

Effectiveness of Shade Measurement Using Intraoral Scanner Compared with Digital Spectrophotometer and Visual Shade Assessment.

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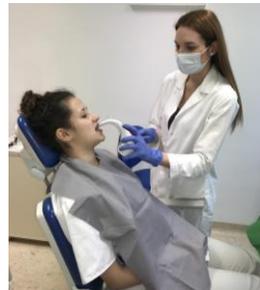
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Abstract

Background: The aim of this study was to evaluate shade measurement function of a digital scanning system in relation to visual shade determination and digital spectrophotometric device.
Methods: 10 dental students took digital impressions and measured tooth shade for 10 different patients using 3Shape Trios intraoral scanner (TR). Students also selected shade using 2 visual methods: Vita A1-D4 (VC) and Vita Linearguide 3D-Master (LG) shade guides and an instrumental method: Vita Easyshade (ES). Students had no previous experience in intraoral scanning and tooth color matching, they attended an education course. The students matched the color of 3 teeth for each patient. Time spent on shade matching were recorded. For each tooth there were a VC shade- tab, an LG shade- tab and LG-shade tabs according to ES and TR measurements. Four selected shade tabs were presented to the patient, the student and an experienced dentist to select the best match. The results were recorded and evaluation of percentage was calculated.
Results. The percentages of the selected best matching shade tabs out of the 4 methods: LG: 35,08%, ES: 26,58%, TR: 21,64%, VC: 16,7%. Time spent on shade matching by the 4 different shade matching methods: ES: 14,12 sec, TR:40,06 sec, VC: 52,42 sec, LG: 70,47 sec.
Conclusions. Intraoral scanner (TR) was acceptable for shade measurement. The fastest shade matching procedure was digital spectrophotometer (ES) followed by intraoral scanner. Most "best fit shade tabs" were selected with visual method (LG). Shade selection with visual method took the most time.

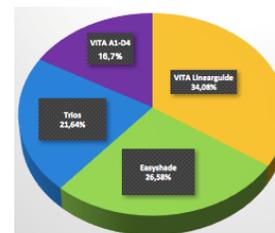
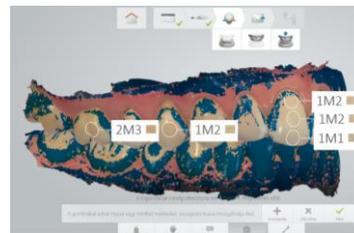
Introduction

In digital shade measurement digital spectrophotometer is used as a gold standard. New intraoral scanner system was developed with a tool for teeth shade measurement, but there is less information about its efficiency. The aim of this in vivo study was to evaluate shade measurement function of a digital scanning system in relation to visual shade determination and digital spectrophotometric device. The study was ethically approved by the Semmelweis University Institutional Review Board (SE-TUKEB 61/2016).



Materials & Methods

10 dental students from Semmelweis University Faculty of Dentistry took part in the study. Dental students took digital impressions and measured tooth shade for different patients using Trios 3 (3Shape, Copenhagen, Denmark) intraoral scanner device (TR). Students also selected shade using 2 visual methods: Vita A1-D4 (VC) and Vita Linearguide 3D-Master (LG) shade guides and an instrumental method: Vita Easyshade (ES). The inclusion criteria of patients were full dentition and no prosthetic restorative treatment. The first and the last patient was the same person for each examiner student. Students had to participate in Ishihara test to screen red-green color vision deficiency. Students had no previous experience in intraoral scanning and tooth color matching, study was preceded by a lecture consisting of two parts: education and training. During training they practiced shade matching with VC, LG, ES and the TR intraoral scanner. They completed the Dental Color Matcher as part of training. Visual shade matching took part under standardized circumstances. The devices were used according to manufacturers guides.



Results

The percentages of the selected best matching shade tabs out of the 4 methods: LG: 35,08%, ES: 26,58%, TR: 21,64%, VC: 16,7%. Time spent on shade matching by the 4 different shade matching methods: ES: 14,12 sec, TR:40,06 sec, VC: 52,42 sec, LG: 70,47 sec.

Conclusion

Intraoral scanner (TR) was acceptable for shade measurement. In case of digital impression taking using another device for shade matching wasn't necessary, color results were showed automatically. The fastest shade matching procedure was digital spectrophotometer, Easyshade (ES) which could make shade measurement in 14, 12 sec followed by Trios 3 (3Shape, Copenhagen, Denmark) intraoral scanner with 40, 06 sec. Shade selection with visual method took the most time. In case of Vita Classical shade tabs the average time spent was 52, 42 sec. Using the 3D master methods time spent was the most 70, 47 sec. Most "best fit shade tabs" were selected with visual method, Linearguide shade tabs (LG).

References

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