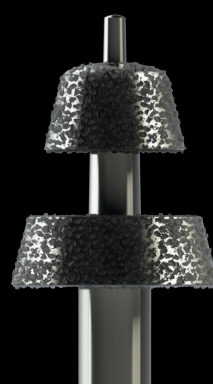
WD511.FG.040



806314511524040
Depth 0.8/1.2 mm

layered

WD511.FG.045



806314511524045
Depth 1.0/1.5 mm



MULTI-RADIUS BURS

POSTERIOR & ANTERIOR TEETH BULK REDUCTION

Multi-radius burs were developed to **improve the preparation** of shoulder margins. The use of single-radius burs can lead to what is called a J margin with an unsupported enamel lip [8]. Such a margin is difficult to scan for a CAD-CAM procedure and not acceptable for ceramic preparation [6].

At the same time, using square burs can lead to stepping or leaving behind sharp lines and point angles in the preparation, which interferes marginal adaptation of the crown. An acute internal line angle can cause undue stress, initiate fracture, and cause fit problems [6,8,3]. All angles

should be rounded on all-ceramic tooth preparations to increase crown strength [3]. The **multi-radius burs smoothen the edges** of shoulder and prevent the above-mentioned errors.

Multi-radius burs are available in three different diamond grits: very coarse, medium, and fine, and in two working part lengths of 6.0 and 8.0 mm for posterior and anterior teeth preparation. Depending on the type of crown, there are four diameter burs for posterior teeth (012, 016, 018, 020) and three for anterior teeth preparation (014, 018, 020).

