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“Orange-Peeling” An innovative fixed tooth preparation technique

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"ORANGE PEELING": AN INNOVATIVE FIXED TOOTH PREPARATION TECHNIQUE

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Abstract

This report describes an innovative technique of crown preparation, called "Orange-Peeling", a straight forward technique valuable for increasing accuracy and speed of the procedure. The concept of this new technique evolves about undermining surface enamel by cutting through it from the side rather than grinding throughout the entire hard surface enamel.

Keywords: Dental crown preparation – enamel – enamel surface.

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ORANGE PEELING ": UNE TECHNIQUE INNOVANTE DE PRÉPARATION DES DENTS EN PROTHÈSES FIXÉES

Résumé

Ce rapport décrit une technique innovante de préparation de la couronne, appelée «Orange-Peeling», une technique simple utile pour augmenter la précision et la vitesse de la procédure. Le concept de cette nouvelle technique évolue pour miner la surface de l'émail en le coupant latéralement plutôt qu'en le meulant sur toute la surface améllaire dure.

Mots-clés: préparation de la couronne dentaire - émail - surface de l'émail.

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Introduction

Tooth preparation is of no doubt an indispensable element of restorative dentistry. It is essential to create optimum thickness for the strength and durability of the final restoration. Tooth preparation is in fact a very sophisticated procedure with many confounding factors like choosing the bur [1-3], grit [4], coolant [5, 6], or amount of applied pressure [5, 6]. Tooth preparation does not only affect fit of the restoration and subsequent micro-leakage [7, 8], but also the efficiency of bonding with adhesive cements [9-14].

Among all the suggested techniques, the one suggested by Schilenburg is the most commonly used in dental schools and practices [15, 16]. It involves removing tooth structure from the coronal then axial aspects. Axial preparation is performed by applying continuous back and forth pressure over the whole surface of each axial until the required finish-line thickness is achieved. The main drawbacks are that the bur-tooth contact is only a line (Figs. 1-3) which increases time of the preparation, and the back-forth motion of the bur results in irregularities.

The proposed innovative technique -"Orange Peeling"- reduces time due to increased bur-tooth contact and increases precision by preparing only one-third of the surface at a time i.e. increases "efficiency of the procedure".

The hardest layer of enamel is the surface enamel [17]. Unlike the conventional technique that grinds the tooth from the surface in a pulpal direction, "Orange Peeling" removes only 1/3 of the mesial surface enamel. This undermines the adjacent surface enamel. Henceforth, "Orange Peeling" technique involves cutting through enamel from the side instead of grinding into the hard surface enamel all around as in conventional technique.

One factor, often missed by the clinician, is that the cutting efficiency of diamond burs decreases dramatically when in use. Their cutting diamonds tend to wear down and debris accumulates in the bur cavities, reducing efficiency. In order to compensate, dentists tend to press harder on the tooth with the bur; inadvertently, this actually decreases the efficiency of the procedure and increases the potential for heat formation. In fact, carbide burs have shown a reduction in the temperature in a simulated pulp chamber when compared to diamond burs [18].

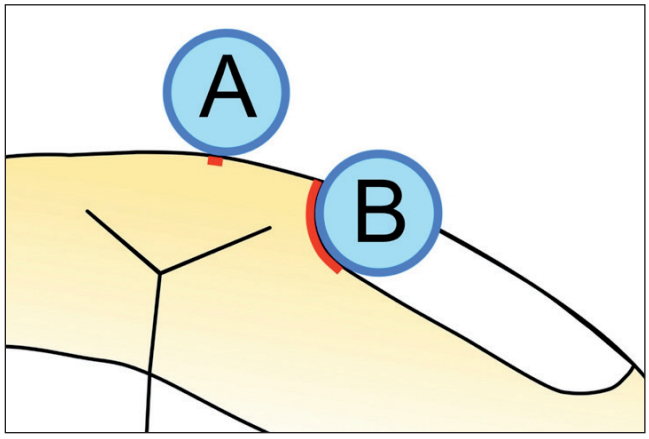


Fig. 1: A: Bur-tooth contact (red line) in conventional crown preparation technique. B: Bur-tooth contact (red surface area) in "orange-peeling" technique.

