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Mechanical Properties of Four Flexible Denture Base materials. BK MOORE*, J.A. PLATT, Y.OSHIDA, H CLARK, (Indiana University School of dentistry, Indianapolis, IN)

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.)