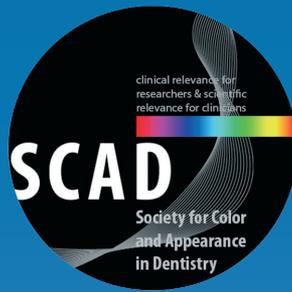


# NextGen Esthetics A Global Outreach

9<sup>th</sup> Annual Conference of  
the Society for Color and  
Appearance in Dentistry  
(SCAD)

October 12-14, 2017  
Duke Hotel,  
Newport Beach, CA  
[www.scadent.org](http://www.scadent.org)  
[info@scadent.org](mailto:info@scadent.org)

PROGRAM BOOK



9<sup>th</sup> Annual Conference • Duke Hotel • Newport Beach, CA, October 12-14, 2017

## Table of Contents

A Message from the President .....	3
Program .....	4
Meeting Sponsors and Corporate Members .....	6
About SCAD.....	8
Oral Presentations .....	12
Abstracts .....	30
Save the Date.....	46

### **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: Sequola Balroom

Vident, Inc. (DBA VITA North America) is an ADA CERP Recognized Provider. ADA CERP is a service of the American Dental Association to assist dental professionals in identifying quality providers of continuing dental education. ADA CERP does not approve or endorse individual courses or instructors, nor does it imply acceptance of credit hours by boards of dentistry. VITA North America designates this activity for 16 continuing education credits. Concerns or complaints about a CE provider may be directed to the provider or to the Commission for Continuing Education Provider Recognition at ADA.org/CERP. Speaker is independent of relevant financial obligations to VITA North America

**ADA C.E.R.P.**® | Continuing Education Recognition Program



### **Contact info:**

Society for Color and Appearance in Dentistry  
 5233 Bellaire Blvd Ste B, #394 Bellaire, TX 77401, USA  
 Phone +1.281.687.8752 • Fax +1.877.255.6075  
[www.scadent.org](http://www.scadent.org) • [info@scadent.org](mailto:info@scadent.org)

## *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 9<sup>th</sup> Annual Conference at the Duke Hotel in Newport Beach, CA on October 12-14, 2017.

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 will be an additional valuable source of evidence-based information. We will announce the 2017 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 2017 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 12, 2017**

**1:00pm-6:00pm** *Color Matching Curriculum*

**1:00pm-6:00pm** *Registration Open*

**6:30-7:30pm** *SCAD Executive Board meeting*

**7:30-9:00pm** *Welcoming Reception*

### **Friday, October 13, 2017**

**7:00am-4:00pm** *Registration*

**7:00-8:00** *Continental Breakfast*

**8:00-8:15** *Opening Ceremony*

**8:15-9:45** Pascal Magne & Michel Magne:  
***Bonded porcelain restorations  
in the anterior dentition: An update***

**9:50-10:30** *Break, Poster viewing, CDT competitor viewing*

**10:30-11:30** Victor Clavijo & Murilo Calgare:  
***Challenges with anterior single units –  
Decision-making for customizing soft  
tissue and color***

**11:35-12:05** Robert Gerlach: ***Reconsidering the role  
of light: Integrated evidence on one  
light-based approach for whitening***

**12:05-1:00** *Lunch*

**1:00-1:30** Corky Willhite: ***Transitional bonding:  
Non-traditional composite restorations  
for major occlusal and esthetic changes***

**1:35-2:05** Rodrigo Rocha Maia: ***Observing nature  
and understanding light propagation in  
dental tissues and composites***

**2:10-2:40** Christopher Orr: ***Predicting aesthetic  
performance of composite resins  
from laboratory data***

**2:40-3:05** *Break, Poster viewing, CDT competitor viewing*

- 3:05-3:35** Vanik Kaufmann-Jinoian: ***Increase dental happiness - More patients better shades & improved aesthetics***
- 3:40-4:10** Cherilyn Sheets: ***Evolving concepts for integrating esthetics and structural integrity in clinical practice***
- 4:15-4:45** Federico Ferraris: ***Composite vs. ceramic: Shade matching protocols and clinical workflows***
- 4:45-5:00** *SCAD Open Meeting*
- 7:00-10:00** *President's Dinner & Award Ceremony*

