Jef M van der Zel, Dent Health Curr Res 2019, Volume: 5
DOI: 10.4172/2470-0886-C1-027

Cognitive design of crowns and bridges

Jef M van der Zel
Foundation of Oral Restorative Technologies,The Netherlands

To design an aesthetic crown in two layers a mathematical model of the general dentin-enamel boundary (DEB) is combined with an enamel layer thickness model for visual individualization effects. Sixty disks of Prmero Enamel porcelain with a translucency of 63% (d = 1.00 mm) were fabricated five groups, with a thicknesses of 0.20, 0.40, 0.60 and 0.80 mm. The disks were placed on a background of zirconia in three cervix colors (A1, A2, and A3) respectively. The L*a*b*- CIE-lab color parameters were determined by a Coloreye® spectrophotometer (Olympus, Japan). The bi-layered restorations were designed with an dentin-enamel boundary (DEB) that corresponded with the original natural element. A mathematical model was derived from the measurements resulting in an equation that predicts the resulting color from the enamel thickness. The overall color and appearance was compared with the Vita Classic color guide for matching. The Lr*-value at the reference point is, where the thickness of the enamel is 0.60 mm to give the exact overall color. At a random measured point the Lm*-value relates to a particular enamel thickness dm. For the purpose of determining the location a wiremesh is projected on the visible side of the adjacent tooth. Where the thickness of the enamel is 0.60 mm to give the exact overall color. At a random measured point the Lm*-value relates to a particular enamel thickness dm. The histo-anatomy of the tooth implies that the dentin core is the key to the digitally-generated aesthetics. The generation of the individual 3D tooth structure, including the dentine-enamel boundary (DEB) and the local enamel thickness, is determined by a combined mathematical model for the local enamel layer thickness of the veneer. The popular color-graded monolithic zirconia, which has fixed color layers in the milling block is not flexible enough for cognitive production. The agreement with the Vita Classic colour guide appeared sufficient (better than 90% by 2 observers). The Primero® process enables the production of durable histo-anatomical restorations. However, these crowns and bridges still have to be designed by trained dental technicians. This study offers two algorithms that reduce the efforts with a cognitive design process for an attractive and natural aesthetic result.

Biography

CV Jef M van der Zel has completed MSc and PhD. He worked in the research of alloys and metal, press and oxideceramics at Elephant Dental, Hoorn-NL from 1977 to 2007. He also served in CAD/CAM research since 1987, CAD / CAM software (1987-2015), laboratory scanners (1990), three-layer CAD/CAM crown (1993), virtual articulation (1996), template guided implant planning (2000), Primero crowns and bridges (2012) and 6-year controlled clinical trial Primero crowns and bridges (2012-2018). He has been the technical director Cyrtina Dental Group BV from 2007 and the professor with a special chair for Computerized dentistry at the University of Amsterdam and chairman of the Foundation of Oral Restorative Technologies from 2004.

jmvanderzel@planet.nl

Notes: