

INTRODUCTION

Herculite Ultra Experimental (HE) is a nanohybrid upgrade of Herculite XRV™ (HXRV). HXRV was the first submicron microhybrid composite introduced to dentistry with an average filler particle size of 0.7 microns. The improved strength and wear resistance made possible universal use of composites, especially in posterior restorations. More recently, advanced nanohybrid composites such as Belleglass NG™ and Premise™ have been introduced. These materials have improved handling, polishability, clinical gloss, and wear resistance in restorations. HE includes these qualities while retaining other features of HXRV such as Dentin, Enamel and Incisal translucencies and precise Vita shading. In this study, the physical properties of both of these materials were compared to show their hybrid nature.

OBJECTIVE

In this study, the physical properties of a new nanohybrid composite, Herculite Ultra Experimental (HE) are reported.

MATERIALS

Herculite XRV Lot. 2954856
Herculite Ultra Experimental (HE) Lot. 3093718

METHOD

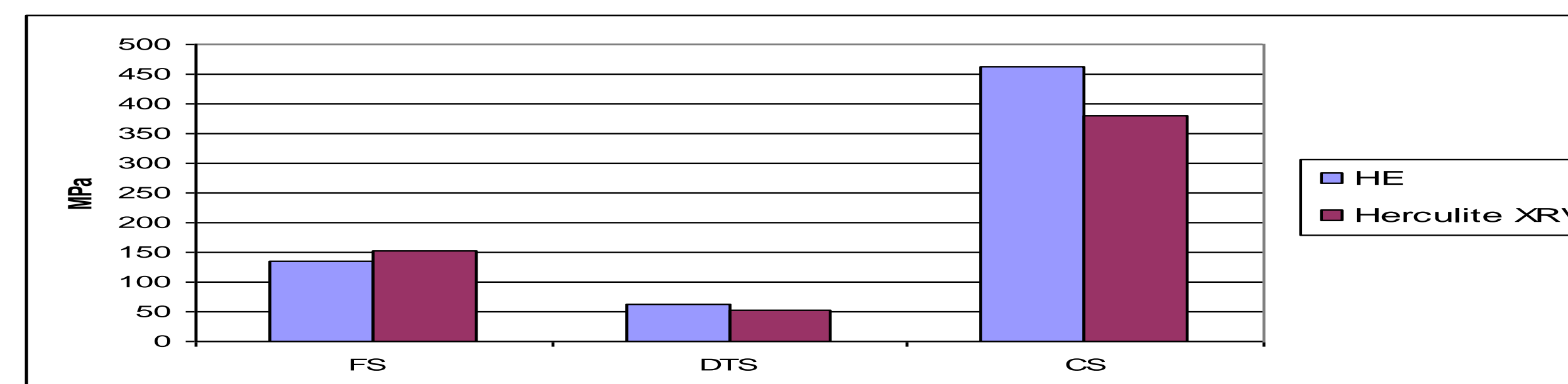
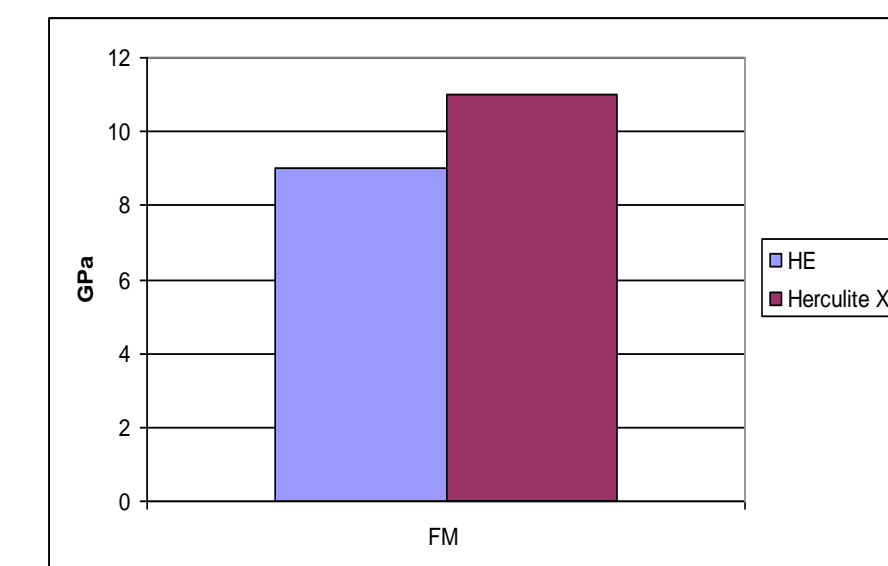
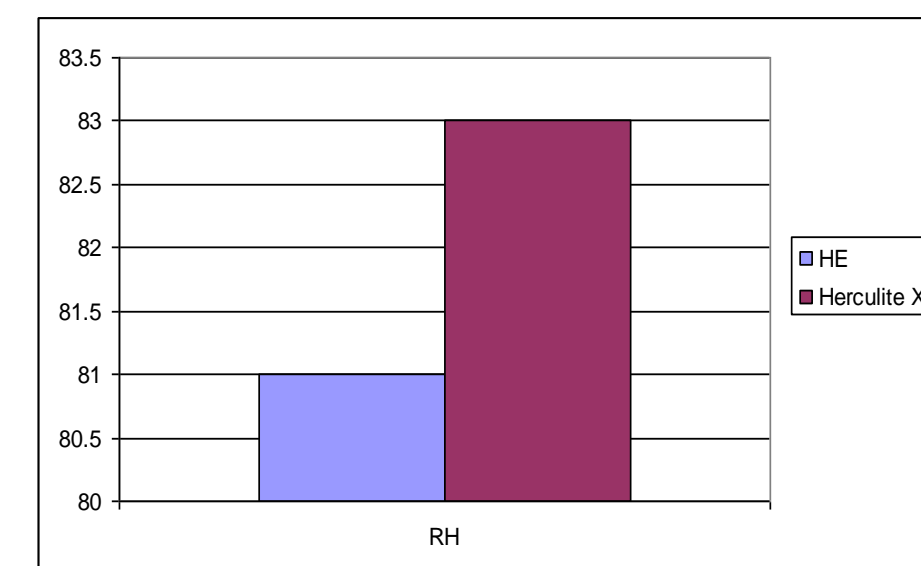
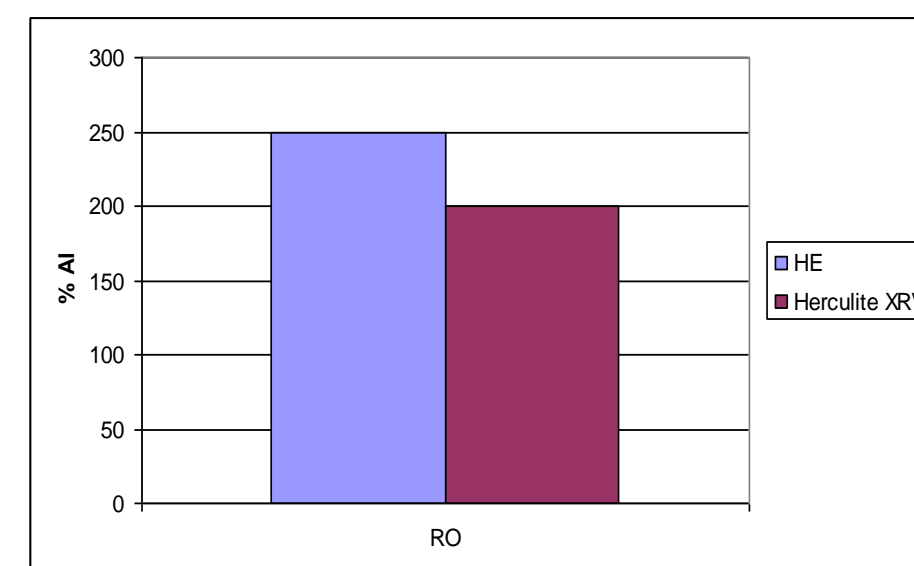
The methods for flexural strength (FS), flexural modulus (FM), diametral tensile strength (DTS), compressive strength (CS) and Rockwell 15T Hardness (RH) were previously reported (AADR Abst. #1039, 2008). In addition, the X-ray radiopacity (RO) was also measured according to ISO 4049 for all materials. The mean and standard deviation (s.d.) were calculated and anova ($p < 0.05$) was used to determine any significance between the means.

