

## Introduction:

The objective of this study was to determine the in-vitro two-body wear resistance of light curing dental resin composites.

## Materials and methods:

18 commercial dental resin composites (nano-,micro-,hybrid-,macro-filled composites, compomer, silorane, ormocer) were studied. Wear was simulated with an oral wear-simulator (50 N, 1.2x10<sup>5</sup> cycles, 1.2 Hz) with a pin-on-block design and simultaneous thermal cycling (600 cycles, 5/55°C, 2 min/cycle). Human enamel and factitious enamel were served as references. Steatite bowls were used as antagonists. Wear volume and vertical substance loss were measured on cast replicas and an optical three-dimensional surface profilometer as well as scanning electron-microscopy. Statistical analysis was performed using one-way ANOVA ( $\alpha=0.05$ ) (SPSS 11.0, SPSS, Chicago).

Table 1. Materials	Name	Manufacturer	Matrix	Filler-rate w/%
	Adamant	Ivoclar-Vivadent FL	Dimethacrylate	n.v.
	Admira	Voco, G	Aromatic DMA, aliphatic DMA, UDMA, TEGDMA	78
	Arabesk	Voco, G	Bis-GMA, UDMA, TEGDMA	77
	Artemis	Ivoclar-Vivadent FL		n.v.
	Compoglass F	Compoglass	UDMA, cycloaliphatic, Dicarboxylic-acid-carbonat, EDMA	n.v.
	Dyract extra	Dentsply, USA	UDMA, TEGDMA, TBC	n.v.
	Enamel plus	Micerium, I	UDMA, Bis-GMA	75
	Esthet X	Dentsply, USA	Butandiol-DMA, Bis-GMA, Bis-EMA, TEGDMA	77
	Filtek supreme	3M Espe, USA	Bis-GMA	78.5
	Filtek Z 250	3M Espe, USA	Bis-GMA, UDMA, Bis-EMA	n.v.
	Grandio	Voco, G	Bis-GMA, UDMA, TEGDMA	87
	Heliomolar	Ivoclar-Vivadent FL	Bis-GMA, UDMA, Decandiol-DMA	76.5
	Filtek Silorane	3M Espe, USA	Siloran	76
	InTen-S	Ivoclar-Vivadent FL	DMA	82.2
	Miris Enamel	Coltene/Whaladent USA	Bis-GMA, Bis-EMA, TEGDMA	n.v.
	Ceram X	Dentsply, USA	Polysiloxan-DMA, DGDMA	n.v.
	Point 4	Kerr, USA	Bis-GMA, TEGDMA, Bis-DMA	76
	Quixfil	Dentsply, USA	UDMA, TEGDMA, DMA	85.5
	Sinfony Spectrum	3M Espe, USA	Bis-GMA	50
		Dentsply, USA	Bis-GMA, Bis-EMA, TEGDMA, DMA	77
	Tetric Ceram	Ivoclar-Vivadent FL	Bis-GMA, UDMA, TEGDMA	79
	Venus	Hereaus Kulzer, G	Bis-GMA	61

Figure 1: Schedule of the chewing simulator.

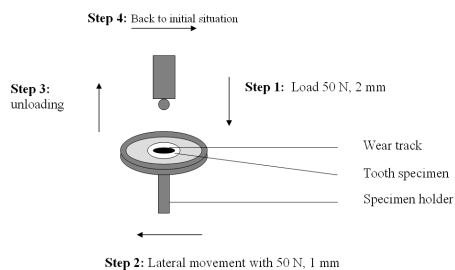
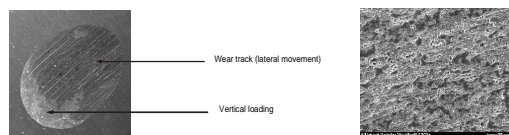
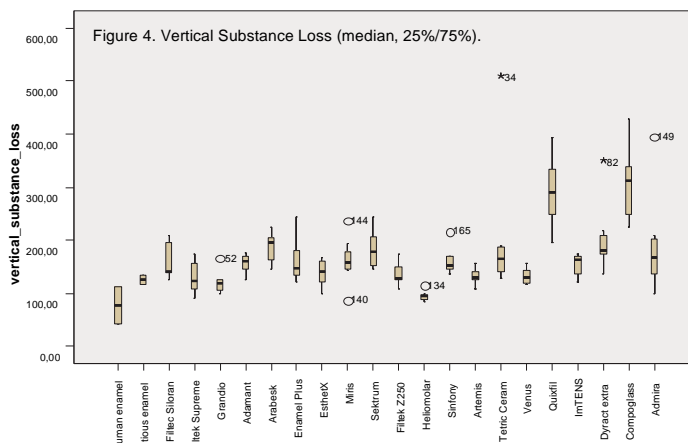
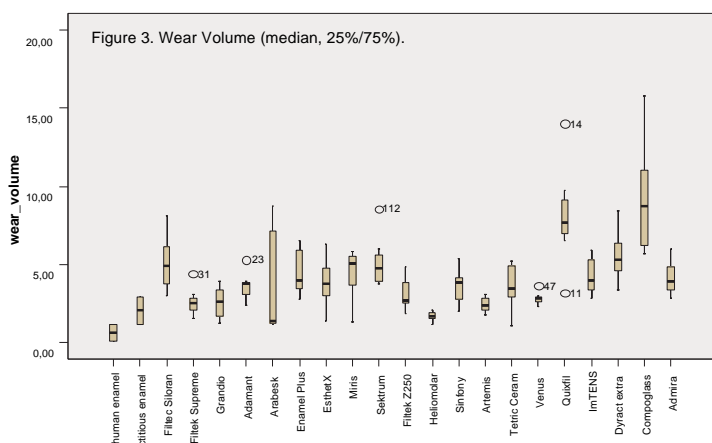


Figure 2: Example of SEM evaluation of wear track, overview and detail.



## Results:

For both vertical substance and volume loss no significant differences were found between most of the analyzed materials relating to naturally enamel. Only one macro-filled composite and one compomer exhibited significant higher wear ( $p < 0.05$ ).



## Discussion:

Highest overall wear resistance have been measured for hybrid composites, and the lowest values were found for compomers. Most light curing composites showed compatibility wear resistance. However, all investigated materials exhibited higher wear than human enamel.