Influence of Light on Intraoral Scanner Shade Matching: A Pilot Study

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Introduction

- Shade reproduction of natural teeth using restorative materials can be challenging
- Visual determination of shade is subjective and influenced by multiple conditions, leading to inaccuracy
- Technology and materials may improve automated shade-matching, leading to better outcomes

Objective

- Assess the influence of various lighting conditions on the ability of a computer-based system to accurately identify tooth shades

Materials and Methods

- Two shade tabs (A1 & C4) placed in a gingival matrix
- Scanned under 3 conditions: Natural daylight, incandescent room light, and no illumination
- 60 total scans (20 per lighting condition)
- Scanner color-calibrated before each scan
- Measurements made in middle 3rd
- Value and chroma of computer suggested shades were compared to the actual shade tabs

Results

Vita Classical						
Measurement Comparison	Incadescent light (Lux=500)		Sunlight (Lux=1250)		No light (Lux=0)	
	A1 (n=10)	C4 (n=10)	A1 (n=10)	C4 (n=10)	A1 (n=10)	C4 (n=10)
Matching	30%	60%	50%	80%	30%	100%
Non matching	70%	40%	50%	20%	70%	0%

Discussion

- Lower value (darker) shade tabs were matched with higher accuracy in all lighting conditions
- Higher value (lighter) tabs were measured with more accuracy in sunlight/higher illumination
- Scanner measured darker value shade tabs with most accuracy in low light conditions

Conclusions

- Amount of illumination did effect scanner accuracy
- Future studies to include larger sample sizes and wider range of shade values

References

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