

NextGen Esthetics A Global Outreach

**10th Annual Conference of
the Society for Color and
Appearance in Dentistry
(SCAD)**

**October 19-20, 2018
Renaissance Newport
Beach Hotel, CA**

PROGRAM BOOK

www.scadent.org • info@scadent.org



10th Annual Conference • Renaissance Newport Beach Hotel, CA, October 19-20, 2018

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Recommended Attire

Welcoming reception and educational sessions: Business casual

President's Dinner: Black tie optional

Event Venues

Scientific Program: Bay Laurel Central/South

Welcome Reception: Bamboo Garden

President's Dinner: Sequoia Ballroom

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A Message from the President



Dear Colleagues,

The Executive Board of the Society for Color and Appearance in Dentistry (SCAD) cordially welcomes you to our 10th Annual Conference at the Renaissance Newport Beach Hotel, CA on October 19-20, 2018.

This meeting features high-quality, evidence-based information on color-related issues in dentistry presented by many of the leaders in this field (up to 16 CE hours).

Our poster session comprises of clinical and research category and it will be an additional valuable source of evidence-based information. We will announce the 2018 recipients of SCAD VITA Award for Excellence in Research Related to Color and Appearance in Esthetic Dentistry (pre-doctoral students, graduate students, and non-tenured junior faculty), and 2018 recipients of Larsen-Chu Award for Excellence in Dental Technology.

We look forward to sharing the information and passion for the NextGen Esthetics with you!

Newton Fahl, Jr., DDS, MS
President, SCAD

Program

Thursday, October 18, 2018

1:00-5:00	VITA Course, Yorba Linda
1:00-6:00	Registration Open
6:30-7:30	SCAD Executive Board Meeting
7:30-9:00	Welcoming Reception

Friday, October 19, 2018

7:00-8:00	Breakfast with new members
8:00-8:15	Opening Ceremony
8:15-9:00	Stephen J. Chu: Surgical & Prosthetic Strategies to Avoid Tissue Discoloration Around Implants
9:05-9:35	Bobby Williams: Vision of Today in Dentistry Clinical Partnerships and the Fusion of "Hand Made" with Technology
9:45-10:05	Edson Araujo: The Influence of Cavity Preparation (Bevel) in Esthetic Appearance and Clinical Performance of Direct Restorations of Anterior Teeth
10:05-10:45	Break, CDT competition
10:45-11:10	Taiseer A. Sulaiman: Ceramics Shade and Translucency... Perception VS. Deception
11:15-12:00	Galip Gürel: The Art of a Personalised Smile Design
12:00-12:45	Lunch
12:45-1:15	Poster Session
1:15-1:40	Francisco H. Imai: Spectral-based Imaging and Application for Aesthetics Dentistry
1:45-2:15	Jacinthe M. Paquette: Evolving Concepts of Patient Care
2:20-2:50	Stephen J. Chu, Marcos Vargas, Federico Ferraris: Material Selection for Optimal Color and Appearance • Round Table, Moderator: Newton Fahl, Jr
2:50-3:25	Break

3:25-3:55 Patrick Rutten: ***"Analogue versus Digital" Anterior and Posterior***

4:00-5:00 Jon Gurea & Augusto Bruguera: ***Empathy. How the Dentist can Make the Technician's life Easier and Viceversa***

5:00-5:10 *SCAD Open Meeting*

7:00-10:00 *The First Ten Years: Sparkling Stars - President's Dinner & Award Ceremony*

Saturday, October 20, 2018

7:00-8:00 *Breakfast*

8:00-8:30 Aki Yoshida: ***The Challenge of Color Management in the Fabrication of Porcelain laminate Veneers***

8:35-9:05 Christian F. J. Stappert: ***Current Ceramic Rehabilitation***

9:10-9:40 Linda Greenwall: ***White, Whiter, Whitest: Current Concepts for Predictable Advanced Tooth Whitening 2018***

9:45-10:15 Marcos Vargas: ***Indistinguishable Direct Resin Composites - Blending for Success***

10:15-10:55 *Break*

10:55-11:25 Petra Guess-Gierthmühlen: ***Digital Workflows & Minimally Invasive Dentistry: Predictable Outcomes***

11:30-12:00 Brian P. LeSage: ***Composite Bonding or Ceramic Veneers: Which is better?***

12:00-1:00 *Lunch*

1:00-1:30 Ernesto A. Lee: ***Novel Methods for the Management of Dento-alveolar Defects in the Esthetic Zone***

1:35-2:20 Markus B. Blatz: ***Evolution Esthetic Properties of New Ceramic Materials***

2:20-2:50 Julian Conejo: ***Optimized Bonding and Material Selection Update for Chairside CAD/CAM Dentistry***

2:50-3:00 *Closing Ceremony*

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SCAD Mission and Goals

The Society for Color and Appearance in Dentistry (SCAD) was founded in 2008 as a consortium of dental professionals and other experts interested in this area of aesthetic dentistry specifically related to scientific investigation and application of color and appearance in dentistry.

The SCAD goals are as follows:

- To serve as a uniting force in the profession by promoting and fostering greater awareness for color and appearance;
- To advance multidisciplinary collaboration and discovery among industrial and institutional researchers, clinicians, laboratory technicians and others with an interest in color and appearance in dentistry;
- To create and implement educational and training programs on color and appearance for dental professionals and students;
- To promote dental health for the general public through the advanced art and science of color and appearance in dentistry.

SCAD Governance

DIRECTORS

Newton Fahl
 William M. Johnston
 Joe. C. Ontiveros
 Esam Tashkandi
 Stephen S. Snow
 Juliana Da Costa
 Federico Ferraris

Officers

Newton Fahl, Board Chair and President
 Aki Yoshida, President-Elect
 William M. Johnston, Vice-Chair/Vice-President
 Federico Ferraris, Secretary
 Sabiha Bunek, Treasurer

Executive Director

Rade D. Paravina

REGIONAL COUNCILORS

Andrey Akulovich, Russia
 Federico Ferraris, Europe
 Yumiko Hosoya, Asia-Pacific
 John M. Powers & Ernesto Lee, North America
 Esam Tashkandi, Africa & Middle East

Poster Session and SCAD VITA Research Award

Poster Session is a very important segment of our program. SCAD has established the VITA Award for the best posters in clinical and research category, related to color and appearance in esthetic dentistry. US/international applicants are eligible for the awards. Each recipient will receive a \$1,500 stipend at the annual meeting.

We also invite you to submit an abstract for consideration for poster presentation at the SCAD 2019 Annual Conference (Newport Beach, CA, September 13-14). The instructions will be provided at the SCAD website (www.scadent.org).

Dental Technician Awards

The Society for Color and Esthetics in Dentistry conducted two competitions for excellence in dental technology in 2018:

- Larsen-Chu Award: Open to dental technicians who have less than 10 years in practice
- Virtuoso Award: Open to dental technicians who have 10+ years in practice

The 2018 applicants duplicated a natural tooth using any material and technique of their choice. Please make sure to see their work during the morning break on Fri, Oct 19.

Also kindly consider participation in the 2019 CDT competition. See www.scadent.org for additional information.



Aki Yoshida RDT, Chair of the 2017 CDT Award Committee presents the awards to Larsen-Chu Award winner Mi-Jeong Jeong (left), Virtuoso Award winner Nobuyuki Kasahara (middle) and Virtuoso Award 2nd place Yuichi Komaki (right). Special thanks to 2017 judges: Stephen J. Chu, Naoki Hayashi, Sascha Hein, Nori Kawada, Michel Magne, Edward A. McLaren, Arturo Mendez, Adam J. Mielezsko and Hideo Yamamoto.

SCAD Members and Past Presidents

Past Presidents

Dan Nathanson (2014-2016)
Edward J. Swift (2012-2014)
Stephen J. Chu (2010-2012)
Rade D. Paravina (2008-2010)

Fellows

Stephen F. Bergen
Stephen J. Chu
William M. Johnston
Dan Nathanson
Joe C. Ontiveros
Rade D. Paravina
John M. Powers
Edward J. Swift
Esam Tashkandi

Active Members

Andrey Akulovich
Sabiha Bunek
Juliana da Costa
Magda Eldiwan
Newton Fahl
Federico Ferraris
Razvan Ghinea
Ronald E. Goldstein
Nour Habib
Yumiko Hosoya
So-Ran Kwon
Brian LeSage
Arturo Mendez
Kathy O'Keefe
Christopher Orr
Jacinthe Paquette
Andree Ritter
Herbert Scheller
Cherilyn Sheets
Sharon Siegel
Stephen S. Snow
Richard Trushkowsky
Aki Yoshida
Maria Gonzales
Natalie Pereira

Associate Members

Vaida Avery
Shereen Azer
Harold Baumgarten
Morse Bayadse
Moataz Bayadse
Kyle Bennett
Jan-Philipp Brüggemann
John Calamia
Steven Campbell
Sonia Cattazzo
Henry Chen
Bruce Crispin
Gerald Denehy
Dmitriy Ermilov
Sandra Farah-Franco
Sivan Finkel
Maria Frosing
Adilson Furuse
Seubg-Ryong Ha
Beatrice Haddad
Helena Hakansson Forthmeijer
Thad Hegwood
Cecilia Infantado
Sung-Hun Kim
Priscila Meneghetti
Omar Moustafa
Leong Seng Neoh
Aleksandr Pershin
Dean Ramus
Giovanni Sammarco
Alan Smith
Michael Weyhrauch
Karry Whitten
Hideo Yamamoto
Richard Young

