

## DIAMOND DENTAL BURS 101

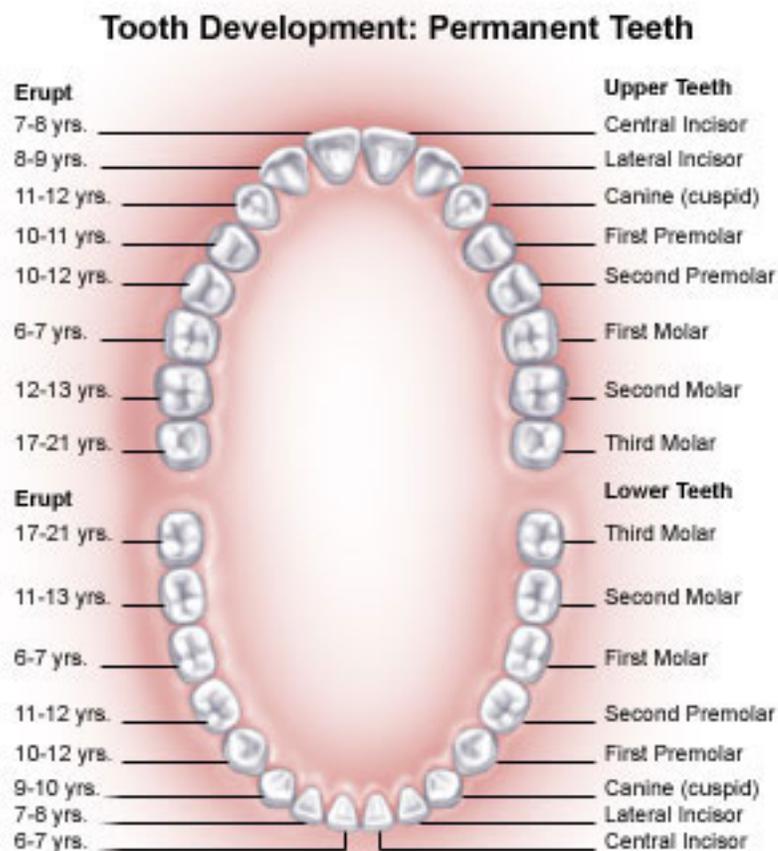


**A SHORT COURSE DESIGNED TO HELP YOU UNDERSTAND  
WHAT OUR DIAMONDS ARE SPECIFICALLY USED FOR  
IN A DENTAL PRACTICE.**

**GENERAL TOOTH ANATOMY:** The teeth are broken down in to two groups in development. Primary teeth, know to us as baby teeth and our permanent teeth which begin coming in at 6-7 years old and continue ending with the wisdom teeth at ages of 17-21 years old. The chart below outlines when permanent teeth begin coming in through completion of the teeth that will last our entire life. Too bad that the permanent teeth do not act like the baby teeth....When you lose one, another comes in....Thus, it creates a “living” for the dental community.

