

The phlogogenic potential of dentin-bonding agents is still disputed. Therefore, it was the aim of this study to determine the acute inflammatory reaction characterized by neutrophil granulocyte infiltration of pulpal tissues in a vital microscopic biocompatibility test model.

26 Wistar rats underwent microsurgical preparation of a lower incisor according to the vital microscopy usage-oriented biocompatibility test (Gaengler 1975). The dentin thickness of the application window was 20 µm. After a 60 min recovery interval the hemodynamic status was investigated by means of vital microscopy index. 16 animals served as test group and the dentin-bonding-agent CPS-Gluma® was applied on prepared dentin. 6 animals comprised the control group with no application of dentin-bonding. 120 min after vital microscopic follow up all animals were sacrificed.

Serial paraffine sections of all teeth were incubated with W3/13-antibody directed against the surface antigen CD43 located on granulocytes. Using immunofluorescence microscopy binding sites of this primary antibody were detected with a Cy-3 conjugated secondary antibody. All microscopic images were processed in a computerized image program to visualize entire pulp sections with labelled cells.

Decisive parameters concerning phlogogenicity are amount and density as well as the location of granulocytes. The comparison of granulocytes in treated and untreated teeth showed a significantly higher amount of granulocytes in dentin-bonding affected pulps. In these specimens we observed granulocytes in different stages of transmigration. They were either attached to the endothelium, transmigrating the blood vessels, or already residing in the pulpal connective tissue. Some granulocytes in test group pulps were blocking microvasculature vessels in contrast to the main distribution of these cells in magistral vessels in the controll group pulps.

From these results we conclude that there is a highly elevated influx of granulocytes into the pulpal microcirculation compartment and connective tissue which could serve as an indicator for acute inflammatory response to dentin-bonding-agents.