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Contents

Scientific Jury

MDDr. Juraj Bánovčin, PhD.

MUDr. Silvia Timková, PhD.

MDDr. Natália Savková

Do Consumers Consider Sustainability when Purchasing a Toothbrush?

Name: Ciara Halton
Year of study: 4th
University: Trinity College Dublin, Ireland
Authors: Ciara Halton, Amelia Conlon, Jia Hua, Fraser Hart, Jay Koh, Aisling Corley
Affiliations: Dental University Hospital, Trinity College Dublin

INTRODUCTION:
A recent resurgence of sustainability in healthcare has resulted in huge progress into more 'eco-aware' products and their incorporation into everyday life with home oral hygiene products being not far behind. However, are the public willing to pay for this change? Objectives: This study aimed to create and use a discrete choice experiment (DCE) to evaluate preferences for attributes of disposable manual toothbrushes along with the willingness to pay (WTP) for said attributes.

MATERIALS AND METHODS:
A mixed method approach was used for attribute identification, refinement and best practice guidelines led the DCE design. An online survey company, Bounce Insights, was used to disperse the survey through their mobile app. Individual weights (β) were determined for each level (except the attribute baseline) of the six final attributes. WTP was then calculated using a conditional logistic regression model, with the cost attribute used as a price proxy.

RESULTS:
A total of 326 participants took part in the survey, with an approximate balance of gender and age. Four out of six final attributes resulted in statically significant results. The top three positively influential attributes were: Bamboo handles at $\beta = 0.486$ and WTP = €5.79, followed by recyclable plastic at $\beta = 0.338$,WTP = €4.02 and third, recyclable packaging at $\beta = 0.191$, WTP= €2.77 (with higher positive β meaning a more positive effect on consumer choice).

CONCLUSIONS:
It can be seen that 'greener' and more sustainable manual disposable toothbrush attributes dominated consumer preference when purchasing. This could be due to new environmental initiatives from influential hygiene companies or from on-trend activism.

KEY WORDS: sustainability, dentistry, toothbrush, recyclable, eco-friendly

The Impact Of Background Color On Shade Assessment Of Preheated Composite Filling Material Kalore Gc

Name: Barbara Gronwald
Year of study: 1st year graduated
University: Pomeranian Medical University in Szczecin
Authors: Barbara Gronwald 1, Karina Kijak 1, Karolina Jezierska 2, Wojciech Podraza 2, Danuta Lietz – Kijak 1*, Helena Gronwald 1*
Affiliations: 1 Department of Propedeutics, Physical diagnostics and Dental Physiotherapy, Pomeranian Medical University, Szczecin, Poland, 2 Department of Medical Physics, Pomeranian Medical University, Szczecin, Poland

INTRODUCTION:
Composites are widely used in dentistry due to the aesthetic value. Preheating is used to improve their physical properties. Clinical evaluation of composite shade can be affected i.a. by background color on which the restoration is perceived. The aim was to evaluate the impact of background color on shade assessment of preheated nanohybrid composite filling material Kalore GC.

MATERIALS AND METHODS:
2 sets of 4 samples of Kalore GC (5mmx5mmx4mm), in shades of WT(1), XBW(2), C2(3) and NT(4) were prepared. The test group (IT) consisted of 4 samples subjected to preheating (54°C,Calset Composite Warmer). The control group (IS) consisted of 4 samples not exposed to preheating (25°C). All samples were polymerized with LED lamp (1800mW/cm2) and photographed on white and black backgrounds with Redmi Note 8T. Color measurements of all samples were made 10x with components of RGB model (red, green, blue), by ColorZilla software (scale 0 - 255). Value differences of RGB components for IS samples vs IT samples on white and black background respectively were calculated and statistically analyzed. Normal distribution was tested with Shapiro-Wilk test. For data analysis Student's t-test (normal distribution) and Mann-Whitney u-test (abnormal distribution) were used, p-value<0,05.

RESULTS:
IS compared to IT evaluated on white background showed statistically significant change in shade of all RGB components for each tested sample. IS compared to IT evaluated on black background showed statistically significant change in shade only in some of the RGB components. Differences in RGB components values analyzed on black background were smaller in comparison to values obtained on white background.

CONCLUSIONS:

Shade evaluation of composite material differs depending on the background color, so it should be conducted in conditions resembling clinical environment (black background). Preheating improves color stability of composite if analyzed on black background. Obtained differences in RGB values are too small to have any clinical implications.

KEY WORDS: preheating, composite, background color, shade stability, color assessment

The Potential of Nicotinamide N-Methyltransferase (NNMT) As An Anti-Cancer Target In Cultured Human Oral Squamous Cancer Cells (OSCC)

Name: Brian Maloney
Year of study: 3rd
University: Trinity College, Dublin, Ireland
Authors: Brian T. Maloney 1, Martyna Kubisztal 2, Marilena Karavyraki 3, Mary F. Rooney 3, Andrew Knox 2 and Richard K. Porter 3
Affiliations: 1 School of Dental Science, Trinity College Dublin, 2 School of Biological and Health Sciences, Technical University of Dublin, 3 School of Biochemistry & Immunology, TBSI, Trinity College Dublin.

