

# 7<sup>th</sup> Global Dentists and Pediatric Dentistry Annual Meeting

March 31- April 01, 2016 Valencia, Spain

## Nanotechnology for the improvement of tribological properties of orthodontic arch-wires

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More than 60% of the force used to move teeth through an orthodontic fixed appliance is lost as friction force, with possible loss of anchorage, an enhanced risk of root resorption, an increase in treatment time. The use of molybdenum and tungsten disulfide (MoS<sub>2</sub> and WS<sub>2</sub>) nano-particles - known for their lubricating properties – can improve from a tribological point of view the substrates to which they are applied, providing a possible solution to minimize friction in an orthodontic system. In this study, nickel (Ni) coatings incorporating MoS<sub>2</sub> and WS<sub>2</sub> nano-particles are applied by electro-deposition to 0.019x0.025 inch orthodontic stainless steel (SS) wires (*Ormco, Glendora, CA, USA*). Friction produced by *in vitro* sliding of coated and un-coated SS wires along self-ligating brackets (*Damon Q, Ormco, Glendora, CA, USA*; *In-Ovation R, GAC International, Islandia, NY, USA*) is then evaluated with the use of a universal apparatus for mechanical measurements (*Instron 4502*). This work shows that good results in terms of friction can be obtained coating SS orthodontic wires with Ni film containing MoS<sub>2</sub> and WS<sub>2</sub> nano-particles, providing a possible change in orthodontic materials in the next future.

### Biography

Martina Dandrea has graduated in 2015 from University of Padua, Italy. Since 2016 she's working as a Dentist in private practice.

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