Comparative color and surface parameters of current esthetic restorative CAD/CAM materials

Ferhan Egilmez[1]*, Gulfem Ergun[1], Isil Cekic-Nagas[1], Pekka Kalevi Vallittu[2,3], Lippo Veli Juhana Lassila[2,4]

[1]Department of Prosthodontics, Faculty of Dentistry, Gazi University, Ankara, Turkey
[2]Institute of Dentistry, Department of Biomaterials Science and Turku Clinical Biomaterials Centre, Turku, Finland
[3]University of Turku and City of Turku, Welfare Division, Turku, Finland
[4]Faculty of Health and Well-being, Turku University of Applied Sciences, Turku, Finland

PURPOSE. The purpose of this study was to derive and compare the inherent color (hue angle, chroma), translucency (TP_{SCI}), surface gloss ($\Delta E^*_{SCE-SCI}$), and surface roughness (R_a) amongst selected shades and brands of three hybrid CAD/CAM blocks [GC Cerasmart (CS); Lava Ultimate (LU); Vita Enamic (VE)]. **MATERIALS AND METHODS.** The specimens (N = 225) were prepared into square-shaped (12 × 12 mm^2) with different thicknesses and shades. The measurements of color, translucency, and surface gloss were performed by a reflection spectrophotometer. The surface roughness and surface topography were assessed by white light interferometry. **RESULTS.** Results revealed that hue and chroma values were influenced by the material type, material shade, and material thickness ($P < .001$). The order of hue angle amongst the materials was LU > CS > VE, whereas the order of chroma was VE > CS > LU. TP_{SCI} results demonstrated a significant difference in terms of material types and material thicknesses ($P \leq .001$). TP_{SCI} values of the tested materials were ordered as LU > CS > VE. $\Delta E^*_{SCE-SCI}$ and R_a results were significantly varied amongst the materials ($P < .001$) and amongst the shades ($P < .05$). The order of $\Delta E^*_{SCE-SCI}$ amongst the materials were as follows LU > VE ≥ CS, whereas the order of R_a was CS ≥ VE > LU. **CONCLUSION.** Nano-ceramic and polymer-infiltrated-feldspathic ceramic-network CAD/CAM materials exhibited different optical, inherent color and surface parameters. ***[J Adv Prosthodont 2018;10:32-42]***

KEYWORDS: Hybrid ceramics; Hue; Chroma; Translucency; Surface roughness

INTRODUCTION

Since chairside computer-assisted design/computer assisted manufacturing (CAD/CAM) systems have enjoyed a significant evolution in the capability and efficiency, several CAD/CAM systems have been introduced, confirming the increased interest in the chairside digital workflow.[1]

Corresponding author:
Ferhan Egilmez
Department of Prosthodontics, Faculty of Dentistry, Gazi University, Mutlukent Mah, 1920. Cadde 2065. Sk. No:15, Beysukent, Ankara, Turkey
Tel. +903122034179: e-mail, ferhanegilmez@gmail.com
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So far, different hybrid materials are currently on the market.[2] These materials are also known as "resin-matrix ceramics" and comprise materials with an organic matrix highly filled with ceramic particles.[3] Nano-resin ceramics, high-density composite resin materials, and the polymer-infiltrated-feldspathic ceramic-network material are the examples of dental hybrid restorative materials. The main advantages of hybrid materials are easier milling and adjustment than glass-matrix ceramics or polycrystalline ceramics, similar modulus of elasticity to dentin when compared to traditional ceramics, and easier repair or modification with composite resin.[3]

In this context, hybrid CAD/CAM materials are classified as composite resins.[4] However, there are numerous *in vitro* studies about recently introduced CAD/CAM composite materials as alternative materials to glass ceramics.[5-8]

With the developments in nanocomposite technology, not only mechanical and physical properties of composite materials are improved but also color characteristics and optical characteristics are affected.[9,10] Because more dentists work independently of a technician, better understanding

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