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**Efficacy of Yttrium (III) fluoride nanoparticles for use in orthodontic bonding****Durgesh Bangalore Huchaiiah**  
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Investigating the adhesion strength and anti-bacterial effect of a conventional orthodontic composite resin blended with Yttrium fluoride (YF3) nanoparticles. Yttrium fluoride (YF3) nanoparticles (NP) were added at 1%, 2% and 3% (w/w) to the conventional orthodontic composite resin (Transbond XT). The blended composite resin was labeled as NP1, NP2 and NP3, respectively according to w/w of NP's. A total of 60 extracted human premolars were randomly allocated into four groups of 15 (n=15). Orthodontic brackets were bonded using the conventional (control) and experimental composite resin (NP1, NP2 and NP3). The adhesion strength of the composite resin was determined by a universal testing machine. The de-bonding sites were assessed and scored using adhesive remnant index (ARI). The antibacterial effect of Yttrium fluoride (YF3) nanoparticles against *Streptococcus mutans* was assessed by viable cell counting method. For the same, a total of 40 composite discs specimen were prepared using the control and experimental composite resin (n=10). The data was analyzed by One-way ANOVA and Tukey's post hoc analysis. In all the tests, the significance level was determined to be 0.05. The highest adhesion strength values were found in control group ( $11.61 \pm 0.23$ ) and lowest values with NP3 group ( $10.49 \pm 0.17$ ). Significant difference was observed between control and experimental groups, NP2 and NP3 ( $P < 0.05$ ). NP1 group showed insignificant ( $P = 0.388$ ) adhesion strength values compared to control group. No significant difference in ARI scores of conventional and experimental groups was observed ( $P > 0.05$ ). The highest colony forming units (CFU) were found in control group ( $75.85 \pm 1.15$ ) and the least CFU was found with NP1 group ( $2.24 \pm 1.14$ ). Significant difference in the mean CFU of the conventional and experimental composite groups was observed ( $P < 0.05$ ). Despite higher anti-bacterial activity in NP1 group compared to NP2 ( $P = 0.146$ ) and NP3 ( $P = 0.117$ ), the difference was not significant. Similarly, no significant difference was observed between NP2 and NP3 groups ( $P = 0.97$ ). Yttrium fluoride nanoparticles at 1% concentration demonstrated significant anti-bacterial effect without compromising the adhesion strength.

**Biography**

Durgesh Bangalore Huchaiiah has completed his Masters from Odessa State Medical University Ukraine and is currently pursuing his Doctoral studies from Biomaterials Sciences Department, Institute of Dentistry, University of Turku, Finland. He has published more than 15 papers in international reputed journals.

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