All SCAD Presenters, 2009-2018

Pinhas Adar	Jens Fischer	Jacinthe M. Paquette
Dario Adolfi	Mauro Fradeani	Rade D. Paravina
Naoki Aiba	Iñaki Gamborena	Stefan Paul
Chad Anderson	David A. Garber	Jin-Ho Phark
Edson Araujo	Robert W. Gerlach	Nicola Pietrobon
Luiz Narciso Baratieri	Russell Giordano	Peter Pizzi
Nasser Barghi	Ronald E. Goldstein	Carlo Poggio
Harald Baumgarten	Charles J. Goodacre	John M. Powers
Stephen Bayne	Stefano Gracis	Richard Price
Panaghiotis Bazos	Dan Grauer	Angelo Putignano
Wolfgang Bengel	Linda H. Greenwell	Ariel J. Raigrodski
Michael Bergler	Philipp Grohmann	Wolfgang Rauh
Nitzan Bichacho	Petra Guess	Andrea Ricci
Markus B. Blatz	Galip Gurel	André V. Ritter
Branko Bojovic	Jon Gurrea	Robert G. Ritter
Franck Bonnet	Sascha Hein	Michel Roge
Lawrence E. Brecht	Gavin Heymann	Stephen Rosenstiel
Lorenzo Breschi	Harald O. Heymann	Sergio Rubinstein
William D. Browning	Christopher Igjel	Patrick Rutten
August Bruguera	Francisco H. Imai	Avishai Sadan
Sabiha Bunek	Stefano Inglese	Irena Sailer
John O. Burges	S. Ishikawa-Nagai	Maurice Salama
Marcelo Calamita	Holger A. Jakstat	David M. Sarver
Murilo Calgario	William M. Johnston	Herbert Scheller
Stephen Campbell	V. Kaufmann-Jinoian	Cherilyn Sheets
Newton Cardoso	J. Robert Kelly	Claude Sieber
Ricardo Carvalho	Sudarat Kiat-amnuay	Thomas Singh
Yi-Yuan Chang	Jason J. Kim	Stephen R. Snow
Stephen J. Chu	Sidney Kina	Roberto Spreafico
Victor Clavijo	John C. Kois	Clark M. Stanford
Christian Coachman	Gerard Kugel	Christian Stappert
Julian Conejo	So-Ran Kwon	Joerg Strub
Lyndon Cooper	Nathaniel Lawson	Taiseer Sulaiman
Theodore P. Croll	Ernesto A. Lee	Edward J. Swift
Lee Culp	Brian LeSage	Dennis Tarnow
John DaSilva	Yiming Li	Norbert Thiel
Alvaro Della Bona	Michel Magne	Van P. Thompson
Krikor Derbabian	Pascal Magne	Bernard Touati
Alessandro Devigus	Rodrigo Rocha Maia	A-P Tripodakis
Diedier Dietschi	Kenneth Malament	Marcos Vargas
Kevin J. Donly	Domenico Massironi	Alessandro Vichi
Sillas Duarte	Bruce A. Matis	Hans-Peter Weber
James R. Dunn	Edward A. McLaren	Stephen Westland
Jungo Endo	Adam J. Mieleszko	Corky Willhite
Newton Fahl	Tal Morr	Bobby Williams
Mark D. Fairchild	Michael Moscovitch	Aki Yoshida
Vincent Fehmer	Dan Nathanson	Richard Young
Jack L. Ferracane	Joe C. Ontiveros	Anja Zembic
Federico Ferraris	Giacomo Ori	Yu Zhang
Johan Figueira	Christopher Orr	Pascal Zyman



Stephen J. Chu, DMD, MSD, CDT

Dr. Chu, received his undergraduate degree from Brown University and his Doctor of Dental Medicine degree from the University of Pennsylvania. He obtained his Master's of Science degree in Restorative Dentistry and completed the Advanced Education Program in Prosthodontics at the University of Washington, in Seattle. Dr. Chu subsequently became a board-certified dental technician in ceramics and obtained a Master's degree in Dental Technology from the New York University College of Dentistry (NYUCD). He is the former Director of the Continuing Education Program in Advanced Aesthetic Dentistry at NYUCD. He is also presently an Associate Clinical Professor in the Department of Prosthodontics and is the Director of Aesthetic Education at the Columbia University College of Dental Medicine. Dr. Chu has authored two textbooks on color and aesthetic/cosmetic restorative dentistry and has contributed chapters to several others. He has published numerous articles in the dental literature and is the section editor for one dental journal and on the editorial board of four others. He is a much sought-after teacher and a world-wide lecturer in aesthetic/cosmetic restorative dentistry and implant dentistry.

Oral Presentations

Friday, October 19
8:15-9:00

Surgical & Prosthetic Strategies to Avoid Tissue Discoloration Around Implants

Stephen J. Chu, DMD, MSD, CDT

Lecture Description

Recent studies have identified a high rate of incidence of tissue discoloration around dental implants. Etiologies of tissue discoloration will be discussed and techniques presented to avoid this problem, especially with implants placed in the esthetic zone. Clinical research will be presented on the effects of bone grafting and provisional restoration on soft tissue color change with immediate tooth replacement therapy.

Objective

- Understand tissue discolorations:
- Etiology
- Incidence
- Techniques for correcting.

Oral Presentations

Friday, October 19
9:05-9:35

Vision of Today in Dentistry Clinical Partnerships and the Fusion of "Hand Made" with Technology

Bobby Williams, CDT

Lecture Description

The need for a harmonious partnership between the technician and the dentist is now more evident than ever. This presentation will dive into the mechanisms from case diagnosis, treatment planning, color communication, case fabrication to completion. Clinical cases will be presented to illustrate the process.

Objective

- To address the necessity of a partnership between the Technician and the Clinician in case diagnosis, treatment planning, etc...
- To address the technology aspect vs. the hand made aspect. There needs to be a symbiotic relationship between the two to be successful today.



Bobby Williams, CDT

Bobby Williams is a graduate of the Kois Center and attended the University of Oklahoma and followed his undergraduate studies with a dental laboratory technical school in Dallas, TX. He has over twenty five years of experience as a lab technician and owner. He has owned and operated, for the last sixteen years, a very active, high-quality, all-ceramic laboratory, Synergy Ceramics, that specializes in cosmetic restorations from single tooth to full-mouth reconstruction. Bobby is also a founder of Techsource Dental, an Authorized Lava Milling Center and Atlantis Custom Abutment specialist, for the last fourteen years. He is a senior member of Claude Sieber's "Art & Experience". He lectures and teaches courses internationally on Patient Specific Abutments, Implants, porcelain and indirect composites for Atlantis Patient Specific Abutments, Dentsply Implants, 3M ESPE and Vita North America.



***Edson Araujo, Jr.,
DDS, MSc, PhD***

A specialist with Master's and Doctoral Degrees in Restorative Dentistry at the Federal University of Santa Catarina; Professor of Integrated Clinical Practice of the Odontology Department of the Federal University of Santa Catarina.

Oral Presentations

Friday, October 19
9:45-10:05

The Influence of Cavity Preparation (Bevel) in Esthetic Appearance and Clinical Performance of Direct Restorations of Anterior Teeth

Edson Araujo, Jr., DDS, MSc, PhD

Lecture Description

This lecture will evaluate the importance of anterior teeth cavity preparation in direct restorations with composite resin. Important clinical aspects as esthetics, effectiveness and longevity will be discussed comparing two techniques, with and without bevel preparation. Beyond demonstrating and discussing techniques, treatments with composites in different situations will be demonstrated.

Objective

- To evaluate the importance of bevel preparation in esthetics and in clinical performance of direct restorations of anterior teeth;
- To evaluate the importance of bevel preparation in the longevity of restorative treatments;
- To describe and discuss restorative treatment techniques with and without bevel preparation.

Oral Presentations

Friday, October 19
10:45-11:10

Ceramics Shade and Translucency... Perception VS. Deception

Taiseer A. Sulaiman, DDS, PhD

Lecture Description

Color and translucency of a natural tooth is a spectacular phenomenon, and is different from one individual to another. Numerous ceramic systems have been recently introduced in efforts to restoring a tooth not only to its proper function, but also to its natural appearance. This presentation will focus on the inherent translucency of modern-day ceramics and compare them to those of enamel and dentin. Translucency perception is subjective and can vary from one person to another. Numerical enhancement in translucency values of certain ceramics may not be perceivable to the human eye. Furthermore, stains and glazes are added to these ceramics to mimic the natural appearance of the tooth structure. A focus on the durability and time-lasting evaluation of these stains and glazes will also be discussed.

Objective

- Defining translucency and its different measurement methods.
- Comparing translucency of enamel and dentin with ceramic systems according to existing translucency perception thresholds.
- Introducing translucency perception threshold according to translucency parameter values.
- An overview of durability and retention of ceramic stains and glazes.



Taiseer A. Sulaiman, DDS, PhD

Taiseer Sulaiman is an Assistant Professor and the Director of Biomaterials and Biomimetics in the Department of Operative Dentistry at the University of North Carolina where he gained his clinical certificate in Operative Dentistry, and completed his PhD in Dental Materials from the Department of Prosthetic Dentistry and Biomaterial Sciences from the University of Turku in Finland in collaboration with the Department of Operative Dentistry, University of North Carolina. Dr. Sulaiman is a clinician and a researcher hoping to bridge gaps between dental research and clinical application. Dr. Sulaiman's research focus is on dental ceramics, adhesion, cements, color and appearance in dentistry and biomimetics. He is a member of numerous academies including the IADR/AADR, Academy of Operative Dentistry, the Society of Color and Appearance in Dentistry and the American Dental Association.



Galip Gürel, DDS, MS

Dr. Galip Gürel graduated from the University of Istanbul, Dental School in 1981. He continued his education at the University of Kentucky, Department of Prosthodontics. Received his MSc degree from Yeditepe University in Istanbul.

Dr. Gürel is the founder and the honorary president of EDAD (Turkish Academy of Aesthetic Dentistry). He was the President of the European Academy of Esthetic Dentistry (EAED) for 2011 & 2012. He received "The Smigel" award from New York University College of Dentistry to honor the best esthetic dentists in the world. He is a member of the American Society for Dental Aesthetics (ASDA) and American Academy of Restorative Dentistry (AARD) and the honorary diplomate of the American Board of Aesthetic Dentistry (ABAD). He is also the editor-in-chief of the Quintessence Magazine in Turkey and on the editorial board of the AACD journal, PPAD (Practical Procedure & Aesthetic Dentistry), EJED (European Journal of Esthetic Dentistry).

He is a visiting professor at the New York University (USA), Marseille Dental University (France) and Istanbul Yeditepe University (Turkey). He is the author of *"The Science and Art of Porcelain Laminate Veneers"* published by Quintessence publications in 2003 translated into 12 different languages.