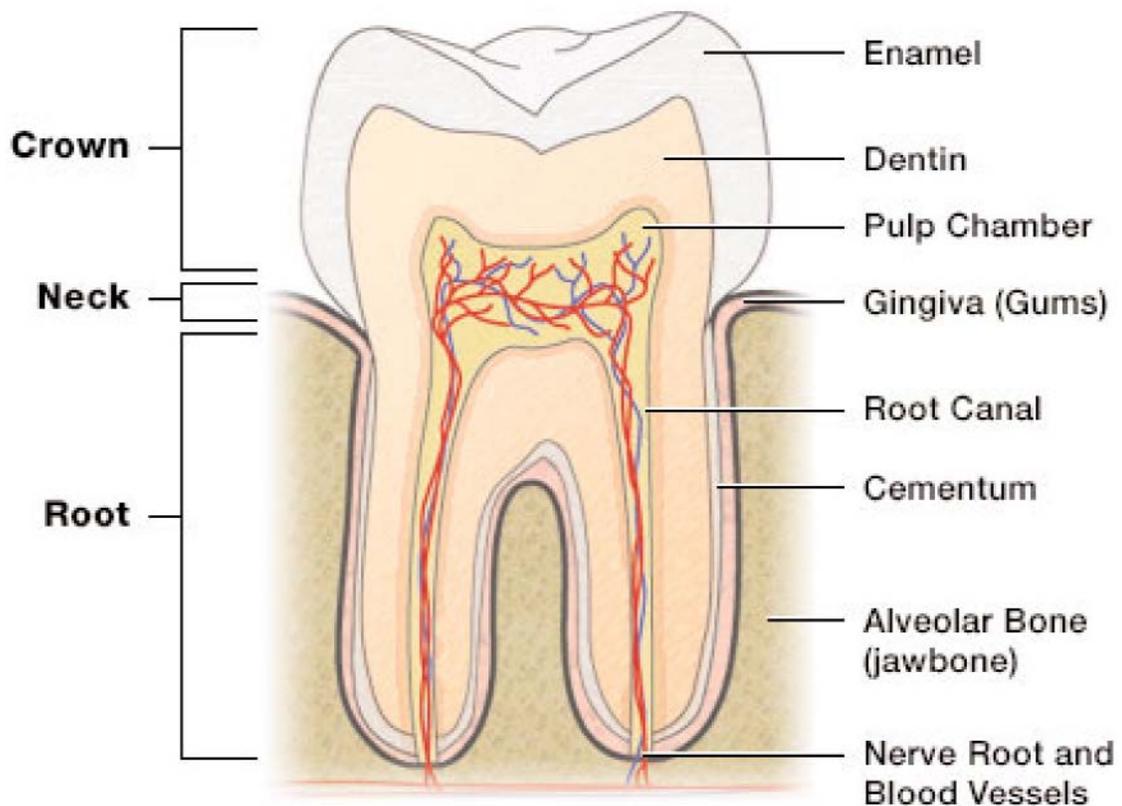
**TYPE OF TEETH:** The teeth are broken down into 4 main groups: 1) **Incisors** which are the front 8 “bladed” teeth used for cutting/biting. 2) **Canine** basically used for tearing and biting; set in between the incisors and pre-molars 3) **Pre-Molars**, also known as **Bicuspid**s which start the grinding action of the chewing process. You will have 8 total. 4) Last but not least are the **molars** that due most of the work in the chewing process. They grind the food to a fine texture, mix with saliva which is the first step of the digestive process.

As long as you have them all, it is a pretty efficient machine making food ready to be digested and absorbed by the body. When elements or teeth are missing, it is not as efficient.



**TOOTH ANATOMY:** In the previous section, we discussed the types of teeth. Their structure is also important in dentistry. *Incisors* and *canine* only have one root. This is because the stress of the tooth's function is not need as much as *pre-molars* with two roots and the workhorse *molars*, who do most of the chewing chores.

**STRUCTURE OF TEETH:** As we all learned in our health/science classes, the tooth is made up of enamel, dentin and pulp. Since we are not an endodontic product company, we will not focus that much on the pulp. We deal with the “crown” and “neck” of the tooth that is comprised of mostly enamel and dentin. See the chart below. It is important to retain this document later as we add new rotary products, we will become involved with the Gingiva, Root and Alveolar Bone.

