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Re: Comparative study on Vicker's Hardness and Diametral Tensile Strength

The following studies were conducted with the sample material provided.
Test specimens and studies were conducted as per IS0 24234 requirements.

Vickers Hardness Test

Figure 15 shows the images of the hardness for the Silverfil amalgam and also the 2 other commercially available amalgams. The hardness test has been measured after 24 H of amalgamation.

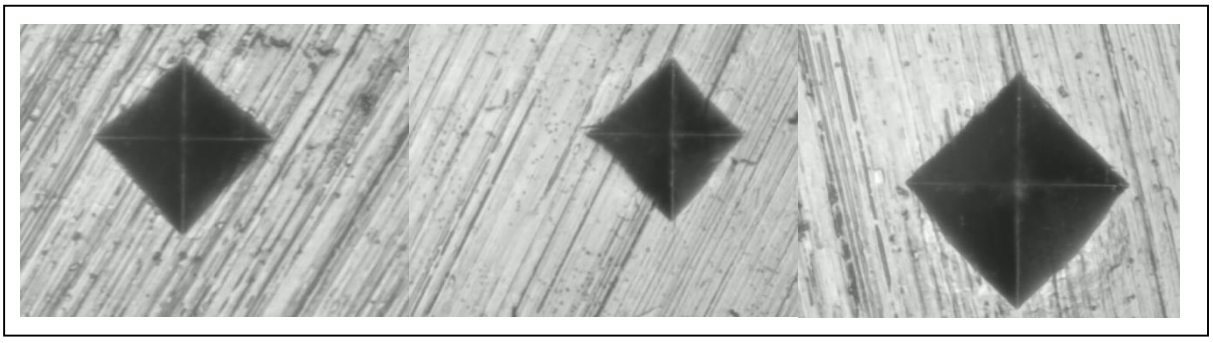

Figure 15: Images of Hardness testing

(From left: a) Disperse alloy amalgam, b) SDI amalgam c) Silverfil amalgam

For the Vickers microhardness (Figure 16), the ANOVA results showing significant (P=0.00) and the post hoc test (Dunnett T3) suggest that the mean of hardness is significantly different between all the 3 amalgam (P=0.000). The mean and standard deviation values VHN were Silverfil (103.1580±4.38730), SDI (233.82 ± 15.68026) and Disperse alloy (175.3800 ± 8.02355).

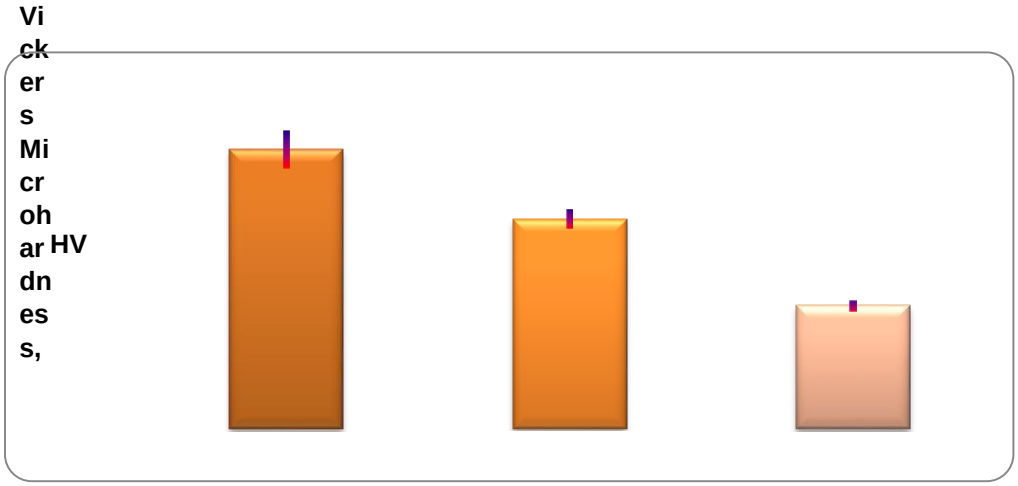

Figure 16: Vickers Micro hardness testing

Diametral Tensile Strength

There were significant difference between the 3 groups (P=0.000) for the diametral tensile (Figure 17). Subsequent post hoc test (Bonferroni procedure) reported that the mean of diametral tensile is significantly different between Silverfil and the 2 other commercial amalgams (P=0.000). The mean and standard deviation values (MPa) were Silverfil (72.7110 ±10.22905), SDI (39.3217 ± 7.78812) and Disperse alloy (41.6554 ± 7.77576). However, there was no significant difference between GS80 amalgam and Disperse alloy amalgam.

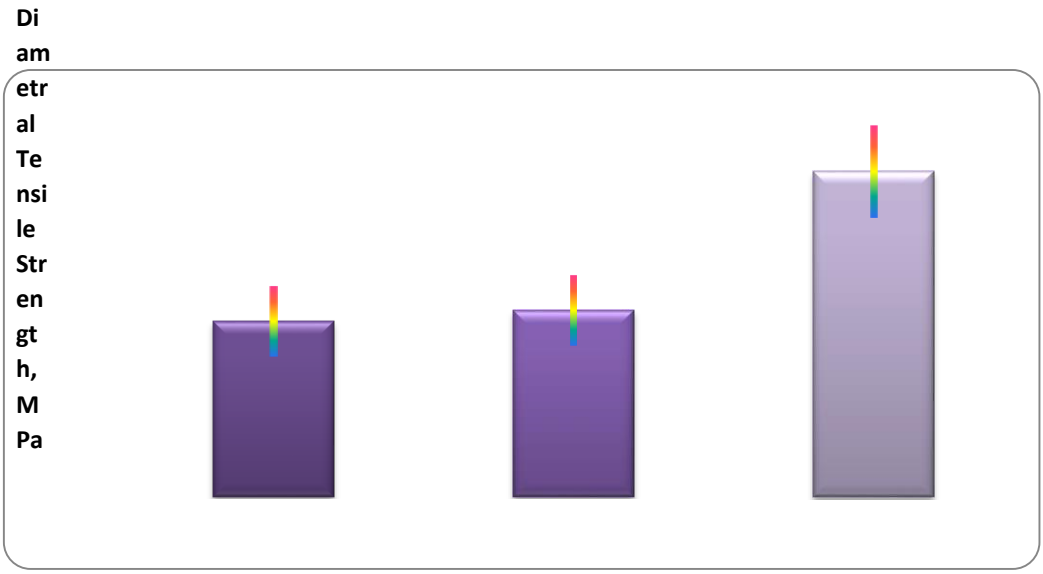

Figure 17: Diametral Tensile Strength of 3 different amalgams.

In conclusion, the Silverfil amalgam showed the highest Diametral Tensile Strength and the lowest Vickers Hardness Testing values compare to the 2 amalgams group.
Note: Silverfil amalgam has been shown to have work hardening properties. Thus, the Vicker's hardness would be higher in the oral cavity due to microscopic structural changes as a result of masticatory forces.

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