

Prevalence and distribution of dilaceration in the permanent dentition of an Iranian population

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SUMMARY

A thorough knowledge of external dental root morphology is fundamental for having successful endodontic, orthodontic and surgical treatments in dentistry. The aim of this anatomical study was to determine the incidence of tooth dilacerations in Kerman, a province in the Southeastern Islamic Republic of Iran. A cross-sectional study was performed on a total of 3150 teeth from 800 PA radiographs; 100 radiographs from each 8 anatomic divisions of the dental arch, within a Kerman population. The numbers of radiographs were equal between 2 genders; 400 from females and 400 from males. Radiographs were studied by 3 specialists in this field in order to determine and record the prevalence and distribution of dilacerations in different teeth of this population. Amongst the total of 3150 teeth from 800 radiographs, 52 teeth (1.65%) showed dilacerations. The prevalence of this anomaly was 7.5% in males and 5% in females, and the distribution was almost equal between different teeth of the maxilla (2%-4%); meanwhile in the mandible, the maximum prevalence was in third molars (14%) and the rate was nil in anterior teeth (Spss and Excel softwares, IBM). The prevalence of tooth dilacerations was almost equal between genders in the Kerman population that was studied. The findings indicated that the presence of dilacerated roots was more prevalent in females in the mandibular arch, while this anomaly was more prevalent in males in the maxillary arch. Interestingly, none of the mandibu-

lar incisor teeth displayed this anomaly.

Key words: Anatomical study – Dilaceration – Distribution – Kerman population – Prevalence

INTRODUCTION

John Tomes, was the first who recorded the term “dilaceration” in 1848, and described it as the forcible separation of the cap of the developing dentin from the pulp while developmental procedures of the tooth germ. He also defined it as the deformity of a tooth because of a disturbance between mineralized and unmineralized parts of the developing tooth structure (Tomes, 1848; Schafer et al., 1983).

Radiographically, dilacerations are determined when there is a sharp angulation or deviation in the crown or root of a developed tooth with an angle of curvature 90° or more, although there is a controversy in the literature for this determination. Some of the experts believe that dilacerations represent a deviation from the normal axis of the tooth with an angle of curvature, 20° more in the apical third of the root (Hamasha et al., 2002; White et al., 2004). There are two major reasons identified for this occurrence. The most widely believed reason is mechanical trauma to the deciduous teeth that results in the formation of dilacerations in the future permanent successors. In cases where there is no clear evidence of traumatic injury, an idiopathic developmental disturbance has been proposed as a possible cause for dilacerations (Andreasen et al., 1971; Chohayeb et al., 1983; Chadwick et al., 1995; Matsouka et al., 2000).

Although the incidence of traumatic injuries to the

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deciduous teeth is about 11 to 30%, the reported prevalence for dilacerated permanent teeth is much less. Hence, traumatic injuries to the primary dentition seem unlikely to account for all cases of dilacerations (Von Gool, 1973; Jafarzadeh and Abott, 2007). Furthermore, since dilacerations are more prevalent in posterior teeth, which are less prone to traumatic injuries, the trauma theory does not seem to be the main or the only factor that contributes to this anomaly (Schafer et al., 1983). Ectopic eruption of teeth, presence of tumors, or cysts are other possible causes for this anomaly among different teeth of the dental arch (Regezi et al., 1991; Silva et al., 1997; Cardoso et al., 2003; Jafarzadeh and Abott, 2007).

Dilacerations are not a frequently encountered dental anomaly, but they do cause a number of diagnostic, prognostic and clinical challenges in dental practice. Hence, a dilacerated tooth has to be identified before any treatment planning by a thorough radiographic examination. Dilacerated teeth have been reported to be a serious challenge in endodontics, orthodontics and oral surgery (Kolokithas et al., 1979; Lin et al., 1982; Lowe et al., 1985; Maragakis, 1985; Kilpatrick et al., 1991; Kearns, 1998; Yeung et al., 2003; Malcic et al., 2006).