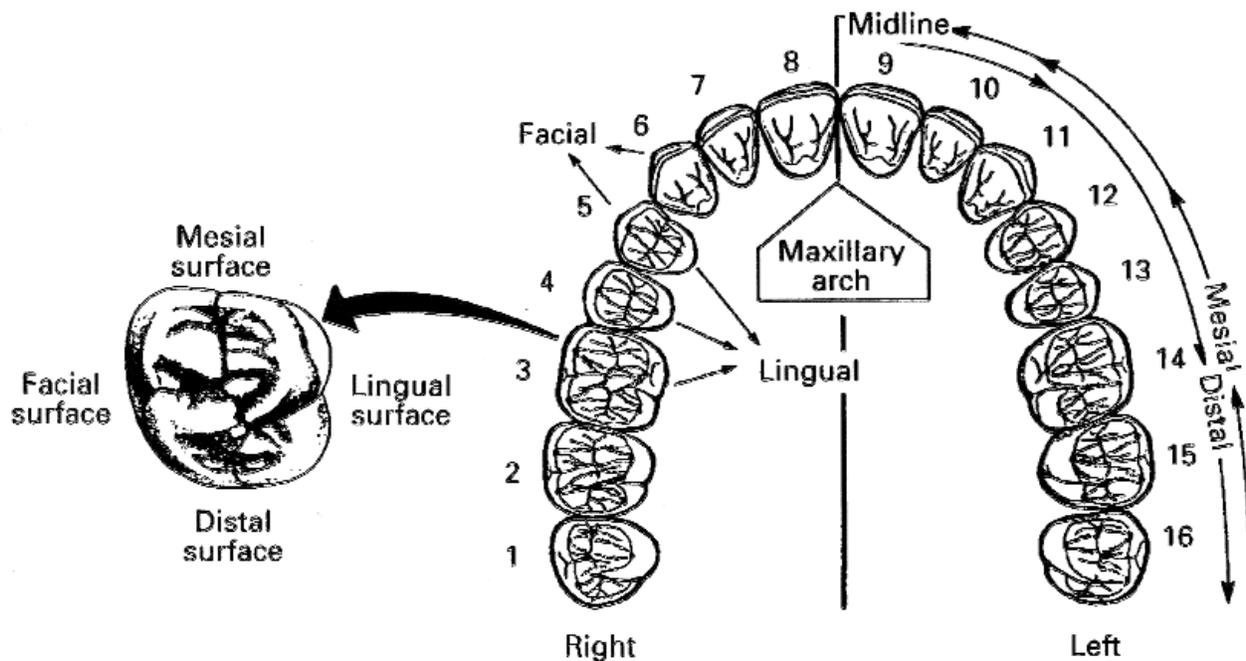


**SURFACES OF THE TEETH:** There is 5 surfaces of any tooth:

1. Occlusal surface is the top surface of the tooth
2. Facial surface is the outside of the tooth facing towards the cheek.
3. Lingual surface is the inside of the tooth facing towards the tongue.
4. Mesial surface is the side surface facing towards the lips.
5. Distal surface is the side surface of the tooth facing towards the back of the mouth.

**IT IS EXTREMELY IMPORTANT THAT YOU MEMORIZE THIS AND MAKE IT A PART OF YOUR SPRING EXPERIENCE.**

**FRONT AND BACK OF THE TEETH:** Divided into two groups: 1) **Anterior** are the incisor plus canine teeth group. 2) **Posterior** are the pre-molars and molars group.



**RESTORATION TYPES:** There are six types of restoration classes:

**Class I - Occlusal Surface.** All pit and fissure cavities on the occlusal surface of pre-molars and molars and cavities on the lingual surfaces of incisors and canine teeth.

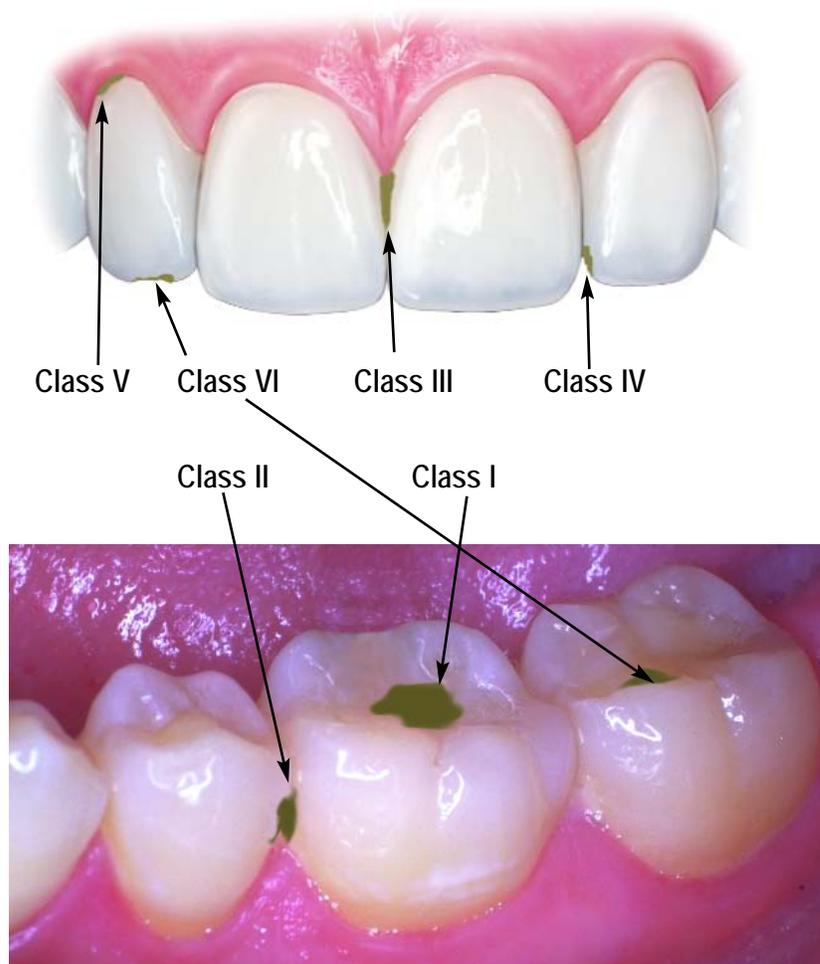
**Class II** - Cavities on the mesial or distal surface of pre-molars and molars

