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Mechanical Properties of Four Flexible Denture Base Materials.

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An increasing number of products are being marketed for use as flexible, removable partial denture (RPD) base materials with little data to support this application. This study evaluated mechanical properties of 4 of these: Valplast (V, Valplast Int. NY), Proflex (P, Dental Resources, MN), Ultraflex (U, Astron Dental, IL), Flexite Supreme (F, Rapid Injection Systems, NY). Elastic modulus and 0.2% offset yield in three point bending were measured in air at 23°C and in water at 37°C (n=5). A 6% maximum strain, low cycle fatigue test was performed in air at 23°C to simulate clasp flexure during RPD insertion in 4 years of use (n=6). High cycle (10⁷) fatigue, 2% maximum strain, was conducted to simulate flexure of a free end saddle (n=5). All specimens were rectangular beams made by commercial laboratories. An ANOVA was followed by Newman-Keuls comparisons at p<0.05.

	Modulo Mpa (sd) 23°C	Yield Mpa (sd) 23°C	Modulo Mpa (sd) 37°C	Yield Mpa (sd) 37°C
V	785(74.6)	30.6(2.4)	462(29.0)*	20.7(1.0)
F	1489(31.9)	64.9(1.4)	1365 (39.7)	54.9(2.2)
P	909(87.3)	25.1(1.1)	84.1(13.5)	5.4(0.5)
U	493(54.1)	16.5(3.0)	422(127.5*)	2.9(0.9)

Groups followed by * are not statistically different. In low cycle fatigue, all groups except V showed permanent deformation and/or fracture. In high cycle fatigue, P exhibited fracture, U significant deformation, and V and F lesser amount of deformation. Base upon the properties examined, only V would appear suitable for an all-plastic, removable partial denture. A clinical study of safety and efficacy of this material is suggested. (Study supported in part by Valplast International Corp.)