A renown sportsman, Dr. Gürel has been the Captain of the Turkish National Team of Water Polo for 110 times, a World Champion of the Camel Trophy and a participant of the Paris-Dakar Rally.

Oral Presentations

Friday, October 19
11:15-12:00

The Art of a Personalised Smile Design

Galip Gürel, DDS, MS

Lecture Description

The aim of this lecture is to present a novel concept which involves the creation of a customized personal image expressing a person's sense of identity which is based on the "visagism".

With the new digital technologies now this problem seems to be solved. The REBEL is the new 3D PERSONALIZED SMILE DESIGN program, which can convert the 2D VIS program in to 3D, to be placed immediately in the patients mouth.

The protocol that will be presented in this lecture will show the attendees on how easy to get in to the stage of working with the REBEL, how to get the 3D digital wax up and emphasize the importance of the correct communication which will improve the treatment planning and the predictability of anterior aesthetic restorations.

Objective

- Review current thoughts on material selection.
- Learn how mechanical testing of teeth can assist in assessing the structural stability of teeth.
- Discover new diagnostic aides to help in choosing the most appropriate esthetic restorative material.
- Learn how restorations can be monitored once cemented to see if structural problems are holding, improving or deteriorating.

Oral Presentations

Friday, October 19
1:15-1:45

Spectral-based Imaging and Application for Aesthetics Dentistry

Francisco H. Imai, PhD

Lecture Description

The current RGB imaging paradigm does neither provide physical accurate capture nor represent appearance accurately. Spectral-based imaging has the ability to capture physical properties that is the basis of building a system that can be applied for aesthetics dentistry.

Objective

- Convey limitations of current imaging systems and provide solutions using spectral-based imaging for aesthetics dentistry.



Francisco H. Imai, PhD

Francisco Imai is a color imaging researcher whose interests include computational color photography, computer vision and spectral imaging. He has authored or co- authored 2 book chapters, 15 peer-reviewed journal papers, 46 conference papers, and 38 granted patents on imaging topics ranging from color appearance, spectral imaging and printing, high-dynamic range imaging (HDRI), computational color imaging, computer vision for consumer, industrial and biomedical applications. Dr. Imai received his Ph.D. in imaging science from Chiba University (Japan) and worked first in academia at Rochester Institute of Technology working on spectral imaging research and after working at Pixim Inc., a start-up company in the field of High-Dynamic Range Imaging, he joined Samsung R&D, and Canon U.S.A. Inc. he currently works for Apple Inc. as Color Imaging Fellow.



Jacinthe M. Paquette, DDS

Dr. Jacinthe M. Paquette is President of the American Academy of Esthetic Dentistry, Past President of the Pacific Coast Society of Prosthodontics, and serves on the Editorial Board of the Journal of Prosthetic Dentistry. Dr. Paquette is recognized nationally and internationally as a leader and educator in Esthetic Dentistry, Prosthodontics, and Implant Dentistry. She is a Diplomate of the American Board of Prosthodontics and a Fellow of the American College of Prosthodontists. Dr. Paquette serves on numerous editorial boards, advisory boards, and peer-reviewed journals. Among her professional affiliations, she holds fellowships in the International College of Dentists, the American College of Dentists, and the Pierre Fauchard Academy. She is also a member of the American Academy of Restorative Dentistry and the Academy of Osseointegration. Dr. Paquette has authored over numerous research and clinical articles on her areas of expertise and co-authored several textbook chapters. She is Co-Executive Director of the Newport Coast Oral Facial Institute, a non-profit international teaching facility for dentists and dental technicians located in Newport Beach, California.

Oral Presentations

Friday, October 19
1:45-2:15

Evolving Concepts of Patient Care

Jacinthe M. Paquette, DDS

Lecture Description

The progressive introduction of new technologies and dental biomaterials, continues to redefine our approach to treatment of the esthetic rehabilitative patient. Yet, with each progression of advancements, one must reflect on the potential for contribution to greater successful outcomes vs. following current trends. Past treatments once viewed as "state of the art" can sometimes be viewed as "dinosaurs of the past" due to today's options. Although our quest to recreate nature has been fulfilled for many patients, our objective today will be to critically examine the current evolution of treatment options..

Objective

At the conclusion of this lecture participants will have a better understanding of

- How new technologies such as CAD/CAM and dental materials can be incorporated into older treatment plans to optimize results.
- How to sequence treatment plans to enhance longevity of complex interdisciplinary cases.
- When to be conservative and when to be bold in approaching comprehensive treatment to maximize long term results.

Oral Presentations

Friday, October 19
3:25-3:55

"Analogue versus Digital" Anterior and Posterior

Patrick Rutten, MDT

Lecture Description:

Clinicians and dental technicians have access to an astounding array of new technologies, tools and materials to design predictable beautiful smiles. This presentation puts an emphasis on a close co-operation between prosthodontist, periodontist and dental technician. In addition, a focus is placed on different surgical, clinical and prosthetic techniques to achieve successful aesthetics. Material selection is fundamental in management of complex rehabilitation and on implants. The aesthetic outcome and the natural appearance of the restoration depends on the skills of the dental technician. Understanding of the gingiva by the dental technician will be explained to re-create in a two-way communication an aesthetic end result. New concepts and trends with focus on zirconium dioxide and its excellent long-term behaviour and extraordinary mechanical properties, will be discussed to realize predictable natural oral aesthetics around implants and natural abutments. The differences between analogue and digital layering technique will be explained to create a natural looking incisal edge and basic colors of the dentition. With new software we can choose occlusal plans out of the library and will simplify our daily work.

Objective

- Creating aesthetics by using FCZ or partial veneered posterior and anterior region
- Directly after surgery installing of final Zirconia abutments and provisional restoration/ final restoration.
- What is the benefit using Full contour zirconia by single tooth replacement.



Patrick Rutten, MDT

Graduated in Dental Technology in 1979 at the Dental Technician School "Anneessens" in Brussels/Belgium.

In 1989 winners (with Luc) of the international contest "Newcomer '90", organized by Das Dental Labor, Munich/Germany.

Numerous publications in international dental journals on a regular basis in the field of esthetic implantology and esthetics in general. Lectures, table-clinics and hands-on courses regularly all over the world.

Co-writers (with Luc) of the textbook "Implant Prosthodontics" – Verlag Neuer Merkur -Munich/Germany.

Co-writers (with Luc) of the textbook "Ceramic Restoration Techniques"- Concept & Text – Fuchstal/Germany.

Writers (with Luc) of the textbook "Implant Aesthetics" Teamwork Media – Fuchstal/Germany.

Writers (with Luc) of the text book "Crown – Bridge and Implants: The Art of Harmony"

Pilot Laboratory of the Vita Zahnfabrik Company.

Global Speakers of Nobel Biocare.

Winners of the "Teamwork Award" Brescia/Italy for the best article of 2009.

Members of the International Academy of Digital Dentistry.

Oral Presentations

Friday, October 19
4:00-5:00

Empathy. How the Dentist can Make the Technician's Life Easier and Viceversa



**August Bruguera,
MDT**



**Jon Gurrea,
DDS**

August Bruguera – Technician Specialist in Dental Prosthesis at “Ramón y Cajal de Barcelona” School; ACADEN honors member; Former consultant member of the North American magazine “Signature International”; Member of the publishing committee of the dental magazine “Dialogue”, Spanish edition; Member of the publishing committee of the dental magazine “Estetica”, Brasil edition; Author of the book “Sombras, un mundo de color” (Shadows, a world of colour), edited in Spanish, English and German; Author of the book “Invisible”, edited in Portuguese, Spanish, English, German, Japanese, Italian; 2003 Golden Scalpel; Director of “Diseny Dental bcn” Laboratory and Educational Center in Barcelona; Director of the “Dental Excellence España”.

Jon Gurrea – Graduated in Dentistry in 2002 from Alfonso X el Sabio University, in Madrid, Spain.

International advanced study program in Periodontics (2003-2005), New York University College of Dentistry.

Clinical Assistant Fellow in Periodontics (2004-2005), New York University College of Dentistry.

Part-time faculty in the Implant Department in Alfonso X el Sabio University (2007-2008).

Visiting lecturer in Universidad Europea de Madrid, Universidad Internacional de Cataluña and Universidad del País Vasco.

Author of articles in several journals, Dr. Gurrea lectures both in Spain and abroad.

August Bruguera, MDT Jon Gurrea, DDS

Lecture Description

Success depends strongly on making our counterparts easier. By understanding the dentists' and technicians' needs we will improve our results. Dentists have to provide clear-cut information to the technicians. This selection of information requires good pictures, good functional records and good color and material understanding. By doing this, the telephone is seldom used and cases usually run smoothly.

Objective

- Provide the dentists and technicians a clear idea of the most valuable information we have to use, emphasising what is critical.
- Explain simple methods of improving the dentist/technician communication with better records.
- Explain how improved preparation by understanding the material will provide the space that the technicians need.
- Understanding how to take advantage of the ceramic materials.

Oral Presentations

Saturday, October 20
8:00-8:30

The Challenge of Color Management in the Fabrication of Porcelain Laminate Veneers

Aki Yoshida, RDT

Lecture Description

Numerous advances have been made over the last decade in dental materials and techniques. However, restoration of the anterior teeth with bonded porcelain veneers is still the treatment of choice for the most esthetically pleasing and natural result. Nothing else even comes close. The greatest challenge in the fabrication of veneers has always been one of color: hue, value and chroma within such a minimal thickness of restorative material and with a myriad of shades of prepared teeth. The lecture will present a systematic approach of color control in the layering of feldspathic porcelain by refractory technique.

Objective

- Discussion on the use of masking materials.
- Discussion of how to control the value or brightness of the veneer.
- Discussion of the need to communicate with the dentist on how much tooth reduction is needed to effectively restore or change the color of the tooth.



Aki Yoshida, RDT

Aki Yoshida is Master Ceramist with many years of experience in all aspects of Dental Technology. His passion and the talent that brings to the industry has been widely recognized.

Aki is owner-operator of Gnathos Dental Studio in Weston, Massachusetts USA. The laboratory originally founded by Dr. Lloyd L. Miller, is an innovative, quality driven dental lab consistently producing the highest level of dental restorations.