***Saturday, October 14, 2017***

- 7:30am-4:30pm** *Registration Open*
- 7:00-8:00** *Continental Breakfast*
- 8:00-8:50** Irena Saler & Vincent Fehmer: ***Management of white and pink esthetics - An interdisciplinary approach***
- 8:50-9:15** Anja Zembic: ***Ceramic implant abutments- Esthetic benefit or clinical risk?***
- 9:20-9:50** Stephen Westland: ***Colour appearance in dentistry and its measurement***
- 9:50-10:30** *Break, Poster viewing*
- 10:30-11:00** Joe Ontiveros: ***Tooth whitening efficacy: monitoring and interpreting***
- 11:00-11:30** Sascha Hein: ***eLABor\_aid® - capture, calibrate & create!***
- 11:30-12:00** Peter Pizzi: ***Nature, light and design for ceramic communication***
- 12:00-1:00** *Lunch*
- 1:00-1:45** Iñaki Gamborena: ***Paradigm shift in implant dentistry : The importance of soft tissue grafting (Sponsored by Nobel Biocare)***
- 1:50-2:50** Edward McLaren & Nathaniel Lawson: ***Cubic zirconia: Esthetic potential, physical properties, and effect of firing conditions on translucency***
- 2:50-3:00** *Closing Ceremony*

## Meeting Sponsors and Corporate Members

### GENERAL SPONSORS

# VITA

[www.vita-zahnfabrik.com](http://www.vita-zahnfabrik.com)

[www.vitanorthamerica.com](http://www.vitanorthamerica.com)

## VITA Easyshade® V: Fast, Accurate Shade Measurement

**\$600  
REBATE\***



### INTUITIVE

Touch-screen color LED display and inductive charging base

### INSTANTLY MEASURE

Verify VITA classical A1-D4® and VITA 3D-MASTER® shades at the push of a button

### BETTER COMMUNICATION

Between lab and doctor with the Bluetooth® interface and VITA Assist PC software and mobile app

\*Rebate will be issued following completion of a VITA North America online shade certification training webinar. For details visit [us.vitanorthamerica.com](http://us.vitanorthamerica.com)

VITA - perfect match

# VITA

[vitanorthamerica.com/easyshadeV](http://vitanorthamerica.com/easyshadeV) | 800-828-3839

PLATINUM SPONSOR



GOLD SPONSORS



www.glidewelldental.com



SILVER SPONSORS



EXIBITOR



## ***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***

### **EXECUTIVE COMMITTEE**

President: Newton Fahl  
 President-Elect: Aki Yoshida  
 Vice-President: William M. Johnston  
 Secretary: Federico Ferraris  
 Treasurer: Sabiha Bunek

### **Board Members-at-Large**

Juliana Da Costa  
 Joe C. Ontiveros  
 Stephen R. Snow  
 Esam Tashkandi

### **Executive Director**

Rade D. Paravina

### **REGIONAL COUNCILORS**

Andrey Akulovich, Russia  
 Luiz Narciso Baratieri, Latin America  
 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. The emphasis for selection of presentations was on clinical, laboratory and educational research involving color and appearance in dentistry.

SCAD VITA Award for Excellence in Research Related to Color and Appearance in Esthetic Dentistry has been established to promote young researchers. Three categories of applicants are eligible for the awards: predoctoral students, graduate students, and non-tenured junior faculty.

We invite you to submit an abstract for consideration for poster presentation at the SCAD 2018 Annual Conference (Newport Beach on October 18-20). The instructions will be provided at the SCAD website ([www.scadent.org](http://www.scadent.org)).

## ***Dental Technician Awards***

The Society for Color and Esthetics in Dentistry (SCAD) is conducting two competitions for excellence in dental technology:

- 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

Applicants must duplicate a natural tooth using any material and technique of their choice. It can be fabricated on a die or as a solid replica (root is optional).

