Najat Farsi, Med chem 2015, 5:10
http://dx.doi.org/10.4172/2161-0444.C1.015

OMICS International
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4th International Conference on
Medicinal Chemistry & Computer Aided Drug Designing
November 02-04, 2015 Atlanta, USA

The prevalence of extra root canals of maxillary first permanent molars among population in Jeddah, Saudi Arabia using Micro-Computed Tomography (Micro-CT)

Najat Farsi
King Abdulaziz University, KSA

Introduction: Worldwide, there have been many studies regarding root canals count and their variations among different populations. Most of those studies were focused on permanent molars, specifically first permanent molars due to their enormous variations from one population to another. They are the most teeth prone to suffer from dental caries therefore undergo root canal treatment. Variations in root canal counts, especially in multi rooted and their identification is the key to a successful endodontic therapy. It is generally accepted that the maxillary first molar has three root canals (mesobuccal, destobuccal and palatal) but in many cases it was found to have four canals (two mesobuccal root canals). Micro-CT has been used in dentistry successfully for a number of years. It can be used to produce qualitative and quantitative data, in various dental disciplines like endodontic, prosthetics and restorative dentistry. It gives a unique insight of the anatomy of the tooth. Micro CT has more advantages over other conventional methods such as cone beam and radiography. It has higher resolution, shorter capture time, higher accuracy and the fact that it's none invasive and it gives reproducible results in comparison to the other methods.

Objectives: This study aimed to utilize Micro-Computed Tomography x-ray, (Micro–CT) to study the prevalence of extra root canals of maxillary first permanent molars per examined tooth.

Materials & Methods: A total of 100 extracted maxillary first permanent molars due to caries or orthodontic treatment were collected. The molars were scanned using Skyscan, high resolution desk top micro-CT (Model 1172, Skyscan, Bruker, Belgium). After scanning and reconstruction, analysis of the data is carried out with Skyscan analyzer software system to detect the extra root canal orifices per tooth.

Results: The results show that of 100 maxillary first permanent molars analyzed, 5.26% had 3 root canals, 47.37% had 4 root canals, 35.09% had 5 root canals and 10.53% had 6 root canals and only 1.75% had 7 root canals.

Conclusions: Within the limitations of this study, our results show a high frequency of four and five root canals and a low frequency of three-root canals in maxillary first permanent molars among population in Jeddah, Saudi Arabia. Based on the results of this *in vitro* study, MicroCT, as a diagnostic modality, is recommended for the effective identification tool in various dental fields. Application of this study on large sample is recorded.

nmafarsi@gmail.com

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