Aki graduated from the Dental Technician School of Nihon University in Tokyo Japan.

He is a technical instructor at Tufts University, Dept. of Post-Graduate Prosthodontics in Boston, where he has participated in Post Doctoral Courses for both dentist and technicians.

He is Fellow member of the AAED (American Academy of Esthetic Dentistry).

He also instructor for Kuraray Noritake Dental Supply.

Aki has presented numerous hands-on courses and lectures throughout the United States, South America, Europe and Asia. He is a four-time masterpiece Technician in the Japanese *Quintessence of Dental Technology*, and he has published several articles on anterior esthetic restoration in the US version of QDT.



Christian F. J. Stappert, DDS, MS, PhD

Dr. Christian Stappert is Professor at the Albert-Ludwigs University of Freiburg, Germany and Executive Medical Director (CMO, CTO) of the Swiss Smile Dental Group, Switzerland. Most recently, he taught as Professor and Director of Periodontal Prosthodontics and Implant Dentistry at the University of Maryland School of Dentistry, served several years as Director of Aesthetics and Periodontal Prosthodontics at the Department of Periodontology & Implant Dentistry associated with the Department of Biomaterials & Biomimetics at New York University College of Dentistry. Prof. Stappert is cross-trained in Prosthodontics and Periodontics as well as Implant Surgery and graduated 'Master of Science - Biomaterials and Biomimetics' at New York University. His research interests involve the reliability of dental materials and clinical restorations, as well as tissue management and the perio-implant interface. Dr. Stappert has published over 90 scientific papers, book chapters and peer reviewed publications. He is editorial board member and reviewer of numerous scientific dental journals, and active member *inter alia* at the AO, AAED as well as GNYAP, and past president of the IADR Prosthodontics Research Group.

Oral Presentations

Saturday, October 20
8.35-9:05

Current Ceramic Rehabilitation

Christian F. J. Stappert, DDS, MS, PhD

Lecture Description:

The evolution of dental ceramics has revolutionized our ability to restore patients. Due to their preferred optical and biological properties, all-ceramic materials assessed to be ideal for tooth- and implant-supported restorations. Yet, the rapidly changing face of new material developments and techniques today, presents us with an ever expanding armamentarium to meet the challenges presented to us in restorative dentistry. An interdisciplinary approach, sound knowledge and awareness of new ceramic materials are essential if we strive for good function and long term predictability. To fabricate all-ceramic restorations, monolithic lithium-disilicate and monolithic translucent zirconia are replacing traditional veneering techniques and metal frameworks. This presentation will shortly review planning and preparation concepts for extended esthetic fixed oral rehabilitations, using current ceramic solutions, asking what makes 'new' really 'better'?

Objective

Upon completion of this presentation, participants should be able to:

- discuss aspects in selecting the ceramic restorative materials to use;
- identify the preparation techniques required by different materials;
- discuss the necessity of a close dentist-technician collaboration.

Oral Presentations

Saturday, October 20

9:10-9:40

White, Whiter, Whitest: Current Concepts for Predictable Advanced Tooth Whitening 2018

Linda Greenwell, DDS

Lecture Description

This Lecture will discuss the Current Tooth Whitening Techniques in Aesthetic Dentistry focussing on new whitening innovations for 2018.

It will describe the classification of bleaching techniques, predicable treatment planning for the tooth whitening programmes, new whitening materials and five percent carbamide peroxide, management of bleaching related tooth sensitivity and discuss how to obtain successful outcomes. The concept of why tooth whitening is the practice of dentistry and not for whitening kiosks will be discussed. How tooth whitening is incorporated to all aspects of dentistry- before, during and for maintenance. The question of how white is white enough will be discussed as well as issues related to bleachorexia. A four step model of whitening, microabrasion, resin infiltration and composite bonding will be discussed.

Objective

- To provide the delegates with an in depth current knowledge of Tooth Whitening and Dental Bleaching as it relates to achieving successful bleaching for 2018
- Have the current knowledge and an understanding of the scientific basis of bleaching
- Have a detailed knowledge of all dental bleaching techniques
- Be able to understand why patients get sensitivity and how to treat whitening related sensitivity.



Linda Greenwell, DDS

Dr. Linda Greenwell is a Specialist in Restorative Dentistry and Prosthodontics. She is the founder of a Specialist Multidisciplinary Private practice in Hampstead, London, where she works with a specialist team. She is a past Chair for the Alpha Omega Society (2012/13), past chair of the British Dental Bleaching Society, Editor-in-Chief of the Journal *Aesthetic Dentistry Today*, and is Past President of the London Metropolitan Branch of the British Dental Association (2015/2016). In March 2016 she was awarded the FMC Award for Outstanding Contribution to Dentistry.

Her first book, *Bleaching Techniques in Restorative Dentistry*, won the award for Best New Dental Book in 2001 – the second edition of this book, *Tooth Whitening Techniques*, was published in May 2017. Her book *Success Strategies for the Aesthetic Dental Practice* was published by Quintessence in 2011. She has authored many papers for scientific journals.

In June 2017 she was honoured by the Queen in the birthday honours to receive the British Empire Medal for her Service to Dentistry in the UK and Abroad. The medal ceremony was held on 17 November 2017 at the Tower of London.



Marcos Vargas, DDS, MS

Dr. Marcos Vargas attended Cayetano Heredia University School of Dentistry in Lima, Peru and graduated in 1985. He spent two years, 1990 to 1992, in the AEGD program at the Eastman Dental Center in Rochester, New York. Dr. Vargas received his Certificate and Master Degree in Operative Dentistry in 1994 at the University of Iowa where he is currently a Professor in the Department of Family Dentistry. His primary research interests are in the area of dental materials including glass ionomers, dentin bonding, composite resins and esthetic dentistry. Dr. Vargas is also recognized for his expertise of Direct Restorative Treatment Procedures and conducts numerous lecture and hands-on seminars in the US and internationally. Dr. Marcos Vargas has published extensively in the area of dental adhesion and resin composites for over 25 years. He maintains a private practice limited to Operative Dentistry with an emphasis on aesthetic dentistry.

Oral Presentations

Saturday, October 20
9:45-10:15

Indistinguishable Direct Resin Composites - Blending for Success

Marcos Vargas, DDS, MS

Lecture Description

Direct resin composites are one of the most performed procedure in dentistry nowadays. Patient satisfaction depends on the esthetic result which means the restoration disappears into tooth structure. This clinical presentation will discuss the most important aspects to achieve ideal blending of resin composites.

Objective

- Select the appropriate shade for resin composites.
- Produce cavity preparation conducive to blending.
- Describe the steps for contouring and polishing.

Oral Presentations

Saturday, October 20
10:55-11:25

Digital Workflows & Minimally Invasive Dentistry: Predictable Outcomes

Petra Guess-Gierthmühlen, DDS, PhD

Lecture Description:

The recent paradigm shift in fixed prosthodontics from traditional to minimal invasive treatment approaches is evidenced by the clinical long-term success of bonded glass-ceramic restorations. Moreover, advancements in all-ceramic/resin matrix ceramics and CAD/CAM material systems, digital restoration planning and fabrication enable the development of innovative treatment concepts for the rehabilitation of severely compromised dentition. Digital face scans and novel CAD/CAM applications offer a standardized manufacturing process, resulting in a reliable, predictable and economic workflow for complex rehabilitations. Moreover the esthetic outcome with respect to color and appearance of these CAD/CAM fabricated restorations and their integration into the facial harmony is superior. The lecture will present case series and the scientific evidence pertaining to the clinical success of all-ceramic and CAD/CAM materials as well as digital restorative technologies.

Objective

- The lecture will provide recommendations for modern all-ceramic, resin-matrix ceramics and CAD/CAM materials.
- The lecture will give rationale of case based selection of CAD/CAM systems related to their optical properties such as color, translucency and gloss.
- The lecture will present scientific evidence pertaining to the clinical success and esthetic outcome of CAD/CAM materials and digital workflows.



Petra Guess-Gierthmühlen, DDS, PhD

Dr. Guess, graduated and received her DDS from Albert-Ludwigs University, Freiburg, Germany in 2001. She was an Assistant Professor (2001-2006) at the Department of Prosthodontics (Chair Prof. Dr. Dr. h.c. J.R. Strub), University, Freiburg, Germany and is a Board certified Prosthodontist (2005) of the German Society of Prosthodontics and Dental Materials (DGPro). From 2006-2009 she was a Visiting Scientist at the Department of Biomaterials & Biomimetics (Chair Prof. Dr. V.P. Thompson), NYU, New York, USA. In 2009 Dr. Guess was appointed Associate Professor at the Department of Prosthodontics, University, Freiburg, where she accomplished the Habilitation in 2011. Since 2016 she is Professor and Chair of the Department of Prosthodontics at the Heinrich-Heine University in Duesseldorf, Germany.



Brian P. LeSage, DDS

Dr. Brian P. LeSage graduated magna cum laude from the University of Maryland, Baltimore College of Dental Surgery in 1983. Dr. LeSage has actively integrated academic pursuits with a private practice, for the last 24 years in Beverly Hills, California, emphasizing aesthetic and reconstructive dentistry.

Dr. LeSage is one of 350 accredited cosmetic dentists in the worldwide American Academy of Cosmetic Dentistry (AACD). In 1995, he was appointed a Consultant and Examiner for the AACD accreditation process. He was awarded the status of Fellow in the AACD in 2002, and was acting Fellowship Chair for the academy for ten years. He was awarded the Excellence in Cosmetic Dental Education Award by the academy in 2009, and was inducted as a member of the American Academy of Esthetic Dentistry also in 2009. He was awarded fellowship in 2014 with The AAED.

Dr. LeSage is the founder and director of the University of California, Los Angeles, (UCLA) Aesthetic Continuum Levels I and II, he is also the director of The Beverly Hills Institute of Dental Esthetics. The institute offers small study clubs and mentoring.

Oral Presentations

Saturday, October 20
11:30-12:00

Composite Bonding or Ceramic Veneers: Which is better?