See [www.scadent.org](http://www.scadent.org) for additional information.



Mr. Aki Yoshida, Chair of the 2016 CDT Award Committee, Dr. Dan Nathanson, SCAD President (2014-2016), and the 2016 CDT Award recipients: Mr. Winnie Tsai (Larsen-Chu award winner) and Mr. Hiroaki Tada (Virtuoso award winner).

## ***New SCAD Color Matching Curriculum II (CMC II)***

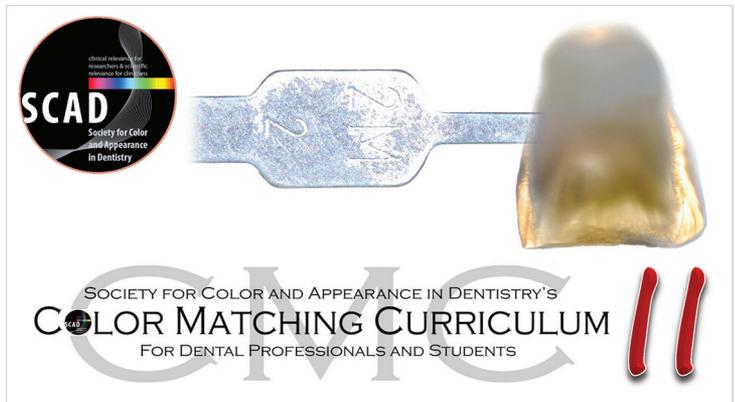
It is our pleasure to inform you about a new Color Matching Curriculum II, a CE program for dental professionals and dental students, in conjunction with the SCAD 2017 Annual Conference.

Presenters: Stephen J. Chu, Juliana da Costa, Newton Fahl, Federico Ferraris, Adam J. Mieleszko, Rade D. Paravina and Aki Yoshida.

This state-of-the-art combined didactic/hands-on CE course is designed to enhance the clinical outcomes, and it is in compliance with our mission to create and implement educational and training programs on color and appearance. CMC II will provide an update on new developments on this subject, revisit and introduce improvements for traditional teaching materials, and provide a hands-on section on visual and instrumental shade matching.

Colleagues that teach (or will be teaching) this topic at dental schools in US, Brazil and Japan registered for CMC 2017.

Registered participants and other educational institutions will be offered the course materials should they wish to include it in their teaching and/or curricula.



## ***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  
Rade D. Paravina  
John M. Powers  
Edward J. Swift  
Esam Tashkandi

### **Active Members**

Andrey Akulovich  
Sabiha Bunek  
Juliana da Costa  
Magda Eldiwany  
Newton Fahl  
Federico Ferraris  
Razvan Ghinea  
Ronald E. Goldstein  
Nour Habib  
Yumiko Hosoya  
William M. Johnston  
So-Ran Kwon  
Brian Le Seige  
Arturo Mendez  
Dan Nathanson  
Kathy O'Keefe  
Joe C. Ontiveros  
Christopher Orr  
Jacinthe Paquette  
Andree Ritter  
Herbert Scheller  
Cherilyn Sheets  
Sharon Siegel  
Stephen S. Snow  
Richard Trushkowsky  
Aki Yoshida

### **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  
Maria Gonzales  
Seubg-Ryong Ha  
Beatrice Haddad  
Helena Hakansson Forthmeijer  
Thad Hegwood  
Cecilia Infantado  
Sung-Hun Kim  
Priscila Meneghetti  
Omar Moustafa  
Leong Seng Neoh  
Natalie Pereira  
Aleksandr Pershin  
Dean Ramus  
Giovanni Sammarco  
Alan Smith  
Michael Weyhrauch  
Karry Whitten  
Hideo Yamamoto  
Richard Young

## Oral Presentations

Friday, October 13  
8:15-9:45

### Bonded Porcelain Restorations in the Anterior Dentition: an Update

**Pascal Magne, DMD, PHD &  
Michel Magne BS, MDT**



*Pascal Magne,  
DMD, PHD*



*Michel Magne  
BS, MDT*

Dr. Pascal Magne is the Don and Sybil Harrington Foundation Prof. of Esthetic Dentistry in the Division of Restorative Sciences, University of Southern California, Herman Ostrow School of Dentistry. He graduated from the University of Geneva Dental School, Switzerland (1989 DMD, 1992 MSc and 2002 PhD). He was a lecturer at the same university beginning in 1989 until 1997 (fixed prosthodontics and occlusion, operative dentistry and endodontics).