**Class III** - Cavities on the mesial or distal surfaces of incisors, canine and pre-molars that do not involve the incisal angle.

**Class IV** - Cavities on the mesial or distal surfaces of incisors that do not involve the incisal angles.

**Class V** - Cavities on the incisal edge of the anterior teeth, or on the occlusal cusp heights of posterior teeth.

**Class VI** - Cavities on the incisal edge of the anterior teeth, or on the occlusal cusp heights of posterior teeth.



## RESTORATION OPTIONS:

**Fillings** - In earlier years, Amalgam, better known to us as “silver” fillings were used quite frequently. It is used frequently by older dentists, while the younger dentists use composites fillings (tooth colored).

**Inlays/Onlays**- Technique is used when massive portions of the tooth structure of the occlusal surface requires a step above a filling. It usually involves the mesial and or distal surfaces as well. It is usually accomplished with precious metals, composites or porcelain.

**Veneers** - This is 90% cosmetic to correct a darker shade of tooth and or misaligned teeth. Composites or porcelain veneers are the materials of choice. In the other 10%, veneers help correct chipped teeth and several classes of restorations if the decay is not excessive.

**Crowns** - Most used to restore an excessively damage tooth. It covers the entire surface of the tooth and in posterior crowns for structural integrity some dentist prescribe a PFM crown (porcelain fused to metal). Anterior teeth are usually done with 100% porcelain with aesthetics in mind.

**Bridges** - As the name implies, when there is a loss of a tooth, a bridge unit usually consisting of 2 crowns and a false tooth that fills the void for the missing tooth.

**Implants** - Even though implants have been around for years, technology now have the general dentist involved. In the past, only highly skill prosthodontist performed implants or a maxial facial surgeon. Cost to the patient now have come down to approximately \$ 2,500/tooth. For us, it is not real good news as the dentist rarely uses rotary instruments in this process.

**Dentures** - False teeth....enough said.

**DIAMONDS AND CARBIDES ARE USED FOR 3 THINGS ONLY:**

***Removing Material*** - Better known in dental circles as Excavating or Gross Reduction. Usually when someone talks about excavating in is referring to crown removal, filling removal and other artificial materials once applied. Whereas, Gross Reduction refers to natural material of enamel, dentin, and caries (cavities).

***Preparation of a Tooth*** - Simply put is shaping and contouring a hole for a restoration in operative dentistry and shaping and contouring a tooth to receive a crown, bridge or veneer.

***Polishing and Finishing*** - Final steps in a restoration, usually to remove cement, adding secondary anatomy and finally to ad shine to a tooth or restoration.

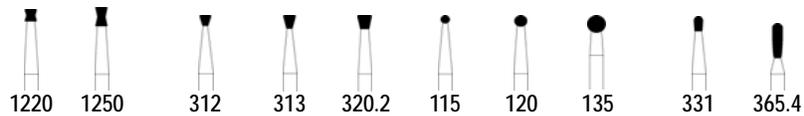
**The only difference between a diamond and a carbide is the preference of the dentist and what he is accustomed or taught.**

**Diamonds grind.....Carbides cut!**

**REMOVING DECAY AND MATERIALS:**

**Removal of Decay and Artificial Materials** - The following Spring shapes are used to remove artificial materials including fillings, crowns and other restorations. These are consider operative diamonds to also remove caries.

**Preparation of cavities** - These type of preparations require undercuts which the bottom of the whole must be wider that the top. When the filling material hardens, it is “locked” into the hole.