Brian P. LeSage, DDS

Lecture Description

Clinically, when and how do you decide between doing direct versus indirect restorations in the Esthetic Zone? How does the patient's expectations play into the decision making process? In the minimally invasive dentistry concept, how does outcome based dentistry factor in. Are veneers always better and composite always less invasive? Experience the rivalry between artistic bonding and master technician's ceramics.

Objective

- What are the indications for direct composite restorations and indirect all-ceramic restorations?
- Observe esthetic dentistry from a truly 3D concept of contour and color
- How do the patient's expectations and longevity of the restoration play into the smile makeover decision making process?

Oral Presentations

Saturday, October 20
1:00-1:30

Novel Methods for the Management of Dento-alveolar Defects in the Esthetic Zone

Ernesto A. Lee, DMD

Lecture Description

Restoring a patient's appearance when soft and hard tissue defects are present constitutes one of the most difficult challenges in dentistry. This is particularly difficult in scenarios that include dental implants and a high smile line. Traditional bone augmentation procedures often result in complications and inadequate peri-implant soft tissue architecture. This presentation will focus on the predictable esthetic management of high-risk compromised sites, demonstrating the use of contemporary interdisciplinary and novel strategies for the treatment of peri-implant esthetic dilemmas and complications. Restorative contour management, orthodontic forced eruption, and S.M.A.R.T. Minimally Invasive Bone Grafting will be discussed.

Objective

- Review implant treatment alternatives for the anterior region.
- Present a protocol for immediate implant placement in the esthetic zone.
- Review restorative contour concepts and techniques.
- Discuss the limitations of surgical and prosthetic management of peri-implant esthetic complications.
- Demonstrate the use of interdisciplinary approaches to develop single and multiple tooth and implant sites.
- Discuss the role of orthodontic forced eruption in the esthetic zone.
- Introduce the S.M.A.R.T. Minimally Invasive Bone Grafting method.



**Ernesto A. Lee,
DMD**

Dr. Ernesto Lee is an internationally renowned Master Clinician, Innovator and Educator. He is the developer of the S.M.A.R.T. Method, a novel Minimally Invasive Bone Grafting Procedure that enhances predictability, with less pain, less swelling and fewer complications. Dr. Lee is also the Founder and Chief Executive Officer of S.M.A.R.T. Biomedical LLC, a startup company focused on innovative solutions for minimally invasive bone regeneration.

Dr. Ernesto Lee is additionally a Clinical Professor and the former Director of the Postgraduate Periodontal Prosthesis Program at the University of Pennsylvania School of Dental Medicine. Dr. Lee graduated summa cum laude from the University of Panama, in his native country. He holds dual specialty degrees in Periodontics and Periodontal Prosthesis/Fixed Prosthodontics from the University of Pennsylvania.

Dr. Lee is the author of several articles and book chapters. Additionally, he is one of the editors of the third edition of Dr. Ronald Goldstein's *Esthetic in Dentistry* textbook, along with Drs. Stephen Chu and Christian Stappert. Dr. Lee has dictated over 200 lectures, including presentations before the European Academy of Esthetic Dentistry, American Academy of Aesthetic Dentistry, Academy of Osseointegration, American Academy of Periodontology, Greater New York Academy of Prosthodontics, American Association of Oral and Maxillofacial Surgeons and the International Symposium in Periodontics and Restorative Dentistry.

Dr. Lee's private practice is located in Bryn Mawr, Pennsylvania; a suburb of Philadelphia, and is limited to Fixed Prosthodontics and Implant Dentistry, with an emphasis in Esthetic Dentistry.



**Markus B. Blatz,
DMD, PhD**

Dr. Markus B. Blatz is Professor of Restorative Dentistry, Chairman of the Department of Preventive and Restorative Sciences, and Assistant Dean for Digital Innovation and Professional Development at the University of Pennsylvania School of Dental Medicine in Philadelphia, Pennsylvania, where he also founded the Penn Dental Medicine CAD/CAM Ceramic Center. Dr. Blatz graduated from Albert-Ludwigs University in Freiburg, Germany, and was awarded additional Doctorate Degrees, a Postgraduate Certificate in Prosthodontics, and a Professorship from the same University. Dr. Blatz is co-founder and immediate past President of the International Academy for Adhesive Dentistry (IAAD). He is a Board-certified Diplomat in the German Society for Prosthodontics and Biomaterials (DGPro) and a member of multiple other professional organizations, including the American Academy of Esthetic Dentistry, the European Academy of Esthetic Dentistry, the International College of Prosthodontists, the American College of Prosthodontists (honorary member), Academy of Osseointegration, and O.K.U. Honor Dental Society. He serves on the editorial boards of numerous recognized scientific dental journals and is Associate Editor of Quintessence International. He is coauthor of the international bestseller "evolution – contemporary protocols for anterior single-tooth implants". Dr. Blatz is the recipient of multiple teaching and research awards and has published and lectured extensively on dental esthetics, restorative materials, and implant dentistry.

Oral Presentations

Saturday, October 20
1:35-2:20

Evolution Esthetic Properties of New Ceramic Materials

Markus B. Blatz, DMD, PhD

Lecture Description

The recent evolution of dental ceramics offers clinicians and dental technicians a never-beforeseen plethora of material options in their quest to mimic the natural dentition as closely as possible in respect to color, translucency, and surface texture. Conversely, selecting the proper ceramic material based on the patient's specific needs seems even more complicated today as several material property aspects lack proper scientific validation.

This presentation will summarize esthetic and other key properties of new ceramic materials in an unbiased manner and provide laboratory and clinical guidelines for their proper selection and application based on decades of research and the latest scientific evidence.

Objective

- Differentiate modern ceramic and hybrid materials and their indications.
- Understand key esthetic and functional properties of ceramic materials based on the scientific evidence.
- Comprehend laboratory and clinical guidelines for successful and long-lasting ceramic restorations on teeth and implants.

Oral Presentations

Saturday, October 20
2:20-2:50

Optimized Bonding and Material Selection Update for Chairside CAD/CAM Dentistry

Julián Conejo, DDS, MSc

Lecture Description

Bonding optimization and proper material selection are crucial for the long-term success and esthetic outcomes of tooth and implant-supported restorations. Scientific studies and step by step clinical protocols will be described in this lecture with the objective of improving success rates for single and multiple-unit Chairside CAD/CAM restorations thru proper material selection. Guidelines for color selection of blocks with different translucency levels will also be discussed to enhance color matching of chairside CAD/CAM restorations.

Objective

- Compare bonding techniques
- Elaborate on optimal material selection for chairside CAD/CAM restorations
- Provide guidelines for color selection of blocks with different translucency levels.



*Julián Conejo,
DDS, MSc*

Julián obtained his DDS from the Universidad Latina, Costa Rica in 2005, and then completed training as a prosthodontist at Universidad Intercontinental, Mexico in 2008. He worked as a Professor at the Prosthodontics Department, Universidad Latina and actually works as a visiting scholar at the Department of Preventive and Restorative Sciences, University of Pennsylvania, Philadelphia USA.

He conducts research on CAD/CAM technology, prosthodontics and implant dentistry. Julián was awarded the Young Clinician Award at the Nobel Biocare World Tour Mexico City, 2008 and the ICP Research Fellowship in Dental Restorative Materials, 2016.

Julián has lectured in over 25 countries focusing on the digital workflows for esthetic tooth and implant-supported restorations.

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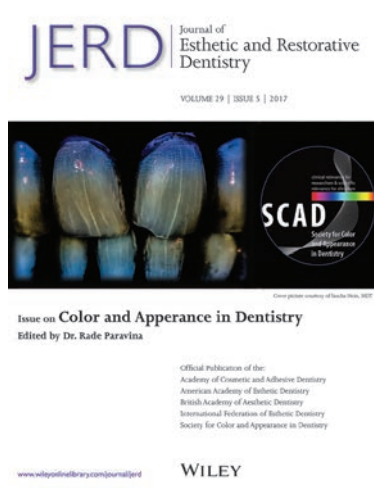
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Journal of Esthetic and Restorative Dentistry (JERD) and SCAD

It is our pleasure to inform you that Journal of Esthetic and Restorative Dentistry (JERD), the longest standing peer-reviewed journal devoted solely to advancing the knowledge and practice of esthetic dentistry, is our home since 2014. In addition to the International Federation of Esthetic Dentistry (IFED), American Academy of Esthetic Dentistry (AAED) and other prestigious groups, JERD also became the official publication of SCA, with two issues per year devoted to color and appearance in dentistry.



We cordially invite you to keep submitting your manuscripts to us, as we intend to keep the high level established by our parent journal – JERD is the only journal devoted to esthetic dentistry with Impact Factor (IF=1.53). We also strive to be the most competitive and most comprehensive resource when it comes to color and appearance in dentistry.

To submit a manuscript, go to <https://mc.manuscriptcentral.com/jerd> and follow the prompts.

Author Guidelines are available at [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1708-8240/homepage/ForAuthors.html](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1708-8240/homepage/ForAuthors.html).

We look forward to keep collaborating with you in supporting and promoting the best clinical and laboratory practice and research related to color and appearance.

Abstracts • Poster Presentations

Chair, Dr. Magda Eldiwany

Abstract #1

Shade Matching of Central Incisors with a Direct and Indirect Approach

T. Aggarwal

University of Pennsylvania, School of Dental Medicine, USA

Objective: To apply a multidisciplinary approach in treating the compromised central incisors with direct and indirect restorations for the best shade match and esthetic outcome.

Methods: A 35-year-old female patient presented with history of trauma and endodontic treatment of tooth #8 and a chipped distal incisal edge on tooth #9 which was restored with composite resin on the distal incisal edge (Esthet-X HD). After finishing and polishing, tooth #8 was prepared for a full-coverage crown. After intraoral scanning (Cerec Omnicam), the BioReference design was used to “clone” morphology, and texture of tooth #9. A crown was milled from a polychromatic hybrid ceramic block (Vita Enamic) shade 1M1 to match the existing dentition.

Results: The restoration was polished (Vita Enamic Polishing Set) and inserted with a universal try-in paste shade A2. After esthetic and functional evaluation, the crown was etched with 5% hydrofluoric acid for 60 s and, after silanzation, inserted with an adhesive resin system (Panavia V5).