MULTI-RADIUS DESIGN

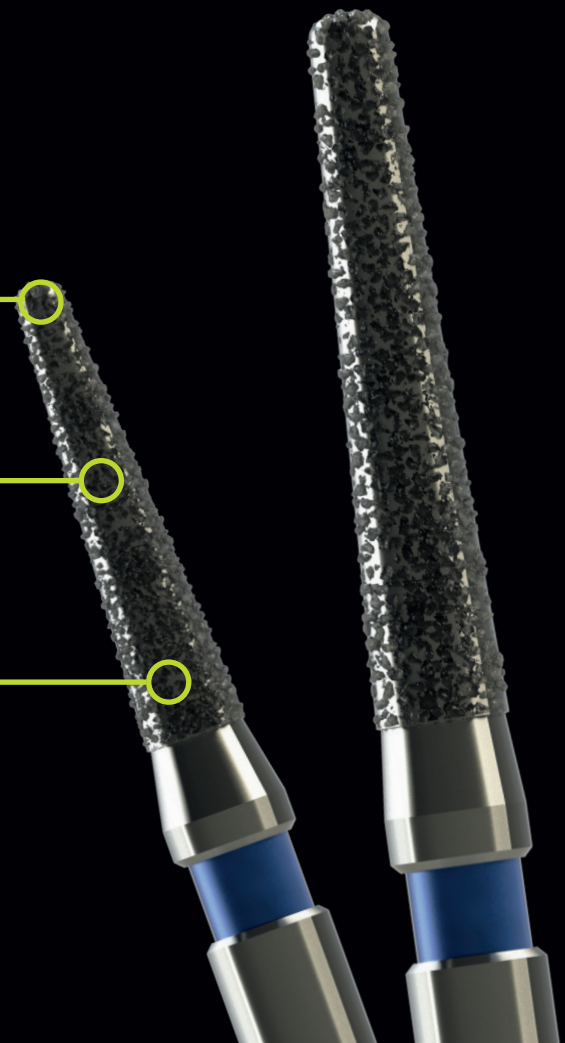
NO STEPPING, LIPPING AND SHARP POINTS

ROUNDED EDGES

PREDICTABLE ROBUST CERAMIC RESTAURATION

6 & 8 mm LENGTHS

FOR POSTERIOR AND ANTERIOR BULK PREPARATION



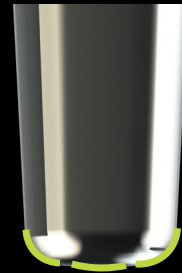
Without radius



One-radius



Multi-radius



MARGIN PREPARATION



Stepping



J Margin



rounded Shoulder



POSTERIOR TEETH BULK REDUCTION AND SEPARATION

WD203SG.FG.012 WD203SG.FG.016 WD203SG.FG.018 WD203SG.FG.020



806314203544012



806314203544016



806314203544018



806314203544020

WD203.FG.016

WD203.FG.018

WD203.FG.020



806314203524016



806314203524018



806314203524020

WD203F.FG.012

WD203F.FG.016

WD203F.FG.018

WD203F.FG.020



806314203514012



806314203514016



806314203514018



806314203514020

ANTERIOR TEETH BULK REDUCTION

WD204SG.FG.014 WD204SG.FG.018 WD204SG.FG.020



806314204544014

806314204544018

806314204544020

WD204.FG.014

WD204.FG.018

WD204.FG.020



806314204524014

806314204524018

806314204524020

WD204F.FG.014

WD204F.FG.018

WD204F.FG.020



806314204514014

806314204514018

806314204514020

MULTI-RADIUS BURS

MARGIN REFINEMENT

All preparation shoulders should always be smoothed. Rough shoulders are not just challenging to scan but also difficult for the technician to work on. A smooth shoulder guarantees an **excellent fit**, **minimal cement line**, and **pleasing aesthetics**. It also reduces unnecessary stress at the margins caused by a rough shoulder [6].

It is recommended at the end of the preparation, an end-cutting diamond must be run over the margins to smooth them [9]. There are three **margin refinement burs** with 0.6, 1.2, and 1.6 mm diameters. They are diamonded only on the top and do not change other preparation surfaces.

WD839F.FG.006



806314839514006

WD839F.FG.012



806314839514012

WD839F.FG.014



806314839514014



REFERENCES

1. P.B. Petal, D.G. Wildgoose, R.B. Winstanley, Comparison of convergence angles achieved in posterior teeth for full veneer crowns, *Eur. J. Prosthodont. Restor. Dent.*, 13 (2005) 100-104.
2. E.M. Nuha, A.B. Neamat, O. Osama, I. Yahia, Assessment of undergraduate students' tooth preparation for full veneer cast restorations, *Open J. Stomatol.*, 4 (2014) 43-48.
3. Goodacre CJ. Designing tooth preparations for optimal success. *Dent Clin North Am.* 2004 Apr;48(2):v, 359-85. doi: 10.1016/j.cden.2003.12.015. PMID: 15172605.
4. Dai N, Zhong Y, Liu H, Yuan F, Sun Y. Digital modeling technology for full dental crown tooth preparation. *Comput Biol Med.* 2016 Apr 1;71:190-7. doi: 10.1016/j.compbimed.2016.02.008. Epub 2016 Feb 22. PMID: 26945598.
5. Hoffman JM. Modern concepts in crown preparation. *N Y State Dent J.* 1991 Aug-Sep;57(7):32-5. PMID: 1923146.
6. Shetty, Rohit & Bhat, Sonia. (2010). Rectifying the Tooth Preparation Errors in All-Ceramic Restorations Rectifying the Tooth Preparation Errors in All-Ceramic Restorations. *world journal of dentistry.* 1. 181-185. 10.5005/jp-journals-10015-1036.
7. Gordon J Chistensen. Frequently encountered errors in tooth preparations for crowns. *J Am Dent Assoc* 2007;138(10): 1373-78.
8. Damon C Adams. The ten most common all ceramic preparation errors: A doctor/technician liason's perspective; *dentistry today* Oct 2004;23(10):94,96-99.
9. Rosenblum MA, Schulman A. A review of all-ceramic restorations. *J Am Dent Assoc* 1997;128;297-307.

SUBSCRIBE OUR CHANNELS



Play video



Follow



Like us



Connect



Jota AG Rotary Instruments
Hirschensprungstrasse 2, 9464 Rüthi, Switzerland
Phone +41 (0)71 767 79 99, info@jota.ch
www.jota.ch  **SWITZERLAND**