In reviewing the literature using PubMed central and Google Scholar, most articles written about dilacerations were case reports demonstrating this anomaly in different teeth of the dental arch; therefore, there has been an insufficient focus on deter-

mining the prevalence of this anomaly in the past. The current study was done to determine the incidence of tooth dilacerations in an Iranian population with regard to gender, jaw and dental subtypes.

MATERIALS AND METHODS

Eight hundred high-quality periapical (PA) radiographs from 8 different divisions of dental arcs with equal numbers were procured and assessed. The two genders were randomly selected from different dental centers of Kerman, a province in South Eastern Islamic Republic of Iran. The age of the related patients was between 15 and 50. The total number of the teeth was 3150, excluding primary and the lost teeth from the study. The radiographs were viewed and interpreted by 3 examiner experts at 2X magnification on an x-ray viewer in a dark room. Bulls eye appearances, meaning a round opaque area showing central radiolucency on the PA radiograph of a tooth, were interpreted as being buccal or lingual dilacerations, according to the reference texts. Furthermore when mesially or distally sharp deviations (over 90°) in any part of the roots were seen, it was interpreted and recorded as a dilacerated tooth of the related subtype.

RESULTS

The overall prevalence of dilacerations was 1.65% among all tooth types of the dental arch in

Table 1. Prevalence and distribution of tooth dilaceration in Kerman population.

	Males	Females	Total no	Males%	Females%	Total%
Maxilla	15.00	10.00	25.00	7.50%	5.00%	6.25%
Central	2.00	0.00	2.00	1.00%	0.00%	0.50%
Lateral	2.00	1.00	3.00	1.00%	0.50%	0.75%
Canine	1.00	1.00	2.00	0.50%	0.50%	0.50%
First Premolar	2.00	2.00	4.00	1.00%	1.00%	1.00%
Second Premolar	3.00	1.00	4.00	1.50%	0.50%	1.00%
First Molar	2.00	2.00	4.00	1.00%	1.00%	1.00%
Second Molar	2.00	0.00	2.00	1.00%	0.00%	0.50%
Third Molar	1.00	3.00	4.00	0.50%	1.50%	1.00%
Mandible	13.00	14.00	27.00	6.50%	7.00%	6.75%
Central	0.00	0.00	0.00	0.00%	0.00%	0.00%
Lateral	0.00	0.00	0.00	0.00%	0.00%	0.00%
Canine	1.00	2.00	3.00	0.50%	1.00%	0.75%
First Premolar	2.00	3.00	5.00	1.00%	1.50%	1.25%
Second Premolar	0.00	1.00	1.00	0.00%	0.50%	0.25%
First Molar	1.00	1.00	2.00	0.50%	0.50%	0.50%
Second Molar	1.00	1.00	2.00	0.50%	0.50%	0.50%
Third Molar	8.00	6.00	14.00	4.00%	3.00%	3.50%