Conclusions: Direct restorations with composite resins provide excellent esthetics. Novel hybrid ceramic blocks and CAD/CAM software tools have the ability to achieve natural esthetics for indirect restorations chair-side.

Abstracts • Poster Presentations

Abstract #2

Evaluating the Fluorescence Properties of Different Shades of Resin Composite by Different Manufacturers

O. Al Hatem, J. C. Ontiveros, J. M. Powers, M. S. Eldiwany, R. D. Paravina

The University of Texas School of Dentistry at Houston, USA

Objectives: To evaluate the λ_{max} and L1/2 fluorescence properties of different shades of resin composite by the different manufacturer.

Materials and Methods: A total of 3 resin composites of different shades (n=3) were evaluated. Fluorescence measurements: wavelength at maximum emission (λ_{max}) and half-width of the emission spectral band (L1/2), were performed using a spectrofluorometer. The results for tested materials were processed, analyzed, and compared with corresponding data for teeth. Data were analyzed by ANOVA test at the 0.05 level of significance.

Results: For λ_{max} , there was no difference in λ_{max} among the three different shades for both Venus (p= 0.15), and Filtek (p=0.53) composites. For λ_{max} of Clearfil composite, C3 shade showed higher means compared to shade A2 (p=0.03), while no difference was shown between shades B1 and A2 (p=0.91). For L1/2, Venus composite C3 shade showed significantly higher mean L1/2 values compared to shade B1 (p=0.03), but no significant difference between A2 and B1 (p=0.40). There were no significant differences in L1/2 mean values among the three different shades for both Clearfil (p= 0.69) and Filtek (p=0.16) composites.

The means (s.d.) of λ_{max} and L1/2 are presented in the table.

Parameter	Material	SHADE		
		A2	B1	C3
λ_{max}	Venus	456 (1) ^{Aa}	458 (3) ^{Aa}	456 (1) ^{Aa}
	Clearfil	454 (1) ^{Ba}	454 (2) ^{Aa}	456 (1) ^{Ab}
	Filtek	456 (1) ^{Aa}	458 (4) ^{Aa}	457 (3) ^{Aa}
L1/2	Venus	125 (1) ^{Aa}	124 (1) ^{Aa}	126 (2) ^{Ab}
	Clearfil	103 (2) ^{Ca}	102 (3) ^{Ca}	102 (2) ^{Ba}
	Filtek	119 (5) ^{Ba}	113 (3) ^{Ba}	117 (6) ^{Ca}

Different superscript letters down columns for both within each parameters indicate significantly different means for same shade and different composites; across row for same composite and different shades, ANOVA and Tukey test; p<0.05.

Conclusions: Within the limitations of this study it was concluded that there were significant differences in the evaluated fluorescence properties among materials and shades evaluated. This has clinical significance when using composites of different shades from different manufacturers to restore preparations in the esthetic zone.

Abstracts • Poster Presentations

Abstract #3

Effect of Duration of Artificial Aging on Color and Translucency of CAD/CAM Restorative Materials

R. Arif¹, X. Liu², R. Paravina³, W. Johnston¹

¹ Department of General Practice and Materials Science, The Ohio State University College of Dentistry, Columbus, USA

² Department of Prosthodontics, School of Stomatology, Jilin University, Changchun P. R. China

³ Department of Restorative Dentistry and Prosthodontics, University of Texas Health Science Center at Houston, Houston, USA

Objective: To describe the rate and extent of color and translucency changes of CAD-CAM restorative materials with increasing duration of exposure to UV radiation in an artificial aging device.

Methods: Three CAD-CAM materials including lithium disilicate glass-ceramic (IPS e.max CAD), integrated ceramic and acrylate polymer network material (Vita Enamic), and cured resin nanoceramic (Lava Ultimate) were studied in 2 thicknesses for complete crown (1.5mm) and laminate veneer (0.7mm) application. For each specimen color was determined before any artificial aging and after exposure to 150, 450, 600, 750 and 900 kJ/m² of accumulated UV radiation. The color and translucency values as a function of the accumulated UV exposure were then separately fit to an exponential decay model of changes in the values for each material and thickness studied.

Results: Left-censoring occurred in less than 17% of the solutions to the exponential decay model, indicating that the initial UV exposure of 150 kJ/m², in combination with higher levels of accumulated exposure, was sufficiently low to describe the change when any change occurred only after low values of exposure and then stayed unchanged after further exposure. For the EM and LU materials, no censoring occurred in at least 79% of the solutions to the model, indicating how the model effectively describes the amount of accumulated exposure where a significant change occurs and the extent of the change after unlimited further exposure. For the VE material, right-censoring occurred in 72.2% of the solutions to the model, indicating that the optical change was not showing decay even after the final exposure of 900 kJ/m² of accumulated UV radiation.

Conclusions: The results of tests for significant differences after each increase in accumulated UV exposure generally agreed with the results of fitting the values to the exponential decay model studied. The exponential decay model offers another tool to assess the rate and extent of changes in optical properties of esthetic restorative materials due to UV exposure.

Abstracts • Poster Presentations

Abstract #4

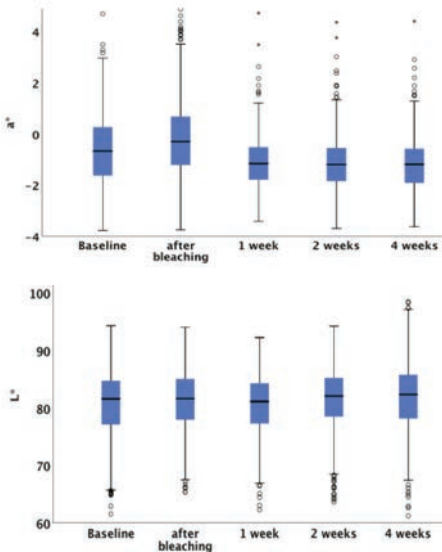
Evaluation of the Whitening Efficiency of Perfect Bleach Office+® - an in-vivo Study

M. Bayadse, S. Wentascheck, C. Igiel, H. Scheller, K.M. Lehmann
Department of Prosthetic Dentistry, University Medical Center, Mainz, Germany

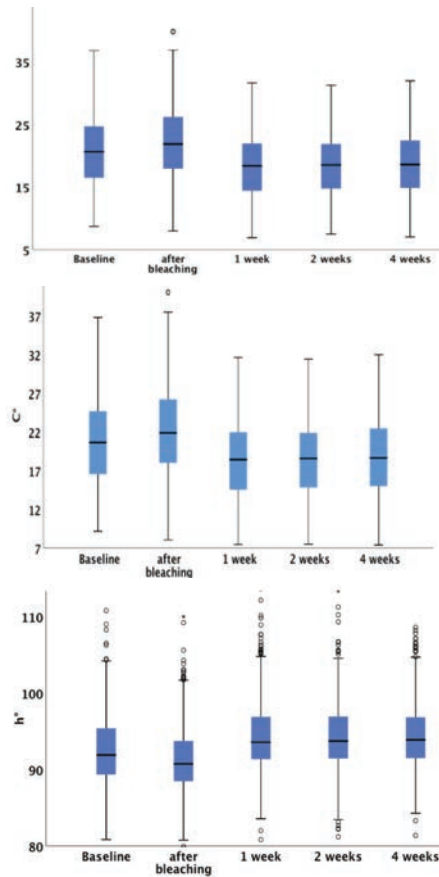
Objective: The dentists are more confronted with the wish of patients of whiter teeth. Because nature white teeth are related beauty, healthy and success, therefore market production of bleaching gel raise. There are different methods of tooth whitening; home-bleaching and in office-bleaching are the most common methods for vital teeth. The aim of this study was to analyze the color coordinates before and after external tooth-whitening using the agent PERFECT BLEACH OFFICE+ (VOCO GmbH, Cuxhaven, Germany).

Methods: 50 patients were included in this study. The inclusion criterions were: no restorations, fillings, increased tooth sensitivity or internal/external tooth structure anomalies. After the initial professional tooth cleaning the patients were bleached in office. The in office bleaching was performed once for 15 minutes with Perfect Bleach Office+® 35% hydrogen peroxide. The shade determination was performed 5 times with a spectrophotometric device (VITA easyshade advanced, VITA Zahnfabrik, Bad Säckingen, Germany); baseline (t_0), after bleaching (t_1), after one week (t_2), after two weeks (t_3), after four weeks (t_4).

Results:



Abstracts • Poster Presentations



Conclusion: The results of this study show different effects of the bleaching procedure tested on L^* , a^* , b^* , C^* and h° color coordinates of natural teeth. For example the standard deviations of on L^* , a^* , b^* and h° color coordinates were significantly higher after bleaching compared to other points in time. This and further facts should be taken into account regarding results of bleaching procedures.

Abstracts • Poster Presentations

Abstract #5

Ectodermal or "E" shade consideration in the development of ceramic restorations

B. Friesen

Image Dental Technology, Winnipeg, MB, Canada

Objective: to create dental restorations that will blend better with adjacent body colors. The ectoderm is one of the primal germ layers of the developing embryo. It is responsible for tooth enamel, epidermis, hair and eye color. Melanin pigment is the source of these colors.

Method: is to denote colors of the facial landscape and to bring them forward to the ceramist to enhance the shade of prosthetic restorations. With photographs, models and shade guides we create a color palette to be used in close proximity to ceramic fabrication. Tooth color should not be created in a vacuum. We want to reconnect with nature by close observation and engagement of the subject and see beyond the distraction of the conspicuous to capture its unique self. Two case studies are presented that will outline color assessment and its implementation.

Result: with careful documentation of an individual we created ceramic restorations with a dynamic and harmonious result. Our desire is to enhance the current science of color selection to create interesting restorations.

Conclusion: The development of the E shade is an artistic exercise to create a custom appearance. Further research is needed to see if these colors are relevant and please viewer perception.

Abstracts • Poster Presentations

Abstract #6

Masking Properties of Translucent Monolithic Zirconia

C. Gasparik, M. Manziuc, A.V. Burde, M. Negucioiu, D. Dudea

Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

Objective: To assess the masking properties of translucent monolithic zirconia on different backgrounds, as well as the influence of thickness and glazing on the masking properties.

