

## **A Comparative Study of Some Physical Properties and Corrosion Potential of Four Commercial High Copper Amalgam Alloys and A gallium-based Alloy**

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### **Abstract:**

Gallium-based alloys were currently introduced as a possible alternative to mercury amalgam inspite that no relationship between amalgam and physical health has ever been established. The aim of this study was to compare hardness, creep and corrosion behaviour of four brands of high copper amalgam (Oralloy, Logic, Permite and Dispersalloy) to that of a commercially supplied gallium-based alloy (Galloy). The particle shape and size of the tested alloys were also examined and the P/L ratios were reaffirmed and compared with those reported by the manufacturers. The results of hardness test showed that, Oralloy reported the highest KH value, while Permite was similar to Logic and Galloy was comparable to Dispersalloy. The results of creep test demonstrated that, the mean creep value of Galloy was significantly lower than Permite and Dispersalloy ( $P>0.05$ ). The results of electrochemical corrosion test showed that Galloy exhibited the highest negative open circuit potential (OCP), meanwhile Logic unicompositional high copper amalgam alloy exhibited the least OCP. Lastly, it could be mentioned that, Galloy has acceptable physical properties comparable to that of high copper amalgam alloys with better creep resistance. Meanwhile, Galloy is more corrosion prone and it should not be introduced as a substitute for mercury amalgam unless its corrosion resistance is improved and long term clinical studies are conducted.

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