

**Republic of Iraq  
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College of Dentistry**



# **A clinical comparison of the effectiveness of two types of orthodontic aligning archwire materials: A multicenter randomized clinical trial**

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By  
**Sarah Adnan Nabbat**  
B.D.S.

Supervised by:  
Assistant Professor  
**Dr. Yassir Abdulkadhim Yassir**  
B.D.S, M.Sc., Ph.D. (Orthodontics) (UK)  
Baghdad-Iraq

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## ABSTRACT

**Objectives:** This study was designed to compare heat-activated nickel titanium (HANT) with superelastic nickel titanium (SENT) archwires in terms of their effectiveness of aligning teeth, possibility of inducing root resorption, and perception of pain during the initial phase of treatment.

**Subjects and Methods:** Orthodontic patients aged 12 years or over with mandibular anterior crowding of 3-6 mm. who required treatment without extractions, were randomly allocated to the HANT and SENT archwires groups with a 1:1 allocation ratio. The archwire sequence in both groups was 0.014-inch and 0.016-inch, respectively. Each archwire was placed for four weeks. The outcome measures included the amount of crowding assessed using Little's irregularity index (LII), apical root resorption at the start and end of the trial (using a scoring index), and pain perception during the first week after each archwire placement using visual analog scale (VAS). The effectiveness of alignment was tested using 2X2 mixed factorial analysis of variance (ANOVA) model, while root resorption and pain perception were tested by the Mann-Whitney U test, and Wilcoxon signed-rank test ( $P < 0.05$ ).

**Results:** Thirty-four patients were randomized and recruited from four centers, of those 31 were analyzed (15 participants for the HANT, and 16 for the SENT groups) with an overall mean age of  $19.13 \pm 5.73$  years. Baseline characteristics were similar between groups ( $P > 0.05$ ). The total reduction in the LII was 2.69mm and 2.74mm for the HANT and SENT groups, respectively. This did not reach the level of statistical ( $P = 0.809$ ) or clinical significance. Similarly, root resorption and pain perception showed non-significant difference between groups. However, there was a slight increase in root resorption with the SENT.

***Conclusions:*** Both HANT and SENT archwires were comparably effective in terms of teeth alignment, pain perception and orthodontically-induced inflammatory root resorption (OIIRR). Root resorption with SENT should be monitored throughout treatment.