Methods: Sixty disc-shaped samples (0.8, 1.5 and 2mm thickness) were fabricated from four zirconia blocks (A1 shade): IPS e.max ZirCAD/MT, Katana/HT, Vita YZ/HT, Cercon/HT; following the fabrication process, the discs were glazed using a standardized laboratory procedure. CIELAB parameters were recorded on tooth shaded backgrounds (IPS Natural Die: ND1=reference; ND2, ND3, ND4, ND5=test backgrounds), before and after glazing. Masking property was calculated as the color difference between the samples placed on reference and test backgrounds using the CIEDE2000(1:1:1) formula. The effect of material, thickness, background, and glazing on the color of monolithic zirconia was analyzed with ANOVA test and the multiple comparisons were analyzed with Tukey HSD tests ($\alpha=0.05$ for all comparisons).

Results: Significant differences in the masking properties of monolithic zirconia ($p<0.001$) were found. Overall, ZirCAD showed the lowest masking properties ($p<0.001$). Thickness had a significant effect on the color of monolithic zirconia ($p<0.001$). At 0.8mm thickness, all tested materials had lower masking properties than at 1.5 and 2mm. The background color significantly influenced the color of superimposed monolithic zirconia ($p<0.001$). ND1 background had the lowest, while ND4 had the greatest effect on the color of tested materials. Glazing also affected the masking properties of the tested materials ($p<0.001$). Overall, better masking properties were observed after glazing. However, for 0.8mm samples, glazing did not influence the masking properties of none of the tested monolithic zirconia, regardless of the background evaluated ($p>0.05$).

Conclusions: Masking properties of translucent monolithic zirconia were influenced by materials, as well as the thickness and glazing; moreover, the background influenced the color of the overlaying translucent zirconia. At 0.8mm thickness none of the materials tested could effectively mask darker backgrounds.

Grant #, acknowledgments: This study was supported by research project "Development of an innovative glass-fiber reinforced composite resin material for CAD/CAM applications in Dentistry (IFRCD)". PN-III-P2-2.1-PED-2016-1936. Contract nr. 253/2017.

Abstracts • Poster Presentations

Abstract #7

Perception of Localized Dental Discoloration: Patients vs Dentist**D. Greta¹, C. Gasparik¹, H. Colosi², D. Dudea¹**¹ Department of Prosthetic Dentistry and Dental Materials, Division Dental Propaedeutics and Esthetic Dentistry, Faculty of Dentistry, University of Medicine and Pharmacy, "Iuliu Hațieganu" Cluj-Napoca, Romania² Department of Medical Education, Division of Medical Informatics and Biostatistics, Faculty of Medicine, Iuliu Hațieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania**Objective:** To compare the patients' and dentist's perception regarding teeth with localized discromies.**Methods:** A group of 160 dental patients were asked to answer a questionnaire with 12 questions, oriented towards the self-perception of their esthetic appearance; most questions addressed the issue of localized dental discolorations (identification of discromic teeth, their impact on the esthetics, motivation to undergo treatment). The same target was solved by the current dentist, who examined the respective patients and answered the same questions, regarding the dental discolorations. In addition, both patients and dentist were asked to indicate a tooth with pleasant color which was considered, in every case, as reference. Color measurements of teeth indicated as discromic and of reference teeth were performed using a spectrophotometer (VitaEasyshade IV, VitaZahnfabrik) and color difference was calculated using ΔE_{ab} formula.**Results:** On the bases of the answers, various situations were identified: 1. "Perfect agreement" between patients and dentists' regarding identification of discromic teeth were found in 61,87% of cases (both considered either absence of teeth with discromia, or indicated the same teeth with color modifications). ΔE_{ab} between teeth considered discromic by patients and dentist and reference teeth, ranged between 1,57-35,86. 2. Cases with "disagreement" between the perception of dentist and patients (38,12%); ΔE^*_{ab} between teeth considered discromic only by the patients and reference ranged between 0,95 - 43,63, whilst ΔE^*_{ab} calculated between teeth considered discromic only by the dentist and reference ranged between 0,95 - 43,89; overall, most ΔE^*_{ab} exceeded acceptability threshold $AT=2.7$.**Conclusions:** Agreement between patients and dentist regarding the perception of discromic teeth may be encountered; however, there are situations of disagreement: patients perceive often as "discromic" vital, more saturated upper canines, defectuous composite or ceramic crowns whilst dentist judge as modified the color of nonvital teeth and discolored restorations.**Grant #, acknowledgments:** This study was supported by the Research Project (PCD 7690/52).

Abstracts • Poster Presentations

Abstract #8

The Evaluation of Fluorescence Properties of Resin Composites by Different Manufacturers

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Objective: To evaluate the fluorescence properties of different resin composites of the same shade.

Methods: A total of 3 different shades: A2, B1 and C3 composites from three different manufactures: Venus, Filtek and Clearfil ($n=3$) were evaluated. Fluorescence properties: maximum intensity (I_{\max} 10^3), and total intensity of the emission band (I_{tot} 10^6) were recorded using a spectrofluorometer. Data were analyzed by ANOVA test at the 0.05 level of significance.

Results:

Parameter	Material	SHADE		
		A2	B1	C3
I_{\max}	Venus	1028 (136) ^{Aa}	1196 (39) ^{A,b}	870 (85) ^{Aa}
	Clearfil	872 (86) ^{A,a}	830 (55) ^{B,a}	658 (90) ^{B,a}
	Filtek	570 (84) ^{B,a}	912 (70) ^{B,b}	647 (80) ^{B,a}
I_{tot}	Venus	134 (19) ^{Aa}	154 (5) ^{A,b}	118 (28) ^{Aa}
	Clearfil	102 (11) ^{B,b}	96 (7) ^{B,b}	78 (11) ^{B,a}
	Filtek	72 (13) ^{C,a}	109 (9) ^{C,b}	83 (11) ^{C,a}

Different superscript within each parameter upper case letters vertically (within columns) and lower case letters horizontally (within rows) for each of two parameters indicate significantly different means, ANOVA and Tukey test; $p<0.05$.

Conclusions: Fluorescence parameters (I_{\max} and I_{tot}) of resin composites showed significant shade- and manufacturer-dependent differences.

Acknowledgments: Special thanks to Dr. Aleksandar Aleksic, PhD for his mentorship.

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Abstract #9

Shade Correlation of Dental Composites with Variant Enamel Layer Thickness and two VITA Shade Guides**E. Ismail, R. Maia, D. Dawson**

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Objective: To compare color of double-layered (DL) samples using two dental composites (DC) and enamel-layer thickness (ET) of 0.5, 0.7, 1.0 mm to VITA Classical (VC) and 3D-Master (V3DM) shade-guides.

Methods: Thirty DL samples (N=30) replicating A2 VITA-tabs were fabricated using 6 custom-made molds, (n=5 per ET-DC combination). Two DC were selected to represent VITA and non-VITA based DC: Clearfil Majesty (CM) (Kuraray) and Vita-I-essence (VL) (Ultradent). Manufacturers' recommendations for shade selection for each layer were followed. A spectrophotometer, Easyshade V (VITA Zahnfabrik) was used to measure L^*a^*b parameters for DL samples, VC and V3DM-tabs. The color difference (ΔE_{ab} and ΔE_{00}) was calculated between the DL samples and A2 and 2M2 -equivalent shade to A2-. The 50:50% AT used for interpretations was 2.7 for the ΔE_{ab} and 1.8 for the ΔE_{00} . Spearman rank correlations were used to assess the relationships among ET, ΔE_{ab} and ΔE_{00} , and L^* . SAS software (Version 9.4) was used with level of significance of 0.05.

Results: Color difference values exceeded the predetermined acceptability threshold for both DC. Results produced by the ΔE_{ab} and ΔE_{00} formula were highly correlated ($r=0.98$, $p < 0.0001$). For CM, ΔE_{00} and L^* were negatively correlated ($r=-0.95$, $p < 0.0001$) and ΔE_{00} and ET were positively correlated ($r=0.63$, $p < 0.012$) when compared to A2 VC. For VL, ΔE_{00} and L^* were positively correlated when compared ($r=0.64$, $p=0.0095$) and ΔE_{00} and ET were inversely correlated ($r=-0.84$, $p < 0.0001$) when compared to 2M2 (V3DM). Correlation patterns were found to differ significantly between the two DC.

Conclusions: Variation in ET when replicating shade A2 using the DL technique with VITA based DC was found to correspond better to the VC shade guide, whereas using a non-VITA based DC was found to correspond better to V3DM shade guide. V3DM might be more suitable to represent non-VITA based DC.

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Abstract #10

Influence of Accelerated Aging on the Color Stability of Precolored Monolithic Zirconia Ceramics

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Objectives: This study aimed to evaluate the effect of hydrothermal aging on the optical properties of precolored dental monolithic zirconia ceramics.

Methods: Fifty square-shaped specimens (17.0x17.0x1.5 mm) of precolored monolithic zirconia were artificially aged in an autoclave at 134°C under 0.2 MPa for 0, 1, 3, 5, or 10 h (n=10). Spectral reflectance was measured using a spectrophotometer and CIE color parameters, TP values, and CIEDE2000 color differences (ΔE_{00}) were calculated. Monoclinic phase transformation was evaluated by x-ray diffraction (XRD), and the surface topographic analyses were performed by atomic force microscope (AFM). Data were analyzed using 1-way ANOVA and Tukey's test ($\alpha=.05$). The aging effect on the optical properties of lithium disilicate glass ceramics was also determined and compared with those of monolithic zirconia.

Results: Color parameters of monolithic zirconia were significantly affected by aging treatments with increasing time ($p<.001$). TP values slightly increased with an increase in aging time. The range of ΔE_{00} was 2.03-2.52 for zirconia and 0.07-0.23 for lithium disilicate. XRD analysis revealed that aging in an autoclave promoted an increase in m-phase contents and AFM demonstrated increased surface roughness as a function of aging time.

Conclusions: Optical properties of pre-colored dental monolithic zirconia ceramics were affected by hydrothermal aging, and translucency slightly increased with increasing aging time.

