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Introduction: Rapid palatal expansion (RPE) is a commonly used orthodontic procedure for correcting maxillary transverse deficiency.

Aim: Aim of this prospective clinical trial was to evaluate the short-term effects on the maxillary complex following RPE assessed with Cone Beam Computed Tomography (CBCT).

Methods and Materials: The study group consisted of 11 patients (4 boys, 7 girls; mean age 11.18 years) with posterior crossbite treated with RPE using a Hyrax type device. CBCT scans were obtained before RPE (T1), after the end of expansion (T2), and 6 months post-expansion (T3). **Six variables** (inter-molar, inter-premolar and inter-canine width of the maxillary dental arch, maxillary dental arch length, palatal height and arch perimeter) were measured at 3 times intervals.

Investigation of the mean value variance per variable at the three-time intervals was performed using the paired Wilcoxon signed-rank test.

Results: In the maxillary dental arch, an increase of the mean value of 5.83 mm of the maxillary inter-molar, of 4.76 mm of the inter-premolar and of 2.41 mm of the inter-canine width, of 2.14 mm of maxillary arch length, of 0.86 mm of palatal height and of 4.71 mm of the perimeter were found statistically significant between T1 and T3 intervals.

Conclusion: The RPE treatment can cause favorable changes in the width of the maxillary arch and arch perimeter and consequently can be very efficient in patients with narrow maxillary dental arches.

Declaration: The authors declare no conflict of interest.

Cumulative table of the mean values in mm of the variables in the 3 times intervals and the differences of the mean values

| | T1 | T2 | T3 | (T2 – T1) | (T3 – T2) | (T3 – T1) |
|-----------------------------------|-------|-------|-------|-----------|-----------|-----------|
| Upper inter-molar width | 49.25 | 57.07 | 55.08 | 7.82 | -1.99 | 5.83 |
| Upper inter-premolar width | 38.92 | 45.71 | 43.68 | 6.79 | -2.03 | 4.76 |
| Upper inter-canine width | 31.96 | 36.01 | 34.37 | 4.05 | -1.64 | 2.41 |
| Arch length | 30.80 | 34.29 | 32.94 | 3.49 | -1.35 | 2.14 |
| Palatal height | 17.99 | 19.76 | 18.85 | 1.77 | -0.91 | 0.86 |
| Arch perimeter | 91.33 | 98.83 | 96.04 | 7.5 | -2.79 | 4.71 |

Hyrax of a patient in T2 interval



Upper inter-molar width measured in CBCT



Palatal height measured in CBCT



References:

1. Kolokitha OE. Rapid Palatal Expansion. Changes in the dimensions of the dental arches after orthodontic treatment with rapid palatal expansion and fixed orthodontic appliances. Research Monograph. (ISBN: 978-960-93-7325-8) 2016.
2. Furtado Á, Furtado GC, El Haje O, Rosário HD, Franco A, Makeeva I, Paranhos LR. Soft-tissue cone-beam computed tomography (ST-CBCT) technique for the analysis of skeletal, dental and periodontal effects of orthopedic rapid maxillary expansion. Journal of clinical and experimental dentistry. 2018 Sep;10(9):e883.