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Incidence of the Fourth Canal in Maxillary and Mandibular First Molars

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Maxillary first molar, the "6-year molar", is the tooth largest in volume and most complex in root and root canal anatomy. Therefore, maxillary first molar is possibly the most treated, least understood. It is the posterior tooth with the highest endodontic failure rate and unquestionably one of the most important teeth. The earliest permanent posterior tooth to erupt, the mandibular first molar seems to be the most frequently in need of endodontic treatment. So, endodontically, the maxillary and mandibular first molar are one of the most presents a variety of considerations for the treating practitioner. The purpose of this study was to determine the frequency with which a fourth canal is clinically located, instrumented and obturated in maxillary and mandibular first molar.

This is an important finding for the general practitioner and endodontist alike, as clinical success is directly related to the complete debridement and obturation of the root canal system. The thorough clinician must assume all maxillary and mandibular first molars have four canals until proven otherwise.

◆016

An in-vitro investigation of appearance of smear layer removal depending on application times and temperature of EDTA

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The objective of this study was to evaluate the effect of EDTA irrigant depending on application times and temperatures.

31 human mature extracted teeth with a single canal and a closed apex were sectioned with microtome in 3mm thickness. They were distributed randomly into 6 groups of 10 specimens each and control group of 2 specimens. Each specimen was prepared with GT™ rotary file (Dentsply, Maillefer Co., Swiss) and irrigated with 3ml sodium hypochlorite every minute. Then smear layer was removed with EDTA solution (PULPDENT®, PULPDENT Co., USA.) except two control specimens. Specimens of each group were irrigated with 17% EDTA.

The time and temperature of application were as follows:

	Application time	Application temperature
Group 1	2 minutes	8℃
Group 2		22℃
Group 3		50℃
Group 4	5 minutes	8℃
Group 5		22℃
Group 6		50℃

Then all specimens were split longitudinally and prepared for examination by scanning electron microscopy. A set of reference micrographs was used to award a debris score as follows: 0 = no smear layer, all tubules clean and open; 1 = no superficial smear layer, tubule openings visible, but some contain debris plug or soft tissue remnants; 2 = moderate smear layer, some tubules open and others closed; 3 = heavy smear layer, most/all tubule openings obscured. Results were evaluated with Kruskal-Wallis test to determine whether there was statistically significant difference among the six groups. Pairs of groups were analyzed using the Student-Newman-Keuls Method and Mann-Whitney test.

The results were as follows:

1. Control specimens showed heavy smear layer at the canal walls.
2. Among the groups applied with EDTA for 2 minutes, group 1 showed the heaviest smear layer, and there was statistically significant difference between group 1 and the other groups ($p < 0.05$).
3. Among the groups applied with EDTA for 5 minutes, group 4 and group 6 showed smear layer, but there was no significant difference between them.
4. Among the groups applied with EDTA for same temperature, group 1 showed heavier smear layer than group 4, and there was statistically significant difference ($p < 0.05$).
5. Among the groups applied with EDTA for same temperature, group 2 showed heavier smear layer than group 5 and group 3 showed heavier smear layer than group 6. But there was no statistically significant difference among them.

From the results above, it could be concluded, EDTA solution is effective in removing of smear layer when it is applied for 5 minutes. If EDTA is applied for 2 minutes, it should be applied above room temperature.