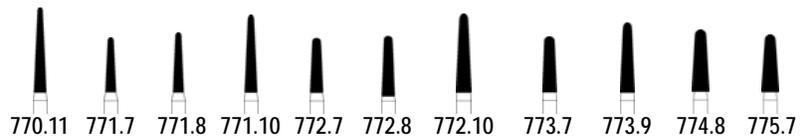
**PREPARATION OF CROWNS AND BRIDGES:**

This is where the ‘big bucks’ are. The following types of instruments explain each type of preparation currently used.



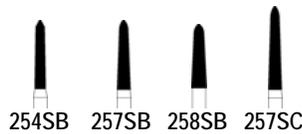
**CHAMFER PREPARATION**

*These diamond instruments create a rounded gingival margin with a taper, suited well to PFM (porcelain fused to metal) restorations.*



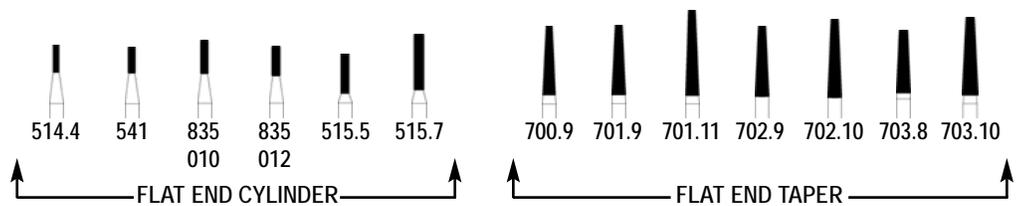
**CURETTAGE PREPARATION**

*Commonly referred to as “K” diamonds and are designed to prepare a rounded gingival margin at or below the gingival line with a 60° finish line. This is the ideal preparation technique for full metal or PFM crowns.*



**SHOULDER PREPARATION**

*Available for tapered or parallel axial walls. They are designed to leave a 90° gingival finish line with a square internal angle. They are ideal for full porcelain and PFM restorations.*





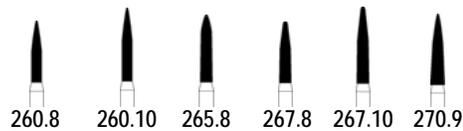
**MODIFIED SHOULDER PREPARATION**

*KR diamonds are designed to have a 90° gingival finish line with a rounded internal angle. This style of preparation is ideal for full porcelain restorations.*



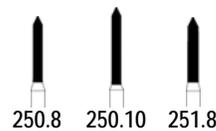
**FEATHER PREPARATION**

*These diamonds provide a tapered wall with an extended chamfer finish line. This style of preparation is used most often for metal margins.*



**BEVELED MARGIN PREPARATION**

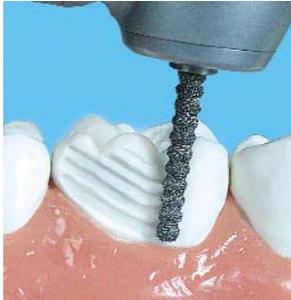
*These diamonds provide a parallel axial wall and a 45° gingival finish line which is suitable for metal or ceramic margins.*



**OCCUSAL & LINGUAL REDUCTION**

*These diamonds provide fast bulk reduction of the occlusal and lingual surface.*





**ST8 BULK REDUCING DIAMOND**

*This bulk reduction instrument acts like two instruments in one. It cuts a rough depth and reduces the tooth down to 50%. Then another instrument must followup with further reduction to achieve a smooth axial wall. The hold back is we only offer it in a chamfer shape.*



**TURBO DIAMOND**

*This preferred bulk reduction instrument acts like two instruments in one. It cuts rapidly and achieves a smooth axial wall. It is also available in many shapes and sizes in super coarse grit only. Below is the list of turbo diamonds that are available.*



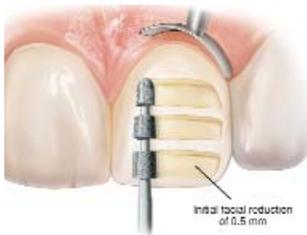
**SPECIALIZED MOSQUITO DIAMOND (392-016)**

*This diamond is primarily used to clean up and finishing margin and subgingival margins to insure a proper equal transition from restoration to natural tooth structure.*



