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القناة الجذرية للضرس الاول فى الفك الاعلى

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Introduction

The largest tooth in volume and the most complex in root and canal anatomy is the six year molar. Which are the most treated and the least understood posterior tooth. It is the posterior tooth with the highest endodontic failure rate. The three individual roots of maxillary first molar are the mesiobuccal, distobuccal and the palatal roots forming a tripod. The maxillary first molar usually associated with many anomalies including four roots and unusual morphology of the root canal systems within individual roots. The cause of endodontic failure is multifaceted but statistically significant percentage of failures is related to missed root canal system. Missed canals hold tissue and at times bacteria and related irritants that inevitably contribute to clinical symptoms and lesions of endodontic origin.

To facilitate the searching for the expected second mesiobuccal canal there are many armamentarium and techniques used. Such as anatomic familiarity, radiographic analysis, computerized digital radiography, enhanced vision with magnification glasses, headlamps, Trans illuminating devices, the dental operating microscope, and surgical length bur are used. Also, access cavities should be prepared and expanded and the isthmus areas and developmental grooves or both are

firmly probed with an explorer in an effort to find a catch. Microopeners, various dyes like methylene blue are used, also sodium hypochlorite can aid in the diagnosis of missed or hidden canals by means of champagne test.

Because of the complex anatomy of the maxillary first molar, the clinician should always assume that there are more than three root canals.

Now in the era of the 21st century the highest technology facilitate the success in endodontic therapy.

REVIEW of Literature

*The hard tissue repository of the human dental pulp takes on many configurations that must be understood before treatment can begin. From the early work of **Hess and zurcher** ⁽¹⁾ to the most recent studies demonstrating anatomic complexities of the root canal system. It has long been established that the root with a graceful, tapering canal and a single apical foramen is the exception rather than the rule. Investigators have shown multiple foramina, fins deltas, loops, furcation accessory canals and more in most teeth.*

Many researchers have studied the different morphological patterns in the pulp chamber (2 - 8)

***Sergio et al** in 1978 examined 134 extracted maxillary first molar for the configuration of the floor of the pulp chamber. The specimens were ground and the pulp chamber was examined with a magnifying glass and explored with 0.08 mm instruments. They found that 93% of maxillary first molar had a tetragonal shaped pulp chamber. Only 6% were found to be triangular. Therefore they recommended modifying the traditional access preparation for maxillary molars by creating a more heart shaped form and by counter sinking the floor of the chamber to remove the overhanging mesial dentinal shelf that hidden the orifice of the mesiolingual canal.*

Wilcox et al in 1989 in a study to relate the access outline on the occlusal surface to the canal orifices in molars. The occlusal surfaces of maxillary and mandibular molars were photographed and prints made, the crowns were then sectioned at the level of the pulpal floor to expose the canal orifice. Transparent photographs of the orifices were taken and projected on the occlusal photograph. Results showed that canal orifices were located in a consistent pattern relative to occlusal landmarks and The resulting out line scribed from the orifices tended to be centered occlusally on the crown of each group and didn't extend to the marginal ridges.

Thomas et al in 1993 examined the root canal anatomy and pulp chamber morphology of 216 maxillary permanent first molar teeth of known age. Using a radiographic technique, after infusion of root canal system with the radio-opaque material sodium thiomate gel. The results showed that the transverse cross section shape of the pulp chamber was trapezoidal in 81% of teeth .Two canals were found in 74% of the mesiobuccal roots. All the types of configuration were seen in the mesiobuccal roots. Over 95% of Palatal and distobuccal roots contained a single root canal.

Yoshika et al In 2002 studied 260 teeth to compare the detection rate of root canal orifice by 3 different methods. Using naked eyes, surgical loupes and under a microscope. Then India ink was injected into the pulp chamber and all the teeth were cleared to determine the actual number of the orifices. There was a significant difference in the detection

rate among the 3 methods; indicating that microscopic method could be more accurately in detecting orifices than the others could.

Hazendroglu et al in 2003 examined 200 extracted teeth consisting of 50 maxillary first molar, 50 maxillary second molars, 50 mandibular first molars, 50 mandibular second molars from Turkish patients. After preparation of access cavities and removal of pulp tissue, the teeth were stored in 5.25% NaOCl₂ for one hour and stored in 0.5% basic fuchsin for one week. The teeth were sectioned at the C.E.J. and the presence of patent furcal canal was examined by stereomicroscope. The results were 24% of maxillary first molar, 16% of maxillary second molar, 24% of mandibular first molar and 20% for mandibular second molar had furcal accessory canals. Conclusion is in a Turkish Population, the incidence of a patent furcal accessory canals on the pulp chamber floor of mandibular and maxillary first and second molars ranged between 16% and 24 %.

Krasner and Rankow in 2004 examined a total of 500 extracted permanent human teeth. Four hundred teeth had their crown cut off horizontally at the level of the C.E.J... Fifty teeth were sectioned in buccal direction. And fifty were sectioned in a mesiodistal direction through the crown and root. Results showed that the pulp chamber was always in the center of the tooth at the level of C.E.J. The orifices of the root canals are always located in the junction of the walls and floor at the angles of the floor-wall junctions (law of orifice location).

Deutsch and Musikant in 2004 studied one hundred randomly extracted maxillary molar teeth to measure critical morphology of molars pulp chambers. Each molar was radio graphed mesiodistally on a millimeter grid using a stereomicroscope. The measurements were read to the nearest 0.5 mm. The results were as follow for maxillary molars: pulp chamber floor to furcation = 3.05mm.

Different morphological variations are evident in mesiobuccal root canal, distobuccal root canal, and palatal root canal as reported by many researchers.

The mesiobuccal root of the upper maxillary first molar is characterized by its great variation in its root canal anatomy (9-35)

Weller and Hartwell in 1989 examined 1134 maxillary first molars. Several proposals have been presented to help to locate the fourth canal. Foremost was a modification of the access preparation to a Rhomboidal shape, also probing of the fissure or groove between the mesiobuccal canal and the palatal canal. They reported that 34.4% only showed two mesiobuccal canals.