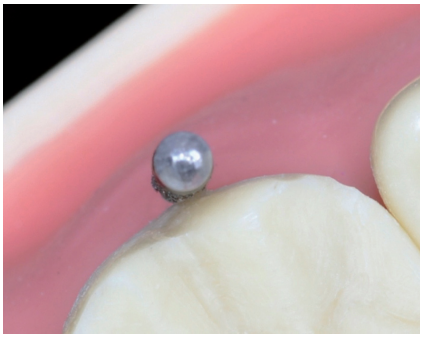


Fig. 2: Bur-tooth contact in conventional crown preparation technique.

Fig. 3: Bur-tooth contact in "orange-peeling" technique.

Technique

1) Place 1 mm depth-orientation grooves with a fissure carbide bur # H31R.314.01 (Komet Dental) at 440.000 RPM on slopes between occlusal cusps.

2) Remove islands between depth grooves following occlusal anatomy using round end taper (RET) carbide bur # H856U.314.016 (Komet Dental) (Fig. 4B).

3) Use the same bur to bevel the palatal cusps mesiodistally at a 45-degree angle to the long axis of the tooth.

4) Slice the mesial and distal contact open using a needle diamond bur #6856.313.014 (Komet, Brassseler) parallel to long axis of the tooth. (Fig. 4 A).

5) Start the axial reduction by moving RET bur back and forth (sawing motion) on the disto-buccal third, while held parallel to the long axis of tooth, until finish line is established (Figs. 5 & 6).

6) Place RET bur against the mesial wall formed after preparation of the distal third and apply light pressure in

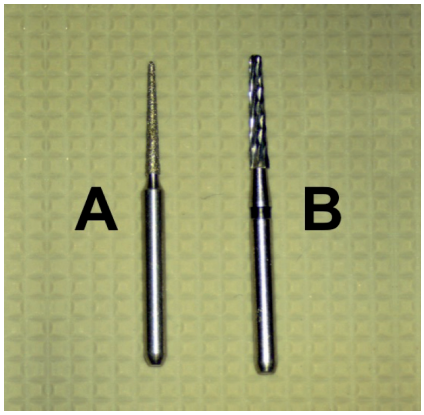


Fig. 4: A: Needle diamond bur # 6856.313.014. B: Round end taper (RET) carbide bur # H856U.314.016.

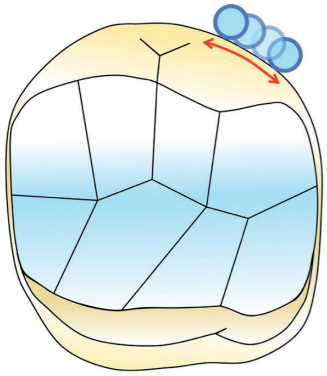
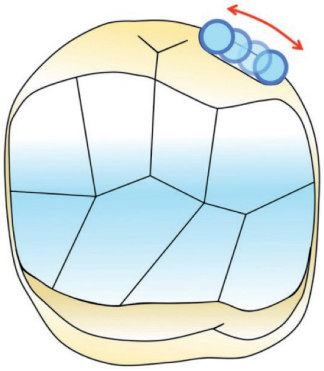
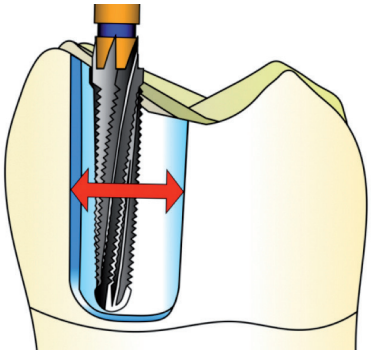


Fig. 5: Diagram showing the back and forth motion of a bur over the first few millimeters of the axial tooth surface in "orange-peeling" technique of crown preparation.





Figs. 6 (A & B): Diagram showing the initial indentation created by the bur in "orange-peeling" technique of crown preparation.