**DEPTH CUTTER (834-021).**

*This diamond is primarily used as a depth guide for bulk reduction. With veneers, it is standard to remove .5 mm of anterior tooth surface. Instrument shown is an 868-021 similar to that of the 834-021.*



## VENEER PREPARATION

**DEVELOPED BY MICHAEL J. KOCZARSKI, DDS, FAACD**  
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**CO-DIRECTOR PAC-LIVE, UNIVERSITY OF THE PACIFIC**



*“Indirect veneers have become a mainstay of the modern dental practice when restoring missing tooth structure and enhancing aesthetics while preserving function. Whether performed for aesthetic and /or functional reasons, ceramics have become the predominant material of choice for these restorations. Achieving predictable, repeatable esthetic results with ceramic veneers is a direct reflection of the preparation. Fundamental preparation protocols must be followed to provide the room and marginal placement enabling the lab to deliver natural looking, vital final restorations. This Veneer Preparation Technique provides the clinician with an excellent method to control aesthetic predictability and consistency during the*

*preparation process for all refractory die or pressed ceramic veneers. Below is a step-by- step technique for indirect veneers.”*

— Michael J. Koczarski

### STEP 1



#### **834-021M DEPTH CUTTER**

*The depth-cutting bur (828-021M pictured) is used to ensure uniform and adequate tooth reduction facilitating the fabrication of aesthetically pleasing veneer restorations. The chosen minimum thickness of the final restoration is 0.7mm. By placing three zones of depth cuts, gingival, middle and incisal of 0.5mm, followed by finishing and polishing of the preparations, the operator will reach a final reduction of 0.7mm uniformly across the facial of the preparation. Recommended speed: 300,000 rpm.*

### STEP 2



#### **773.9C CHAMFER DIAMOND**

*This diamond is used for facial reduction, scribing a uniform gingival finish line and uniform incisal reduction. The initial action is to use the tip of the bur to scribe a supragingival gingival chamfer finish line that mirrors the gingival soft tissue contours. The tip of the bur is 1.25 mm in diameter, by using half of the bur depth; the operator can further monitor depth of reduction in the 0.6 to 0.7 mm range. Second, the bur can be used to “connect the dots” of facial and gingival reduction. Third, the burs base or shank, at a diameter of 2.0 mm can be used for a uniform depth reduction of the incisal edge. Finally, the burs diameter is well suited to create axial interproximal depth reduction of at least 1.0 mm. These cuts should mirror the final axial inclination of the finished restoration, either prepared “into” the facial proximal contact, or used to “slice” through the entire contact.*

**STEP 3**



**285.5C OCCLUSAL/LINGUAL DIAMOND**

*This course football shaped diamond aids in the finalization of lingual reduction in those anterior restorations that must “wrap” onto the lingual aspects. With a 1.6 mm diameter, at least 60% of the bur’s depth is used to provide at least 1.0 mm of lingual reduction for final restorative material strength.*

**STEP 4**



**392-016F MOSQUITO DIAMOND**

*The “mosquito” bur is used to slenderize the tooth gingival margin. This is ideal when the operator is “moving” the proximal contacts of the final restoration mesially or distally.*

**STEP 5**



**772.8F CHAMFER DIAMOND**

*Shaped almost like the 773.9C reduction diamond, this 40-micron diamond is used to finish and polish all margins and reduction areas. The removal of “ski jump” or “over-chamfered” margins aids in marginal integrity of the stone model and porcelain fabrication process. As margins are finished, the operator may also reduce the margins to their final supragingival position, right at the soft tissue margin location. In addition, facial aspects are reduced an additional 0.2 mm for a finished reduction depths of 0.7 mm.*

**STEP 6**



**285.5F/EF OCCLUSAL DIAMOND**

*Designed for final finishing and trimming, the fine and extrafine football shaped carbide bur is ideal for shaping and finishing the lingual contours and contacts of acrylic and Bis-acryl temporaries.*

**STEP 7**



**201.3 SF FINISHING DIAMOND**

*This 40-micron finishing diamonds are suited for adjusting the lingual and facial marginal areas, as well as adjusting occlusal contacts. The sharp tip of the flame shaped diamond provides ideal access to facial and interproximal marginal areas.*

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