INTRODUCTION:
Background Oral squamous cell carcinoma (OSCC) is the sixth most common cancer and accounts for 90% of oral malignancies. Surgical excision, radiation, and chemotherapy are the typical treatment regimens against OSCC; however, they are not always satisfactory. The enzyme nicotinamide N-methyltransferase (NNMT) is overexpressed in a variety of human cancers, including OSCC and has recently been investigated as a potential anticancer target. A recent in-silico investigation identified several small molecule inhibitors of NNMT with drug like properties. The effect of these modulators of NNMT on OSCC cell viability and respiration was evaluated. Aim The aim of this project was to confirm the presence and expression levels of NNMT in oral squamous carcinoma (SCC-4) and human dysplastic oral keratinocytes (DOK) cells; assess the impact of two small molecule inhibitors of NNMT on cell viability; and determine the effect of treatment with these molecules on cellular respiration and extracellular acidification rate of SCC-4 and DOK cells..

MATERIALS AND METHODS:
Materials and Methods The expression of NNMT in DOK and SCC-4 cell lysates was assessed by immunoblot. Cell viability was determined by Alamar blue assay. Cellular respiration and extracellular acidification rate were determined by Seahorse XF analyzer. NNMT inhibitors; compound 1 and compound 4 (unpublished data) were administered at 10 μM.

RESULTS:

This investigation confirmed the presence of NNMT in both SCC-4 and DOK cells, with preliminary data suggesting higher expression in SCC-4 compared to DOK cells. Neither NNMT inhibitor had any significant effect on the viability of the cells at the concentration and incubation times tested. Significantly, our data showed that both NNMT inhibitors studied reduced oxidative phosphorylation and increased glycolysis in DOK and SCC-4 cells.

CONCLUSIONS:

Our data suggests that NNMT expression is higher in malignant oral cells compared to dysplastic cells and inhibition of NNMT by our selected small molecule inhibitors attenuates cellular respiration and increases extracellular acidification rate (an indicator of glycolysis), suggesting that inhibition of NNMT may prove a potential therapeutic target in OSCC.

KEY WORDS: cancer, NNMT, immunoblot, dysplasia, chemotherapy

1st place winner

Defect Analysis of Complete Removable Dentures Fabricated Conventionally and by Three-Dimensional Printing

Name: Christa Serban
Year of study: 5th
University: Victor Babes University of Medicine and Pharmacy Timisoara
Authors: Christa Serban 1, Florin Ionel Topala 1, Meda Lavinia Negrutiu 1, Virgil Florin Duma 2, Liviu Marsavina 3, Cosmin Sinescu 1, Adrian Gh. Podoleanu 4
Affiliations: 1 - Victor Babes University of Medicine and Pharmacy Timisoara (Romania), 2 - Aurel Vlaicu University of Arad (Romania), 3 - Polytechnic University of Timisoara (Romania), 4 - University of Kent (UK)

INTRODUCTION:
Complete removable dentures are most commonly made of polymethyl methacrylate (PMMA). Fracture of acrylic resin dentures is a frequently occurring and unresolved problem. Material defects in stress-bearing areas can lead to denture fractures during occlusal function. Additive manufacturing, also known as 3D printing, is alternative complete denture fabrication technique. The aim of this study is the evaluate defects of complete removable dentures made by conventional fabrication and complete removable dentures made by 3D printing.

MATERIALS AND METHODS:
Ten complete removable dentures fabricated conventionally and ten 3D printed complete removable dentures were obtained. To produce ten 3D printed dentures, ten gypsum casts were scanned using Planmeca Planscan Lab scanner. Selective Laser Sintering (SLS) technology was used for the printing of the dentures. Subsequently, material defects of the conventionally fabricated dentures and 3D printed dentures were visualized using an optical coherence tomography (OCT) system working in Time Domain mode at 1300 nm. 3D reconstructions of the OCT scans were made for further analysis of the defects.

RESULTS:
The OCT 3D reconstructions allowed for identification and visualization of defects of different sizes in the dentures. The OCT detected the presence of defects in the complete removable dentures that were fabricated conventionally. Defects were not found in 3D printed complete removable dentures. However, there was one situation in which layers of material peeled away causing a major fracture line.

CONCLUSIONS:

This study showed that conventionally fabricated complete dentures had more internal material defects than 3D printed complete dentures. 3D printing of complete dentures has the potential to modernize denture fabrication techniques, improve efficiency, and lower fabrication costs. More research on 3D printing for definitive prostheses fabrication is needed to increase its application in removable prosthodontics.

KEY WORDS: complete removable dentures, additive manufacturing, 3D printing, prosthodontics, optical coherence tomography