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Abstract #11

Effect of Glazing on Color, Translucency, and Surface Roughness of Translucent Monolithic Zirconia**M. Manziuc, C. Gasparik, A.V. Burde, M. Negucioiu, D. Dudea**

Department of Prosthetic Dentistry and Dental Materials, Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania

Objectives: This study aimed to compare the translucency of four translucent monolithic zirconia materials and to assess the effect of thickness and glazing on color, translucency, and surface roughness of these materials.

Methods: Sixty disc-shaped samples were fabricated from four zirconia blocks (A1 shade) with 0.8, 1.5 and 2mm thickness (n=5): IPS e.max ZirCAD/MT, Katana/HT, Vita YZ/HT, Cercon/HT; following the fabrication process, the discs were glazed using a standardized laboratory procedure. CIELAB parameters were recorded on black, white and a tooth shaded background (ND1) before and after glazing. Surface roughness of samples was measured with a contact profilometer and Ra was recorded before and after glazing. Translucency parameter (TP) was calculated as the color difference between an opaque black and opaque white background using the CIEDE2000(1:1:1) formula. Color differences after glazing and between materials were calculated with the samples placed on a tooth shaded background (ND1) using also the CIEDE2000 formula. TP, Ra, and color difference values were analyzed using ANOVA and post-hoc tests (Bonferroni corrections, $\alpha=0.05$ for all analyses).

Results: TP varied significantly among materials ($p<0.001$), and thicknesses ($p<0.001$), with the interaction effect between material type and thickness being also significant ($p<0.001$). Pairwise comparisons showed a significant effect of glazing on TP only for Katana at 1.5mm thickness ($p=0.004$) and for Cercon at 2mm thickness ($p=0.042$). Color differences calculated after glazing procedures were significantly different between materials ($p<0.001$), and thicknesses ($p<0.001$) with the interaction effect also significant ($p<0.001$). Ra varied significantly among materials ($p=0.012$), however the multiple comparisons revealed significant differences only between Vita YZ and Cercon ($p=0.024$). Glazing influenced surface roughness, Ra decreasing significantly for all materials tested ($p<0.001$).

Conclusions: Significant differences were found between translucency values of monolithic zirconia materials at certain thicknesses. Color, translucency and roughness changed after glazing for the materials tested; color changes were clinically more significant than changes in translucency.

Grant #, acknowledgments: This study was supported by research project "Development of an innovative glass-fiber reinforced composite resin material for CAD/CAM applications in Dentistry (IFRCD)". PN-III-P2-2.1-PED-2016-1936. Contract nr. 253/2017.

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Abstract #12

Color Comparison: Natural Teeth versus Shade Guides

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Objective: To compare fundamental optical properties and CIELAB values of natural teeth and shade guides utilizing visual and instrumental method.

Methods: The reflection curves and CIELAB values of eight natural maxillary right central incisors and 60 shade tabs from three different shades guides (VITA classical A1-D4 [VC], VITA Linearguide 3D-MASTER [LG], and VITA Bleachedguide 3D-MASTER [BG], VITA Zahnfabrik, Bad Säckingen, Germany) were generated instrumentally using a non-contact spectroradiometer (PR-670 SpectraScan, Photo Research, Chatsworth, CA) with a standard illuminant D65, 2° Standard observer, and 0.5° aperture. The middle third (from mesial to distal and cervical to incisal) of each tooth and shade tab was measured three times with repositioning. Visual evaluation (shade matching) of natural teeth was performed by three evaluators with superior color discrimination competency using a hand held shade matching light with color-corrected light with correlated color temperature of 5500 °K (Rite-Lite 2, AdDent, Danbury, CT). A sample size of seven teeth was determined (power of 0.8, $\alpha=0.05$) for comparisons between instrumental and visual shade matching based on paired difference t-test. Means and standard deviations are reported.

Results: Instrumental findings for the means (s.d.) of the 1st (corresponding to lowest Coverage Error, ΔE_{COV}), 2nd and 3rd best matches for VC, LG and BG are presented in the table.

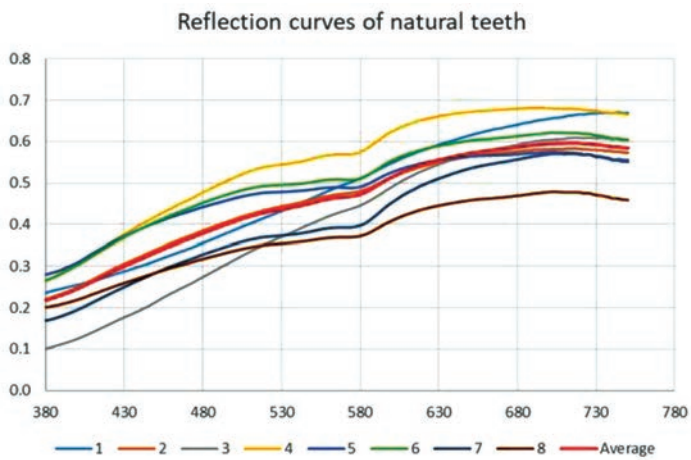
Best matches	VC	LG	BG
1 st	3.8 (0.7)	3.0 (0.8)	3.7 (1.1)
2 nd	4.6 (0.8)	3.7 (0.9)	4.2 (1.2)
3 rd	5.5 (0.8)	4.3 (1.1)	5.1 (1.2)

The ΔE^* values (s.d.) that corresponded to the best matches determined visually for VC, LG and BG were 5.7 (1.5), 4.3 (1.2) and 5.2 (1.6), respectively.

Based on paired t-tests, significant differences occurred between visual and instrumental findings for BG-1st, LG-1st, LG-2nd and VC-1st.

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Reflection curves for eight natural teeth and their average are presented in the picture.



Certain shape discrepancy between reflection curves of natural teeth and shade guides was observed at approximately 580 nm, which can be a source of metamerism.

Conclusion: Within the limitations of this study, it was concluded that the Linearguide 3D-MASTER exhibited the smallest Coverage Error (the mean of best matches to natural teeth), followed by VITA Bleachedguide 3D-MASTER and VITA classical A1-D4, respectively. All shade guides exhibited Coverage Error greater than 50:50% acceptability threshold of $\Delta E^*=2.7$. Visual shade matching did not correspond to the smallest ΔE^* .

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Abstract #13

Color and Translucency of Ceramic Materials Compared to Human Dentine of Anterior and Posterior Teeth

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Objectives: To evaluate CIELab color coordinates and translucency parameter of three types of ceramic materials with 2 different opacities and to compare them with corresponding optical properties of both incisors/canines and molars human dentine.

Materials and Methods: Three ceramic systems with different shades and opacities were tested: Vita Suprinity[®], Vita Enamic[®] (Vita Zahnfabrik) and Noritake Super Porcelain EX-3[®] (Kuraray Noritake Dental Inc). All the specimens were divided into groups (n=3) according to their shade and opacity (T or HT). Seventy-three dentine specimens were obtained by cutting with a precision saw machine water-cooled at low speed. All ceramic and dentine samples were flattened and polished to a final thickness of 2 mm. Reflectance measurements were performed over white and black backgrounds with a non-contact spectroradiometer (SpectraScan PR-670) under a d/0° geometry. CIE L*a*b* color parameters were calculated for CIE D65 Illuminant and CIE 2° Standard Observer. The translucency parameter (TP) was calculated for all samples. Color coordinates and translucency were analyzed using one-way Anova and post-hoc multiple comparisons tests.

Results: Statistically significant differences in lightness (L*) were found between the three types of ceramics tested and the incisor/canine human dentine (p<0.05) while no significant differences were found with molar dentine samples. In terms of translucency, the greatest similarity with incisors and canines translucency was found Vita Suprinity T (p=0.997). Vita Enamic HT was the only ceramic that showed no statistically significant differences in TP when compared to molar dentine (p=0.819).

Conclusion: Conventional feldspathic ceramic showed the highest lightness values, when compared to the other 2 ceramic systems. Molar human dentine can be successfully replaced by any of the three ceramic systems evaluated.

Among the materials studied, in terms of translucency, Vita Suprinity Translucent adequately matched translucency of anterior teeth dentin specimens, while Vita Enamic High Translucent best suited molars human dentine.

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Abstract #14

The Relationship between Tooth Colour Metrics and Age in a US Based Population**M.S. Wolff¹, D. Hershkowitz², J. Lomangino-Cheung², K. Allen², J. Gomez³, R. Ellwood³**¹ University of Pennsylvania School of Dental Medicine, USA² NYU College of Dentistry, New York, New York, USA³ Colgate Palmolive, Piscataway, New Jersey, USA

Objective: Teeth become darker as we age, due to factors such as; increased dentine thickness, enamel thinning and intrinsic/extrinsic staining. Differences in tooth color with aging have not been extensively investigated in US populations. To investigate the relationship between age and tooth colour in a US based population.

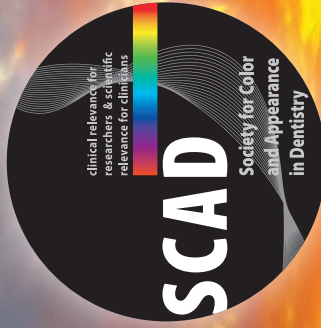
Methods: Color images were captured of the upper anterior teeth using a calibrated camera system conforming to ASTM E2466. Subsequently color metrics of the upper central incisors were calculated to include CIELAB values and WIO. Subjects (n=400) were recruited from NYU College of Dentistry and were stratified by age: 11-20, 21-30, 31-40, 41-50, 51-60 and 61+ years. They were further stratified to broadly reflect the US ethnicity demographic. The relationship between age and tooth colour measurements was tested using a linear regression model.

Results: For the youngest subjects teeth became whiter for all metrics up to the age of around 18 years and then became increasingly darker. For this reason the slope of the relationship between age and the tooth colour metrics was evaluated in those subjects 18 years and above (n=369). For L*, a*, b* and WIO the slopes of the regression with age were -0.152, 0.05, 0.066 and -0.554 respectively. This represents -6.58, 25, 15.2 and -1.8 years per unit change for each metric.

Conclusions: After the age of 18 years teeth tend to get darker with age teeth linearly throughout life. A single unit change in b* is equivalent to approximately 15 years of tooth color aging.

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