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CASE REPORT

Myofunctional approach for open bite correction in a patient with severe upper incisor external apical root resorption

Manejo miofuncional de mordida abierta anterior en un paciente con reabsorción radicular apical externa severa de incisivos superiores

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ABSTRACT

Root resorption is a complication of orthodontic treatment that may occur in various degrees of severity. However, considerable root resorption can also be appreciated in patients where root development has been interrupted by different circumstances during the orthodontic treatment. A 9-year-old female patient was admitted after being in a treatment with fixed appliances for 3 years. She presented clinical features of anterior open bite and the radiographic evaluation showed important root resorption of the four maxillary incisors. It was decided to use a more conservative approach instead of fixed appliances during the initial phase of treatment and a myofunctional therapy was chosen. Assessment of the upper airways was performed before placing a tongue crib accompanied by exercises of the *orbicularis oris* muscle complex, after one month of follow-up appointments, bite closure was obtained. Chances of relapse are reduced with appropriate growth guidance and changes in the muscular behavior of young patients.

RESUMEN

La reabsorción radicular es una complicación que se puede presentar en el tratamiento ortodóncico en diversos grados. Asimismo, en pacientes cuyo desarrollo radicular es interrumpido por diferentes causas puede observarse un acortmiento radicular. Fue admitida una paciente femenina de 9 años de edad después de un tratamiento interceptivo de 3 años de duración, que presentó características clínicas de mordida abierta anterior. En la valoración radiográfica se observó un acortamiento considerable de los cuatro incisivos superiores. Se tomó la decisión de no colocar aparatología fija de forma inicial y abordar el problema con una terapia muscular funcional. Después de evaluar la permeabilidad de las vías aéreas superiores, se colocó una trampa de lengua y mediante ejercicios peribucales se consiguió cerrar la mordida tras un mes de citas de control. Al guiar el crecimiento esquelético y modificar el comportamiento muscular del paciente se reduce la posibilidad de recidiva.

Key words: Open-bite, root resorption, myofunctional therapy, tongue thrust disorder.
Palabras clave: Mordida abierta, reabsorción radicular, terapia miofuncional, deglución atípica.

INTRODUCTION

Root shortening, a specific type of external root resorption, is an orthodontic treatment complication that occurs in mild degrees on most occasions in patients who undergo important orthodontic movements. However, it is rare that such reabsorption is severe enough to create a clinical problem. Currently, it has not been reported in the literature the spontaneous loss of a dental organ due to the root resorption by iatrogeny.

External apical root resorption is the loss of root structure involving the apical region to such a degree that can it be detected by means of dentoalveolar radiographs. The reabsorption can be physiological, as is the exfoliation of temporary teeth, or pathologic, when it affects permanent teeth. It may be defined as a defense mechanism by which the body responds to external or internal stimuli and takes place in hard tissues.[1] External root resorption is probably the most common sequelae of orthodontic treatment, because forces applied on teeth in a short period of time may produce root resorption.[2]

Root resorption associated with orthodontic treatment is more evident in patients on whom heavy, long-term and in an adverse direction forces, were applied or when the tooth is not capable of withstanding normal forces due to a deterioration of the support system by factors such as pressure of the adjacent teeth, periodontal inflammation, periapical inflammation, tooth reimplantation, severe occlusal trauma, dentoalveolar trauma with partial or total

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avulsion, tumors and cysts, endocrine and metabolic disorders or idiopathic factors.[3,4] In addition, the severity and type of malocclusion are important factors that must be taken into consideration since it has been observed that an increased overjet and open bites have a greater risk of root resorption.[5,6]

Classic orthodontics consists of fixed appliances for solving dental malocclusions, but sometimes it is better to use functional forces instead of stronger mechanics. Continuous and heavy forces produce greater root resorption by the generated friction and the recovery inability of the periodontal ligament.[4]

BACKGROUND

At the beginning of the last century, the orthodontic community was shocked by the root damage that may occur due to orthodontic movement.[1] The condition was more evident in subjects where the forces applied on the teeth were strong and applied for long periods of time, in inadequate directions or in individuals whose teeth were unable to withstand normal forces due to the weakening of the support system. Root resorption was located in the outer surface of the root and could be observed in the cervical, middle and apical thirds.[3,4]

Controversy exists in clinical and laboratory research reports on root resorption compared to the incidence and amount of external apical root resorption. The mean for root resorption varies from 0.2 mm to 2.93 mm, while the prevalence of radiographic detectable resorption varies from 0 to 100%.[7-9] Such controversies may be attributed to the considerable differences in the studied tooth type, sample sizes, follow-up duration, type of dental movement, measurement methods and patient's characteristics.[1]

The etiology of root resorption has two phases: a stimulus and a re-stimulation. In the first phase, the stimulus affects non-mineralized tissues, such as the pre-cement or cementhoid tissue which covers the external root surface. This stimulus may be mechanical (by dental trauma or orthodontic treatment) or chemical (dental bleaching with high concentrations of hydrogen peroxide).[2]

The exposed mineralized tissue is colonized by multinucleated cells, which initiate the resorption process. However, if there are no more stimuli to the reabsorbing cells, the process will end spontaneously. The repair with cement will happen in two to three weeks, if the affected surface does not involve a large area. If the affected area is large, the cells have the ability to invade the root before the cementoblasts can colonize the surface and generate anchylosis. In the second phase, the continuation of the resorption process depends on continuous odontoclasts stimulation or re-stimulation by infection or pressure.[2]

CASE REPORT

Female patient, 9 years of age, attends the Orthodontics Clinic at the Postgraduate Studies and Research Division of the National Autonomous University of Mexico. Upon interrogation, the patient's mother explained that the patient underwent a previous orthodontic treatment for 3 years to correct the anterior open bite. Her chief concern was the relapse of the anterior open bite four months after appliance removal. Upon clinical examination, a convex profile, chin muscles hypertonicity, anterior open bite and atypical swallowing were observed accompanied by a mouth-breathing habit.

INITIAL RECORDS

Extra and intraoral photographic records were obtained *(Figures 1 and 2)* as well as cast study models. Clinically, an anterior open bite in the mixed dentition stage was observed. It was also observed

Figure 1. Frontal and lateral facial photographs. Increased lower third and chin muscle hypertonicity may be observed.

Figure 2. Frontal and lateral intraoral photographs, where an anterior open bite in the mixed dentition is observed.