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ORIGINAL ARTICLE CE AJO-DO

Comparison of root resorption after bone-borne and tooth-borne rapid maxillary expansion evaluated with the use of microtomography

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Introduction: Root resorption was compared between bone-borne and tooth tissue–borne rapid maxillary expansion patients with the use of microtomography. **Methods:** The study included 20 patients (ages 11–16 years) requiring fixed orthodontic treatment who underwent extraction of their first premolars after rapid maxillary expansion with the use of modified appliances. One side of the appliance covered the teeth with acrylic, while the other side was fixed to the palatal bone by means of a miniscrew. After 3 months' retention, the appliance was removed and teeth were extracted and examined with the use of microtomography. **Results:** When the apical, middle, and cervical thirds, as well as the buccal and lingual sides, were compared, the volume loss was significantly higher in the tooth tissue–borne group than in the bone-borne group ($P < 0.01$). The least volume loss occurred on the cervical third lingual surface in the tooth tissue–borne group and on the middle third buccal surface in the bone-borne group. In the former group, least resorption occurred on the cervical third and highest resorption on the buccal side. In the latter group, surfaces showed no significant changes. **Conclusions:** More root resorption occurred in the tooth tissue–borne group, mostly in the apical and middle thirds. The amount of resorption on the buccal surface was higher than that on the lingual surface. (Am J Orthod Dentofacial Orthop 2019;155:182-90)

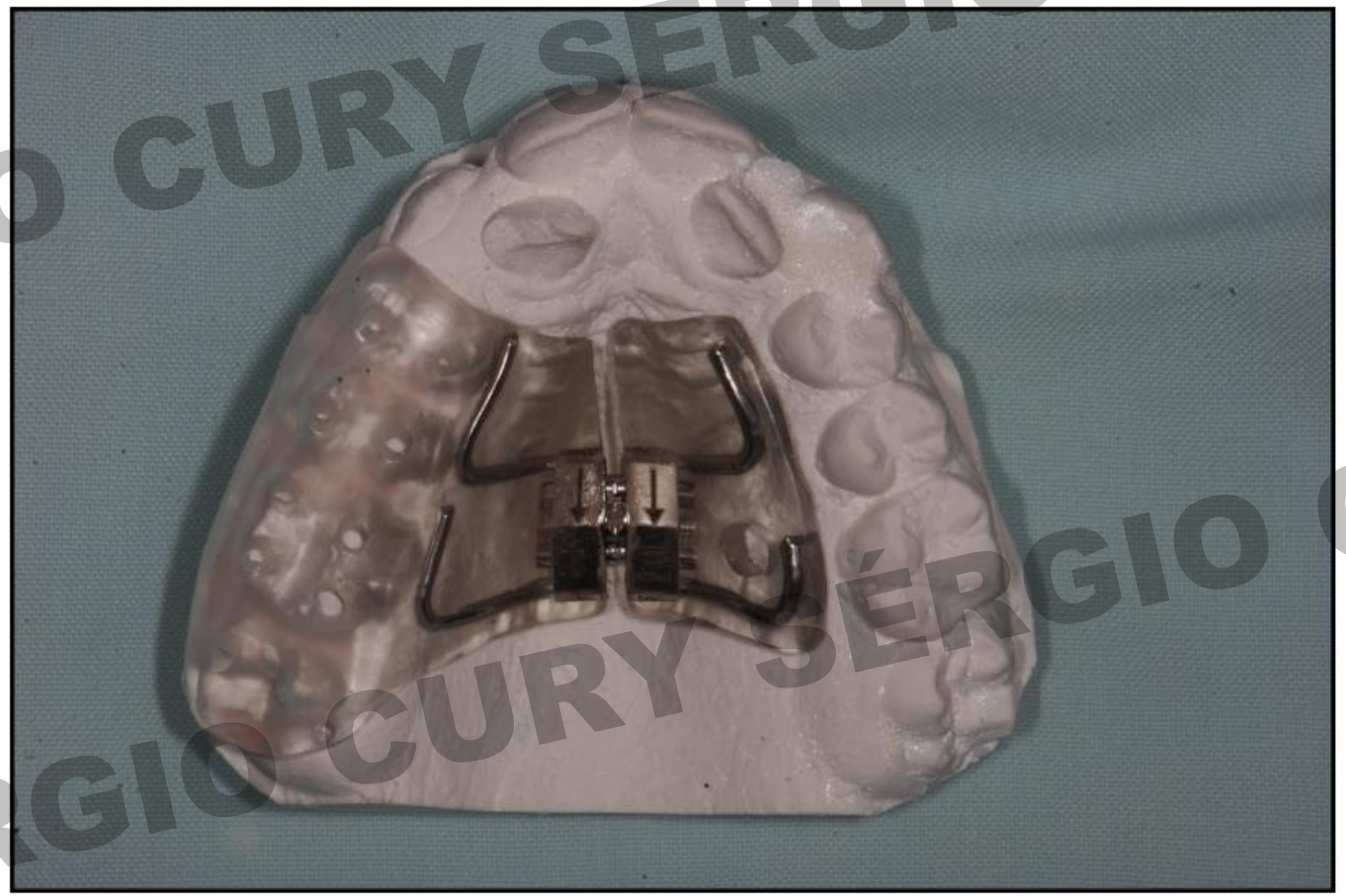

Fig 1. Modified rapid maxillary appliance design.