Michel Magne was born in la Chaux-de-Fonds (Switzerland) and became certified as Dental Technician in 1979. He developed his technical education in fixed prosthodontics (ceramics) and esthetics until today. From 1992 to 2004, he has been the owner and director of Oral Design Center, Dental Laboratory in Montreux (Switzerland). In January 2005, he became Associate Professor of Clinical Dentistry and Director of the Center of Dental Technology at the University of Southern California (USC, Los Angeles). In 2013 Michel Magne became a Co-founder of Oral Design Los Angeles, Dental Laboratory and Dental Education Center in Beverly Hills, CA USA. He is author and co-author of articles on esthetic dentistry and is worldwide frequently invited to lecture and teach on these topics.

#### Lecture Description

Careful approach will reveal and allow the need for selective reduction of tooth substance based on the dental technologist needs and the ultimate goal of the restoration..

#### Objective

- Clinicians and dental technologists should apply knowledge, wisdom and experience.
- Careful customized recipe that should lead to the right treatment for a specific individual.
- Treatment that will respect the principles of enamel preservation while delivering what was pledged to the patient through the appropriate diagnostic approach, waxup and in-vivo mock-up.

## Oral Presentations

Friday, October 13  
10:30-11:30

### Challenges with Anterior Single Units – Decision-making for Customizing Soft Tissue and Color

**Victor Clavijo, DDS, MSC, PHD & Murilo Calgaro, MDT**

#### Lecture Description

Selecting the appropriate ceramic system for the restoration of anterior single units is paramount and should be thoroughly scrutinized at treatment planning. Each restorative material presents specific tooth preparation designs, indications, and limitations that should be respected for maximum esthetic outcomes. This presentation will suggest a joint clinical and laboratory decision-making process to determine why, when, and how to customize soft tissue and color in anterior single units. Several clinical challenges will be presented to address from conservative to.

#### Objective

- Creating a balance between soft tissue level and thickness for single unit restorations.
- Minimizing mistakes when considering tooth preparation, the choice of ceramic systems, and color matching, in light of currently available materials.
- Understanding the importance of color morphology interpretation to achieve optimal appearance in single units with ceramics..



**Victor Clavijo,  
DDS, MSC, PHD**



**Murilo Calgaro,  
MDT**

Victor Clavijo, DDS, MSc PhD Graduated in Dentistry at the Paulista University – UNIP; Restorative Dentistry, Araraquara Dental School, São Paulo State University, Araraquara, SP, Brazil.

Specialization in Restorative Dentistry in Restorative Dentistry at Araraquara Dental School, São Paulo State University - UNESP

Specialization in Implant Dentistry, SENAC University, Sao Paulo, Brazil.

Master and PhD in Restorative Dentistry at Araraquara Dental School, São Paulo State University UNESP

Murilo Calgaro graduated in Dental Technology at the School of Dental Technician Senac Sao Paulo in 2002

He is a member of the Brazilian Academy and Society of Esthetic Dentistry.

In 2005, Murilo Calgaro opened a private lab, and a training center, Studio Dental in Curitiba (Brazil).

In 2007 Murilo Calgaro was invited to be part of the team of ceramists of Eric Van Dooren in Antwerp Belgium where he became his master ceramist from 2008 until 2011.

Murilo Calgaro is Oral Design member , invited by Mr. Willi Geller in 2013.

Currently Murilo Calgaro is working on his Lab. and training center in Curitiba Brazil ( Murilo Calgaro Dental Design Institute ) where he has a training program for Dental Technicians and Dentists.

