

Alignment Efficiency of Superelastic Coaxial Nickel-Titanium

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Received date: May 13, 2016; Accepted date: May 20, 2016; Published date: May 30, 2016

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Short Communication

The preliminary phase of any orthodontic treatment with fixed appliances is the alignment and leveling of teeth. Leveling is the process in which the incisal edges of the anterior teeth and the buccal cusps of the posterior teeth are placed on an ideal horizontal level; and alignment is the lining up of teeth of an arch in order to achieve normal contact point relationship. In the alignment phase, the arch wire used should have the property of delivering light continuous forces for a long period of time [1]. This can be achieved by either varying the cross-section of the arch wire or by varying the elastic modulus of the wire. The shape of the initial arch wire-whether solid, multi-stranded, looped or tubular-imparts a unique force level, strictly because of its physical characteristics by varying elastic modulus. The material composition of the wire also affects its force characteristics. Metallurgical advances have produced initial arch wires that can deliver light forces even under extreme physical deformation [2].

Most of the trials conducted in order to assess the efficiency of various arch wires in arch alignment have not demonstrated any significant advantage of one wire over the other [3-5]. Hanson's concept of superelastic coaxial NiTi led to the introduction of supercable, a seven stranded round superelastic coaxial NiTi arch wire. Supercable provides the additional benefits of increased springback and resistance to deformation, and low force delivery. The laboratory tests suggest that these wires exert much lower forces (only 36% to 70%) compared to solid NiTi wires [6].

The article titled "Alignment efficiency of superelastic coaxial nickel-titanium vs superelastic single-stranded nickel-titanium in relieving mandibular anterior crowding. A randomized controlled prospective study" had the objective to clinically compare the efficiency of 0.016 inch superelastic coaxial NiTi and 0.016-inch single stranded superelastic NiTi in aligning the lower anterior region, with measurements made at 4, 8 and 12 week intervals [7]. Even though the wires used were of the same diameter, the elastic modulus of both wires differed. The mandibular irregularity of the selected samples

were all greater than 6. For this a good quality impression of each dental arch was made using alginate at the prealignment phase and during follow up appointments at 4, 8, 12 weeks after removal of wire. A coordinate measuring machine was used to measure the inter-tooth distances, and these measurements were collated and summed to represent overall tooth movement from the cast.

The results showed that the degree of up righting, leveling, and rotational control achieved was greater with coaxial super elastic wire. Though these results are promising, further comparative studies of these arch wires in cases with less severe crowding conducted over longer durations are recommended.

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