Anatomy and shaping of the mesial intercanal groove of the lower molars

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INTRODUCTION: Root canal anatomy, especially in molars, has always been a subject of study in endodontics. In the mandibular molars, a groove situated on the pulp-chamber floor between the mesial-canal orifices has been paid specific attention. According to Yesilsoy et al., after the canal shaping, potentially infected pulpal tissue could persist in the groove and might compromise the treatment prognosis [1]. The aim of this work is to study, on a set of first and second mandibular molars, the impact of using shaping instruments and ultrasonic tips on the depth and surface of this anatomical feature.

METHODS: This study was carried out on 18 healthy mandibular molars having two roots, one mesial and one distal, which were separate and fully formed. The crowns were cut horizontally at the level of the cemento-enamel junction [2]. After radiographs (mesial view), the roots were embedded in transparent resin cubes. An isomet was used to make a mesio-distal cut between the mesiobuccal and mesiolingual orifices. Then, an experienced operator mechanically prepared all the teeth in the same way. First, the canal orifices were enlarged and the mesial root canals prepared with HEROShaper® files (Micro-Mega Besançon, France). Subsequently, the intercanal groove was specifically prepared with ultrasonic tips under constant irrigation. The teeth were randomly split into two groups and prepared using the ETD 20 or the ET 25 tip (Satelec, Acteon Group, Mérignac, France). For each operating stage (before the treatment, after the shaping and after the ultrasonic preparation), three views (occlusal, internal, external) were taken with an operating microscope. The pictures were analyzed with the Photoshop® software. The peripheral limits of the canal orifices and the groove were drawn in order to calculate the depth and the surface area of the groove. These parameters were calculated after the mesial root canal shaping and the groove ultrasonic preparation. The depth and surface area data were converted into percentages to allow comparisons from one face to the other and between the different teeth. These data were then analyzed by a paired series Student test, before and after the ultrasonic preparation. The analysis of the variance of the effect of the two types of ultrasonic tips was also performed with a risk α=5%.

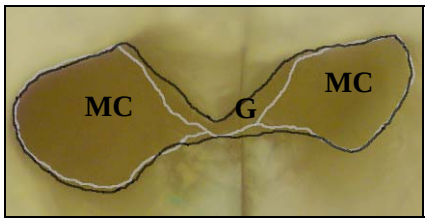

Fig 1: Canal orifices and groove limits, on occlusal view

— Limit after the root canal shaping

— Limit after the groove ultrasonic preparation

G: groove; MC: mesial root canal

RESULTS: The ultrasonic preparation allowed a significant gain in surface area of the groove on the occlusal, internal and external views. This preparation also provided a significant deepening on the sagittal views.

There was no significant difference between the groove preparation using the ETD 20 and the ET 25 tips (p=0.3722 to 0.9904 depending on the views).

Table 1: Depth and surface area average gain

View	Parameter under study	Average (%)
Internal	Depth	182.51
	Surface area	244.79
External	Depth	197.09
	Surface area	246.05
Occlusal	Surface area	35.98

DISCUSSION & CONCLUSIONS: Ultrasonic preparation enables the groove to be widened and deepened without distorting the root canal orifices. It allows the cleansing of this area by favouring the elimination of the pulpal tissue and by forming a reservoir for the irrigation. Moreover, thanks to a significant gain in surface area, it creates a "beam" between the mesial root canals which, prepared in this way, could be used to bond and fix coronoradicular restorations.

REFERENCES : [1] C. Yesilsoy, W. Gordon, O. Porras, B. Hoch (2000) *Journal of Endodontics* **28**:507-9. [2] P. Krasner, H.J. Rankow (2004) *Journal of Endodontics* **30**:5-16.