RESULTS

The data are presented in the table below. Significant differences between the means in each column are indicated by different superscript letters. HE was significantly higher in DTS, CS, and RO; whereas HXRV was significantly higher in FM and RH. However, the properties were typical of hybrid composites.

Composite	FS (S.D.) MPa	FM (S.D.) GPa	DTS (S.D.) MPa	CS (S.D.) MPa	RH (S.D.)	RO (S.D.)
HE	135 (12) ^a	9 (0.7) ^b	62 (4) ^a	462 (11) ^a	81 (0.0) ^b	250 (0) ^a
HXRV	152 (17) ^a	11 (0.9) ^a	52 (4) ^b	381(30) ^b	83 (1.2) ^a	200 (0) ^b

*Means with same letter in same column are not statistically different at $p < 0.05$.



DISCUSSION

Herculite Ultra Experimental (HE) is a nanohybrid composite containing submicron hybrid filler (0.4 microns) and nanoparticle filler (50 nm). It also has prepolymerized filler particles (25 microns) containing the same submicron hybrid and nanoparticle fillers. The result is a trimodal filler distribution that produces excellent handling properties, ease of polish, retention of clinical gloss and improved wear resistance. Esthetic properties such as opalescence and fluorescence have also been improved as well as the X-ray radiopacity. Other features, include Dentin, Enamel and Incisal translucencies as well as precise Vita shading.

HE is a nanohybrid composite. It contains both nanofillers and a special microhybrid filler with an average particle size below the wavelength of visible light. The microhybrid filler imparts physical properties similar to hybrid composites, while imparting improved polishability and clinical gloss similar to microfills. Thus, HE may be used in both anterior and posterior restorations in a single syringe, without layering. Unlike nanofilled composites that contain nanoclusters, the HE fillers do not interact as much with visible light at the surface of restorations and hence maintains its high luster clinically (as exhibited by the products, Belleglass NG and Premise). The results of gloss testing will be described next.

CONCLUSION

Overall, physical properties of Herculite Ultra Experimental, novel nanohybrid composite, are similar to other microhybrid composites.