Summery

Properties of Prosthodontic Materials

Background: Dental ceramics and dental alloys have been found to be the most suitable material for prosthetic restorations. The biological inertness of ceramics is considered to be the best among all dental materials. The aim of this study was to determine the level of corrosion and cytotoxic influence on the cell line of mouse fibroblasts of selected dental materials.

Methods: In total, 11 types of ceramic materials and 6 types of dental alloys have been chosen for the analysis. The composition of ceramic materials was qualitatively evaluated by X-ray spectrometry. For evaluation of a corrosive behaviour *in vivo*, presence of released ions in saliva of tested individuals by mean GT-AAS was valuated. For evaluation of a corrosive behaviour *in vitro,* leaching in hydrochloric acid was used. Extracts were analysed by mean ICP OES and ICP MS. The cytotoxic influence of the materials on the cell line of mouse fibroblasts NIH 3T3 was monitored (direct contact test, extract test).

Results: The study of dental alloys corrosive behaviour *in vivo* determined, that chromium release depends on the dental alloy composition and the time after the denture delivery. The nickel release depends only on the time of delivery. In extracts, measurable amounts of sodium, magnesium, iron, manganese, zinc, silicon, aluminium, yttrium and titanium were found. Zirconium and gold were found in leachates. All materials were considered non-toxic in the direct contact test. Lithium disilicate ceramics IPS e. max® Press was considered slightly toxic in the extract test.

Conlusion: The study determined release of different ions from dental materials´ surface in solutions. None of the known dental materials including ceramics can preserve absolute resistance against all corrosion forms. Lithium disilicate ceramics was considered slightly toxic in the extract test. Toxicity was probably caused by the presence of lithium ions in this ceramic material.

Key words: corrosion, cytotoxicity, dental ceramics, dental alloy, optical emission spectrometry, immersion test