Title	New fibre-reinforced composites with UEDMA-based resin matrix for dental use
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NEW FIBER-REINFORCED COMPOSITES WITH UEDMA-BASED RESIN MATRIX FOR DENTAL USE

OBJECTIVES: There are currently some concerns on *bis*-phenol-A-glycidyl methacrylate (*bis*-GMA) as a component in dental biomaterials. This study aims at investigating Vicker's hardness, flexural properties and water sorption of experimental fiber-reinforced composites(FRC) with a newly developed urethane dimethacrylate(UEDMA)-based resin matrix.

METHODS: Three experimental light-curable E-glass fiber reinforced groups(Exper1, Exper2, Exper3; n=18) with different UEDMA contents in the resin matrix were prepared. The control group had a *bis*-GMA-based resin matrix(n=18). After preparation and light curing, the specimens were stored in dry condition for 24h or in deionized water at 37C for 1 and 3months. Water sorption, Vicker's hardness together with flexural modulus and strength in 3-point bending(n=6) were investigated at each storage point. To evaluate the fracture type, scanning electron microscopy(SEM) images were taken. Kruskal-Wallis one-way ANOVA and Mann-Whitney U test were carried out to analyse the results with α=0.05.

RESULTS: Maximum weight increase trend after water storage was Control(0.001g) < Exper1(0.004g) < Exper2(0.006g) < Exper3(0.007g). The hardness value for the four groups was Control > Exper1 > Exper2 = Exper3($p=0.001$). The storage time had no significant effect on the hardness. The trend for the flexural strength(Table1), according to composition, was Control > Exper1 >Exper2 = Exper3($p<0.001$); according to storage time, it was dry storage > 1month = 3month($p=0.001$). The trend for the flexural modulus, according to composition, was Control = Exper1 = Exper2 > Exper3($p<0.001$); according to storage time, it was dry storage > 1month = 3month($p=0.006$). SEM image showed good adhesion between the fiber and surrounding matrix.

CONCLUSIONS: The novel UEDMA-based resin matrix showed comparable properties to the traditional *bis*-GMA-based matrix, however, further investigations are on-going.

Table1 Mean±SD(MPa) of flexural strength

Group	Storage		
	0month(dry)	**1month**	**3months**
Control	429±67	446±95	461±78
Exper1	499±78	441±34	387±94
Exper2	485±107	285±34	328±25
Exper3	370±53	191±14	182±14