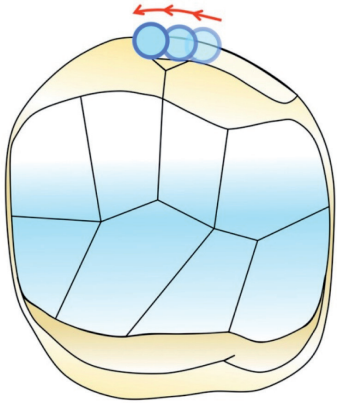


Fig. 7: Diagram showing a unidirectional movement of the bur in the second stage of tooth preparation using "orange-peeling" technique.

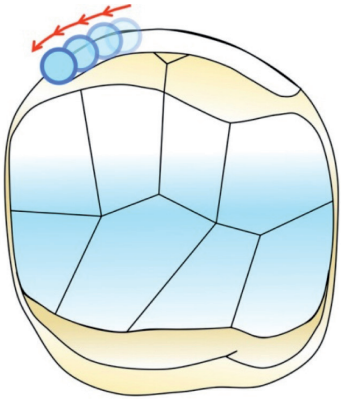


Fig. 8: Diagram showing continuous unidirectional motion of the same bur in fig. 7.

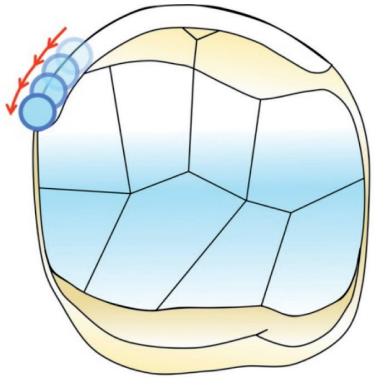


Fig. 9: Diagram showing continuation of movement of the bur in fig. 8.

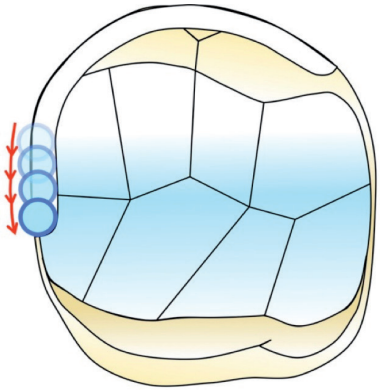


Fig. 10: Diagram showing continuation of movement of the bur in fig. 9.

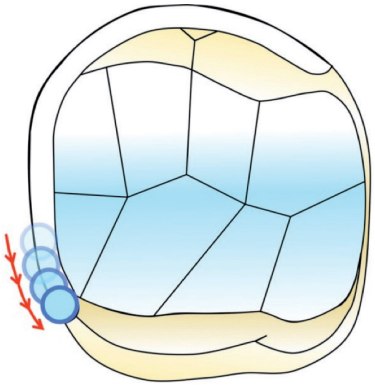


Fig. 11: Diagram showing continuation of movement of the bur in fig. 10.

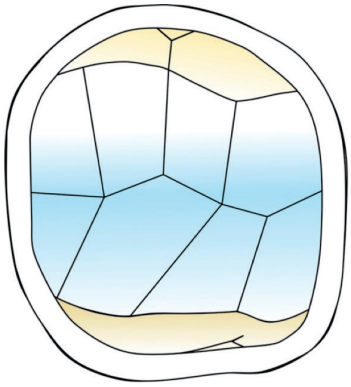


Fig. 12: Diagram showing circumferential preparation of the crown that was completed using "orange-peeling" technique.

the mesial direction, until finish line is established. (Figs. 7-9).

7) Continue the preparation using the same bur on all axial surfaces of the tooth until finish line is completed around the tooth (Figs. 10-12).

8) Use RET to refine tooth surface, round all point and line angles and eliminate any undercut.

Summary

Orange peeling technique is an innovative, easy-to-perform technique for crown preparation. It increases speed and reduces time that is the ultimate desire of every dentist. Moreover, enhanced control over the bur provides increased precision during the procedure. Enhanced control of the bur is due to the innovative concept of cutting over a small surface area of the axial surface enamel (one-third of the disto-buccal surface enamel) initially then from the side of the surface enamel instead of cutting into it in a pulpal direction all around the crown. If used as directed, "Orange Peeling" technique will indeed improve the efficiency of crown preparations. This technique should be applied in dental schools as well as well dental practices.

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