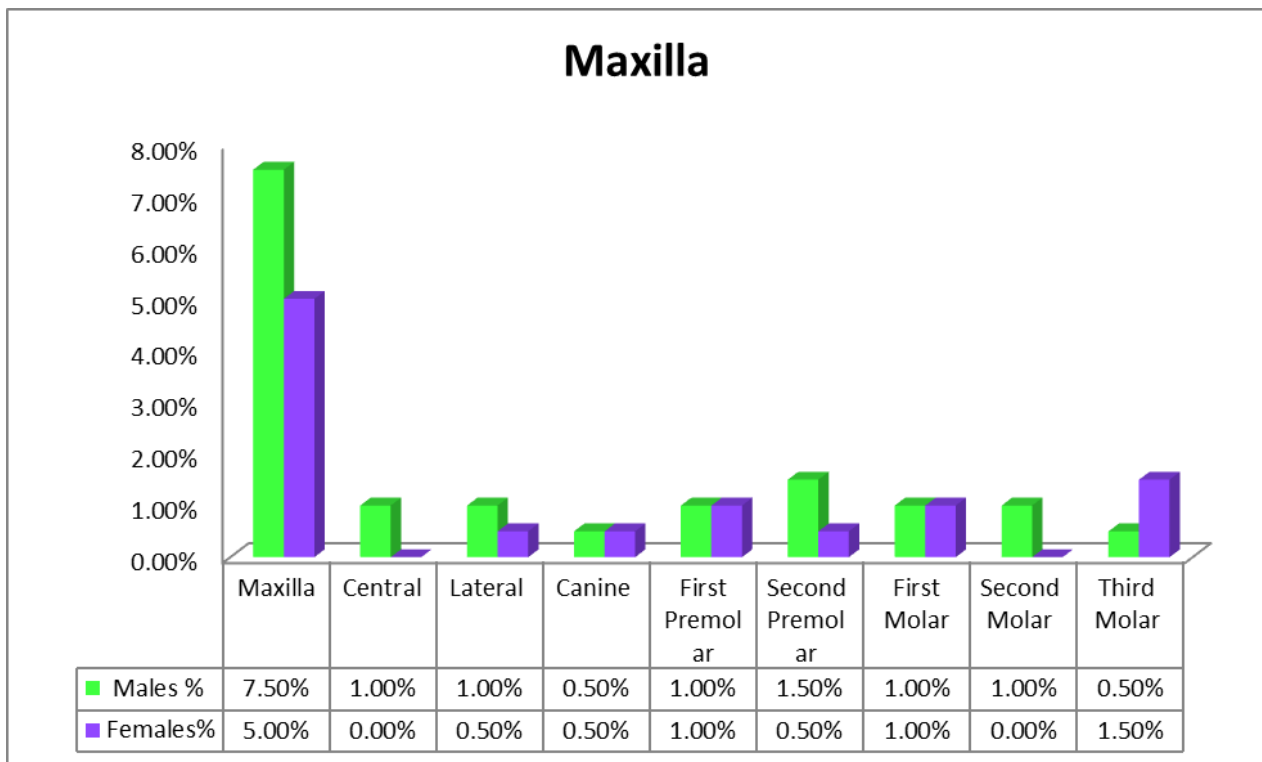


Fig 1. Prevalence and distribution of dilaceration in the maxillary arch of Kerman population.