ORIGINAL ARTICLE CE AJO-DO

Buccal bone plate thickness after rapid maxillary expansion in mixed and permanent dentitions

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Introduction: Rapid maxillary expansion (RME) might cause buccal displacement of anchor teeth. Dislocation of teeth outside their alveolar process can damage the periodontium; for this reason, maxillary expansion using deciduous teeth as anchorage in the mixed dentition might be suggested. The aim of this study was to compare changes of buccal bone plate thickness on the maxillary permanent first molars after RME in the mixed and permanent dentitions with different types of anchorage. **Methods:** Two groups of patients were evaluated with cone-beam computed tomography before and after RME. Group E (21 patients) underwent RME using deciduous teeth as anchorage; group 6 (16 patients) underwent RME using permanent teeth as anchorage. The Wilcoxon test was used to compare changes between the time points in the same groups, and the Mann-Whitney U test was used to compare differences between the groups. **Results:** In group E, generally, no statistically significant reduction was found in buccal bone plate thickness between the time points. In group 6, most measurements showed significant reductions in buccal bone plate thickness ($P < 0.05$) between the time points, with a maximum decrease of 1.25 mm. **Conclusions:** RME in the mixed dentition with the appliance anchored to deciduous teeth did not reduce the buccal bone plate thickness of the maxillary permanent first molars, except for the mesial roots on both sides. RME in the permanent dentition caused a reduction of the buccal bone plate thickness of the maxillary permanent first molars when they were used as anchorage in the permanent dentition. (Am J Orthod Dentofacial Orthop 2019;155:198-206)

effects produced by RME in the permanent dentition raised interest for research about the effect of RME in the early phases of the mixed dentition.[21] According to previous evidence, separation of the maxillary halves should correspond to 50% of the screw activation in the early mixed dentition and to about 30% of the screw activation in the permanent dentition with consequently a lower orthopedic effect.[22] Baccetti et al[23] also observed that RME before the peak of skeletal maturation produces more skeletal effects than does RME after the peak.

Cozzani et al[16] showed that RME on deciduous teeth allows the resolution of a crossbite of the permanent first molars because these teeth spontaneously follow the deciduous teeth. Furthermore, the permanent first molars should follow the expansion with a more bodily move-

Fig 1. Tooth-borne hyrax expansion appliance anchored on deciduous teeth, used for group E.

activate the screw twice a day starting the day after insertion (0.45-mm per day activation). Maxillary expansion was performed until dental overcorrection, defined as the point where the palatal cusp of the maxillary permanent first molars occludes on the inner slope of the buccal cusp of the mandibular permanent first molars. The screw was activated 30 ± 3 turns (mean opening, 7.5 mm) for group E. After active expansion treatment, the appliance was kept in place passively for 6 months. During this period, no patient had other orthodontic treatment. CBCT scans (i-CAT, 120 kV, 3.8 mA, 30 seconds; Imaging Sciences International, Hatfield, Pa) were performed before and after treatment, immediately after appliance removal (mean interval, 9 ± 1 months).

The appliance used for group 6 was a tooth-borne

Fig 2. Tooth-borne hyrax expansion appliance anchored on permanent teeth, used for group 6.

ORIGINAL ARTICLE CE AJO-DO

Mandibular incisor alignment in untreated subjects compared with long-term changes after orthodontic treatment with or without retainers

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Introduction: The aim of this work was to analyze the dental and skeletal changes in patients treated with fixed orthodontic appliances with or without retention appliances, and to compare the changes with untreated subjects. Specifically, mandibular incisor irregularity was analyzed. **Methods:** A total of 105 children who had undergone orthodontic treatment with fixed appliances in both jaws were examined in 2 groups: 64 had a lingual mandibular retainer and 41 had no retainer. Retention time was 2.7 ± 1.5 years. The untreated group consisted of 25 subjects. Measurements were done on study casts and lateral head radiographs before and after treatment and 6 and 12 years after treatment. The Little irregularity index (LII) was the most important variable. **Results:** No differences were found in LII 12 years after treatment between the group that had a retainer and the group without a retainer after treatment. In the untreated group, LII was increased over time, but not to the same extent as in the treated groups. Correction of overjet and overbite was stable long-term. At the last examination, the amount of overjet was almost the same in all 3 groups. **Conclusions:** The routine use of mandibular retainers for 2 to 3 years does not appear to prevent long-term relapse. If the patient wants to constrain natural development and changes, lifelong retainers are needed. (Am J Orthod Dentofacial Orthop 2019;155:234-42)