Spectrophotometric reassessment of the color fastness of IPS e.max CAD crowns and follow-up of monolithic three-unit IPS e.max CAD bridges in the non-indexed posterior region

Ralf J. Bäppler¹; Michael Feldbacher²; Rüdiger Junker²
¹Zentrum für zahnärztliche Prothetik und Biomaterialien, Austria; ²DPU, Austria

Background: It is known that the colour of cements might influence the optical perception of the predefined colour of ceramic crowns. However, changes in optical perception are not uniform, but depend on different parameters like predetermined colour of the ceramic, wall thickness of the ceramic, thickness of the cement or adhesive material.

Aim/Hypothesis: Therefore, the aim of the current in-vitro experiment was to examine colour stability of monolithic crowns cemented on metal custom made abutments in relation to different luting materials.

Material and Methods: The experimental part was divided into experiment 1 and 2. In the first experiment, IPS e.max CAD crowns were optically evaluated with a color ring and digitally with a spectrophotometer after insertion with different colored zinc phosphate cements on simulated titanium abutments made of NEM. The color accuracy or color fastness was examined. In the second experiment IPS e.max CAD crowns were cemented on NEM stumps. Different sizes of the spacers and, consequently, different sizes of the ceramic layer thicknesses were selected and used in the design of the crowns. Here again, the color fastness was observed. In the experimental section, in the first part, IPS e.max CAD crowns were cemented on NEM stumps with differently colored cements and then visually assessed. In the second part, IPS e.max CAD crowns were designed with spacers of different sizes and then re-attached to NEM stumps and optically evaluated.

Results: In the experimental part of the diploma thesis, it was found that the three selected shades of the zinc phosphate cement used to cement the IPS e.max CAD crowns (IVOCLAR VIVADENT, Schaan, Liechtenstein) on the NEM stumps could not reach the original shade of the A2 tooth crown. All tooth crowns became lighter. In the second experiment of the experimental part different sized spacers were chosen. Again, the desired tooth color A2 was not achieved. All results were brighter and could not reach the brightness level A2.

Conclusions and Clinical Implications: All tooth crowns became lighter. From this it can be concluded that the HT IPS e.max CAD crowns due to the too low ceramic wall layer thickness, caused the white part of the cement to shimmer too much due to the high translucency and thus achieved a lighter shade.