## Oral Presentations

Friday, October 13  
11:35-12:05

### Reconsidering the Role of Light: Integrated Evidence on One Light-based Approach for Whitening

**Robert Gerlach, DDS, MPH**



**Robert Gerlach, DDS, MPH**

Research Fellow in Global Oral Care at the Procter & Gamble Company, Cincinnati, Ohio USA, where he is responsible for clinical trials research on oral care product safety and effectiveness worldwide. His clinical trials research includes initiatives in the areas of caries prevention, periodontal therapy and esthetic dentistry. Dr. Gerlach is recognized as a leading clinical researcher in the area of tooth whitening, with contributions to novel delivery systems, dentifrice development and clinical methods. His recent research focuses on the public health implications of daily oral hygiene and relationships between oral diseases and overall health. Dr. Gerlach is Adjunct Professor in the Department of Prosthodontics and Operative Dentistry (Research Administration) at Tufts University School of Dental Medicine in Boston, Massachusetts USA. Dr. Gerlach holds various technology and methods patents, and his research has been reported in more than 300 manuscripts and published abstracts.

#### Lecture Description

The use of light in tooth whitening represents one of the most controversial aspects of aesthetic dentistry. Previous evidence from clinical trials is limited, and outcomes are generally ambivalent as to whether light-aided whitening impacts effectiveness and/or safety. Recently, new research was conducted to assess the possible contribution of light to clinical response with peroxide delivery. This inclusive review reports evidence from randomized controlled trials on the use of light as part of strip-based hydrogen peroxide application. The pooled outcomes include hundreds of subjects from multiple clinical trials with efficacy and safety assessments over periods of up to 6 months. Evidence includes single variable research on the role of light, positively-controlled research on meaningfulness and long-term follow-up on color retention, relapse and safety. Discussion focuses on the possible implications from the pooled analysis with respect to light-assisted tooth whitening.

#### Objective

Attendees will learn:

- Review the “light controversy”, including previous research on the use of light and/or peroxide for tooth whitening.
- Describe a novel whitening technology using light with strip peroxide delivery, plus clinical trials research evaluating its use.
- Report the inclusive, evidence-based analysis on effectiveness and safety and possible implications of these outcomes for light-assisted tooth whitening.

## Oral Presentations

Friday, October 13  
1:00-1:30

### Transitional Bonding: Non-traditional Composite Restorations for Major Occlusal and Esthetic Changes

**Corky Willhite, DDS**

#### Lecture Description

Patients love conservative treatment, whether for financial reasons or just because they don't want their teeth "drilled down." Transitional Bonding is a composite technique requiring little or no tooth reduction, yet can restore anterior guidance or increase VDO. Besides providing esthetic improvements, long-lasting results can be expected, even in bruxers!.

#### Objective

- How to provide solutions for common problems (such as severe wear).
- Why porcelain isn't always the best option...even in non-compliant patients.
- How to build large composite restorations quickly and conservatively.



*Corky Willhite, DDS*

Dr. Corky Willhite has achieved Fellowship by the Academy of General Dentistry and the American College of Dentists. He is one of only 70 Fellows of over 6,000 American Academy of Cosmetic Dentistry members worldwide and has served on their Board of Governors (currently American Board of Cosmetic Dentistry) and spent years as an Examiner for Accreditation. He is on the faculty of the Center for Esthetic Excellence in Chicago and postgraduate esthetic program at Eastman Dental Center. His private practice in suburban New Orleans, The Smile Design Center, is limited to Cosmetic Dentistry..



