particulate filler resin composite (PFC) to 5 PFC substrates, namely Targis (Ivoclar), Sinfony (3M ESPE), Tetric (Vivadent), Gradia (GC), Sculpture (Jeneric Pentron) in dry and thermocycled (TC) conditions. PFC substrates were fabricated according to each manufacturer's recommendations and the oxygen inhibition layer was removed by grinding. The substrates in each group (n=6) were randomly assigned to each of the following 3 treatment conditions: (1) Etching for 90 sec with 9.5% HF (Ultradent® Porcelain Etch, USA) (2) Sandblasting (50μm Al_2O_3), (3) Tribochemical silicacoating (CoJet, 30μm SiOx, 3M ESPE). Each surface treatment was followed by silanization and bonding agent application. The repair resin (Sinfony, 3M ESPE) was bonded to the conditioned substrates using teflon tubes (3.6 x 5 mm). TC was applied for 6000 cycles (5-55ºC, 30 sec). The SBS were measured in a universal testing machine with a cross-head speed of 1mm/min. The ANOVA showed that SBS values before TC differed significantly ($P<0.001$) between the acid etched specimens (7.5-14.5 MPa) and those treated with either Al_2O_3 (15.9-20.8 MPa) or silicacoating (25.8-42.2 MPa). After TC, the silicacoating process resulted in the highest values in all material groups (17.3--30 MPa). The results indicate that composite resin repair strengths are dependent on the brand of the composite. This could be due to the differences in chemical composition of the polymer.

33.

The Problem of Solving Fracture of the Denture Base in Preedentulous States

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The mechanical fatigue resistance of the denture base seems to be a neglected part of treatment planning. Extreme overload can occur, which is only evaluated in the case of fracture. In full or partial edentia the dental base can be exposed to an extreme stress concentration which may be coupled with the incidental source of failure during processing of the denture.

The aim of this lecture is to report cases, where we were able to overcome dental base fracture, which had not been foreseen earlier.

In the first case a history of several fractures of an upper complete denture is presented. Metal net, framework and incorporation of glass fibres and reline were stages of the instructive problem solving process.

In the second case a man wearing an overdenture with ball attachments under implant fixtures is presented. After multiple fractures of the dental base we used glass fibre reinforcement for repair. After this procedure there was an eventless period, which proves the mechanical resistance of the denture base.

In the third case presented both the denture base and the acrylic tooth were damaged. The multiple fracture could also be treated with glass fibre reinforcement, which was successful.

From these cases we concluded:

1. Careful case history and treatment plan could have helped to overcome the subsequent problems.
2. The clinical implication is that the glass fibre reinforcement can provide effective strength for the denture base. We could not neglect evaluation of the mucosa and bone support.

In the following period we reinforced new dentures preventively with fibres in 15 cases. At the same time we also continued the repair the broken dentures of 10 patients. The outcome exceeded our greatest expectations: no fracture was seen. However, further study is needed to extend the observation period.

34.

Investigation of the Fracture Surface of E Glass Fiber Reinforced PMMA Denture Base Resins

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The interface between fibers and the acrylic resin matrix is considered to be an important factor in the reinforcement, and the microscopic surface structure may play a key role in the effectiveness of this reinforcement. Adequate adhesion of the fibers to the polymer matrix is one of the most important factors for strength. The optic microscope, although of limited resolution, is still a popular choice. The scanning electron microscope (SEM) provides measurements in 2 dimensions.

The aim of the study was to examine the interfacial region of PMMA reinforced with chopped glass fibers