In Vitro Study of the Incidence of Radicular Grooves in Maxillary Incisors

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The purpose of this investigation was to determine the prevalence of radicular grooves in 500 central and 421 lateral extracted maxillary incisors. Radicular grooves were present in 2.0% of the central and 2.6% of the lateral maxillary incisors. The majority of radicular grooves in central maxillary incisors were detected on the buccal root surface (1.6%), and fewer on the lingual root surface (0.4%). In lateral maxillary incisors, the radicular grooves were always observed on the lingual surface.

Key Words: maxillary incisors, radicular grooves.

Introduction

Radicular grooves are among the morphological defects of the teeth which have been reported as predisposing factors to periodontal disease (Lee et al., 1968; Everett and Kramer, 1972; Withers et al., 1981; Meister et al., 1983).

The radicular grooves encountered in maxillary incisors have received several names, such as palatal gingival groove (Lee et al., 1968), radicular developmental anomaly (Simon et al., 1971), distolinguinal groove (Everett and Kramer, 1972) and radicular lingual groove (August, 1978).

Everett and Kramer (1972) observed that the distolinguinal grooves may be of varied length and depth, and emphasize that, once exposed to the mouth environment, bacterial plaques and calcified deposits may lodge in it. The cleansing of the region by the patient is impossible, causing consequent periodontal pocket formation. Effective treatment of such pockets is difficult. The radicular groove may be seen radiographically as a radiolucent parapulpal line.

August (1978) stresses the importance of diagnosing the presence of eventual radicular grooves, so that the dental practitioner can instruct his patient to pay greater attention to the hygienic care of that specific area, in order to avoid periodontal problems. In fact, periodontal pockets installed in radicular grooves carry an uncertain prognosis.
Withers et al. (1981) studied the incidence of palatogingival grooves in 2099 teeth of 531 patients, and detected the presence of root grooves in 2.3% of the central and lateral maxillary incisors examined. They associated poor periodontal health with the presence of radicular grooves.

The objective of the present investigation was to study in vitro the presence of radicular grooves in the maxillary central and lateral incisors.

Material and Methods

Extracted maxillary teeth (500 central and 421 lateral incisors) were studied with the aid of a magnifying lens (10X). The examination was performed throughout the tooth, from the crown to the radicular apex, and the teeth presenting radicular grooves, either buccal or palatine, were photographed.

Results

Only 10 of the 500 central maxillary incisors examined presented radicular grooves (2.0%). In these teeth, 8 of the grooves were buccal (1.6%) and 2 (0.4%) lingual. The buccal groove in the central upper incisors initiated in a pit located at the cervical region of the crown and extended to the apical region of the root, while the radicular lingual groove initiated in the region of the cingulum. In the lateral maxillary incisors, the radicular grooves were detected in 2.6% of the cases on the lingual surface, and none on the buccal surface.

Figures 1 and 2 show the aspect of these grooves on the buccal and lingual root surfaces of maxillary incisors.

Figure 1 - Presence of radicular grooves, buccal and lingual, in maxillary central incisors.
Discussion

Maxillary incisors are normally uniradicular teeth, with only one canal in most cases (Barrett, 1925; Pucci and Reig, 1944; De Deus, 1982). Nevertheless, several investigators have reported cases of root anomalies, principally in maxillary lateral incisors (Christie et al., 1981; Herrero-Moraes, 1983; Halton and Ferrillo, 1989).

The region in which the lateral incisors are located is considered an area of embryological risk, where a number of malformations may occur: cleft palate, cleft ridge, globulomaxillary cyst, supernumerary teeth, conic teeth, dens in dente and talon cusps (Mitchell, 1892; Goldstein and Medina, 1974; Gardner and Girgis, 1979; Pécora et al., 1987; Vansan et al., 1990).

Radicular grooves are encountered in maxillary incisor roots, mainly in lateral incisors, and this anatomical anomaly favors the installation of periodontal pockets difficult to treat (Everett and Kramer, 1972; Withers et al., 1981).

In the present study, 2.6% of the radicular grooves were detected in the lateral maxillary incisors, all beginning at the region of the cingulum. This finding is in accordance with that reported by Everett and Kramer (1972).
In central maxillary incisors, a 2.0% incidence of radicular grooves was found, which was greater on the buccal face (1.6%). In these teeth, the radicular buccal groove initiates in a depression of the cervical region of the tooth crown and extends to the root, where it may reach the apex.

The literature reports the presence of radicular grooves only on lingual surfaces, but in this study we observed that they can be encountered also on the buccal surface of the central maxillary incisors. In view of this location, it was given the name of radicular buccal groove.

The radicular grooves, buccal or lingual, are anatomical anomalies capable of favoring the installation of periodontal diseases of difficult solution.

The radicular lingual grooves are more frequent in the lateral maxillary incisors than in the central ones, but the radicular buccal grooves seem to be present only in the central maxillary incisors.

The dental surgeon ought to always be alert for the existence of eventual radicular grooves, in order to assure a correct prognosis in case they are present, and to better instruct his patients as to the necessity of better hygienic care of these areas, to prevent periodontal problems. In fact, teeth with radicular grooves are more prone to cause serious endodontic-periodontal problems.

Conclusions

1. The central maxillary incisors presented radicular grooves in 2.0% of the teeth studied.

2. In the central maxillary incisor, the incidence of radicular grooves was greater on the buccal (1.6%) than on the lingual (0.4%) radicular face.

3. The incidence of radicular lingual grooves in lateral maxillary incisors was 2.6%.

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