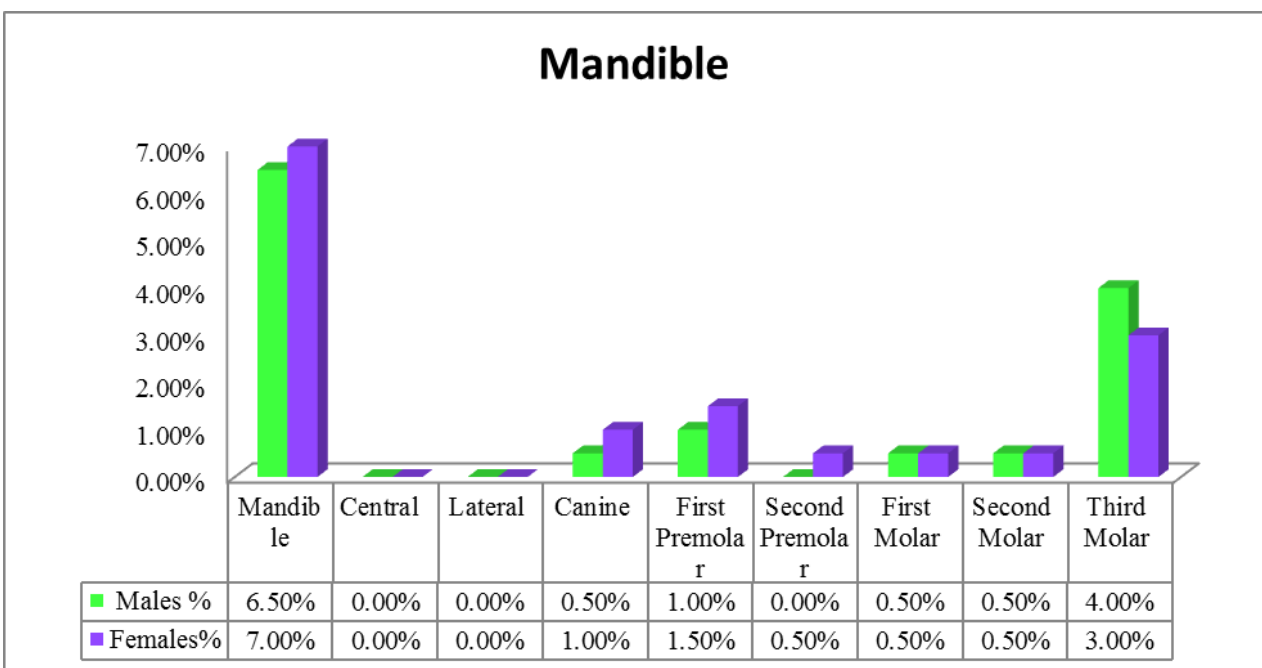


Fig 2. Prevalence and distribution of dilaceration in the mandibular arch of Kerman population.

this South Eastern Iranian population (Table 1). The prevalence of this anomaly was 7.5% in males and 5% in females and the distribution was almost equal between different teeth of maxilla (2%-4%); meanwhile in the mandible, the maximum prevalence was in third molars (14%) and this rate was nil in anterior teeth. (SPSS software & EXCEL, IBM). The results of this study are summarized in Table 1 and also in the Graphs 1 and 2.

DISCUSSION

The prevalence of dilacerations (1.65%) in Kerman was higher than the incidence of this anomaly in Shiraz (0.3%), which is also a southern province in Iran, but much less than Yazd (16%), a central province in this country (Ardakani et al., 2007; Nabavizadeh et al., 2013). Regarding the prevalence of dilacerations between 2 jaws, the results

of current study in Kerman are consistent with Nabavizadeh et al. (2013) in Shiraz and with Miloglu et al. (2010) in Turkey. These studies report similar prevalence in maxillary and mandibular jaws. The overall incidence reported for dilacerations is (9.5%) in Turkey, (16%) in the United Arab Emirates (UAE), (0.5% in India), (3%) in Nigeria, (0.32%) in Croatia, (3.8%) in Jordan (Hamasha et al., 2002; Malčić et al., 2006; Udoye et al., 2009; Miloglu et al., 2010; Renuka et al., 2010; Zakaria et al., 2018).

As indicated, most of the studies have found a prevalence rate for dilacerations less than (0.5%) in different parts of the world, which is in contrast with the results found in Yazd, Turkey and the UAE. The large difference in the results of different studies may be due to different criteria for determining the presence of tooth dilacerations, as has been explained in the introduction.

The implications for the presence of dilacerations are far-reaching and depend solely on the nature of the treatment plan for these teeth. For all three disciplines, endodontics, orthodontics and oral surgery, the choice of treatment will vary based on the desired outcomes, the radiographic assessments, for which a CBCT may be indicated and the skill and expertise of the clinician (Sakir et al., 2014; Lu et al., 2018; Dudeja et al., 2016; Sumathi, 2018; Kuzekanani et al., 2017; Kuzekanani and Najafipour, 2018).

CONCLUSION

The prevalence of tooth dilacerations was almost equal between genders in the Kerman population that was studied. The findings indicated that the presence of dilacerated roots was more prevalent in females in the mandibular arch, while this anomaly was more prevalent in males in the maxillary arch. Interestingly, none of the mandibular incisor teeth displayed this anomaly.

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