A COMPARISON OF THE QUADHELIX AND THE NICKEL TITANIUM PALATAL EXPANDER IN THE TREATMENT OF NARROW MAXILLARY ARCHES: A PROSPECTIVE CLINICAL STUDY

by

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ABSTRACT

Background and Objectives: Narrow maxillary arches can complicate any type of malocclusion. Traditionally quadhelix has been used for slow maxillary expansion. With the recent introduction of the nickel titanium (Ni-Ti) expander by Arndt in1993, the concept of slow maxillary expansion has been reinvigorated. Ni-Ti expander has been claimed to be the 'Holy Grail' among the various slow expanders on the basis of its low load deflection, high springback as well as its temperature dependant memory. Quadhelix constructed from Elgiloy is more like stainless steel in behaviour. Theoretically Ni-Ti expander appears to be more ideal.

The study was undertaken with the following aims and objectives

1. Comparison of the effects of the two on lower facial height.

2. To quantify the dentoalveolar changes in the transverse plane and evaluate the difference in the changes between the two appliances.

3. To evaluate the orthopedic changes if any and their differences with respect to the two appliances in the transverse plane.

4. To derive clinical implications from the study.

Methodology: Twenty patients were part of this study, ten for the quadhelix and ten for the nickel titanium expander with equal distribution of crossbite and non-crossbite cases in the two. The criteria for inclusion being, a need for expansion according to the original treatment plan as well as the Ashley Howe's model analysis showing that expansion is possible. All patients were either in the mixed or early permanent dentition. Records taken for the study were pre and post expansion clinical lower

facial height measurements, study models every month from pretreatment till the expansion was completed. Posteroanterior cephalograms and occlusal radiographs pre and post expansion. The expansion phase lasted for an average of 3.1 months in the non-crossbite sample and 5.2 months in the crossbite sample. A total of 8 readings were taken, 1 for the clinical facial height, 2 for the model analysis and 5 for the posteroanterior cephalometric analysis. The data obtained from these readings were subjected to statistical analysis. The statistical tests used were, the student's unpaired t-test and the paired t-test.

Results: Both appliances individually, produced statistically highly significant expansion every month in both premolar and molar areas. There was, however, more uniform expansion in both molar and premolar regions for quadhelix every month in contrast to nickel titanium palatal expander, which showed less expansion in the premolar region initially and seemed to catch up but did not match the values of quadhelix. Though not statistically significant, for a clinician this would imply that if one wishes to have more expansion in the premolar region along with molars, quadhelix would be a favorable appliance.

While assessing the posteroanterior cephalometric readings, for the intra-appliance comparison, both appliances produced statistically significant changes in the parameters studied. However the skeletal to dental change ratio showed that there was more dental change than a skeletal one with no interappliance differences statistically. Hence these appliances are to be used when the expansion required is primarily dentoalveolar and not skeletal. In conclusion we suggest that both the appliances are equally efficacious maxillary expanders though they have certain differences in the nature of expansion.