**Rodrigo Rocha Maia, DDS, MS, PHD**

Rodrigo Rocha Maia received his Dental Degree from Gama Filho University in 1994. After his graduation he served in the Brazilian Air Force - BAF (Captain 1995 – 2012). In 1998 he finished his residency program in Operative Dentistry (BAF), Masters (2004) and PhD (2008) in Operative Dentistry from Rio de Janeiro State University in Rio de Janeiro, Brazil (UERJ). Also, he completed his residency in Periodontology in 2005 (BAF - Health Directory). In 2006 his was appointed as the Coordinator of the residency program in Operative Dentistry (Brazilian Dental Association – section: Rio de Janeiro). After he finished his PhD (2008) he received the Brazilian Air Force 2 years Scholarship to study abroad at The University of Iowa. In 2010, he completed his postdoctoral work at Dows Institute of Dental Research UIOWA - College of Dentistry when he returned to Brazil and was appointed as the Program director in Operative Dentistry residency course at the BAF. He worked for 17 years as a part-time in private practice in Rio de Janeiro and joined the Department of Operative Dentistry in 2012 at the University of IOWA as a visiting assistant professor and in 2013 he became an assistant professor. He is participating as a co-director of graduate operative dentistry program and has an intramural dental practice in the Department of Operative Dentistry.

## Oral Presentations

Friday, October 13  
1:35-2:05

### Observing Nature and Understanding Light Propagation in Dental Tissues and Composites

#### Rodrigo Rocha Maia, DDS, MS, PHD

##### Lecture Description

The purpose of this course is to present direct bonded restorative approaches based on minimally invasive principles, highlighting different materials and key clinical approaches. The focus of this lecture will help the participants achieve excellent esthetics outcomes, function and affordable solutions for direct composite restorations while preserving natural tooth structure.

##### Objective

At the completion of the lecture, participants should be able to:

- Understand the light propagation in dental tissues and dental composites for different incremental direct build-up techniques.
- Explain the difference between shade selection and shade reproduction.
- Chose which type of bevel in a class IV direct composite restorations is the most esthetic and most closely mimics the optical properties of natural tooth structures.

## Oral Presentations

Friday, October 13  
2:00-2:40

### Predicting Aesthetic Performance of Composite Resins from Laboratory Data

**Christopher Orr, BSC, BDS**

#### Lecture Description:

Whether following a “natural” or “polychromatic” layering strategy, successful application of multi-layered composite resin depends on the careful combination of materials of different opacity and translucency. According to Fahl, these materials can be classified as body enamel, dentine, value enamel, opaquers and effect colours, depending on the role that the composite is to play in the restoration. When discussing composite resin layering techniques, many opinion leaders speak about a certain composite resin being a “good” or “poor” choice for these different functions.

The measurement of Translucency Parameter (TP) is well-established in dental materials science and studies to date have made measurements of body enamel shades. It is yet to determine whether TP and other laboratory measurements can be used to predict aesthetic performance within multi-layered composite restorations, or at which thickness the material performs its intended task optimally.

The aim of this presentation is to thoroughly explore several composite resin products and relate the laboratory measurements to their aesthetic performance in a multi-layered restoration.

#### Objective

- To understand the different optical tasks that different restorative resins fulfil in a multi-layered restoration.
- To discuss comprehensive laboratory and clinical evaluations of several multi-layered composite resin products.



*Christopher Orr, BSC, BDS*

Dr Christopher Orr is one of the UK's most prominent cosmetic and aesthetic restorative dentists, who practices in his multidisciplinary clinic in central London.

He is an Accredited Member and Past President of the British Academy of Cosmetic Dentistry and also a Certified Member of the European Society of Cosmetic Dentistry. He was voted at the most influential private practitioner in the UK by the readers of *Private Dentistry* magazine in 2013.

Through Advanced Dental Seminars, he is the sole lecturer for a one-year course on cosmetic dentistry and aesthetic restorative dentistry for general dentists - the UK's most popular course programme on the subject with over 1200 dentists completing the programme over the last 13 years. Dr Orr lectures extensively around the UK and abroad and his work has been widely featured in the UK and international press, across radio, television, print and online media.



**Vanik Kaufmann-Jinoian, MDT**

Vanik Kaufmann-Jinoian grew up in Switzerland, in a city close to Basel, where he went to school and received his training in order to become a certified dental technician. In the years after, he optimized his dental skills in various dental laboratories in Switzerland. During this training period, he spent one year in the United States to master the skills of marketing. Upon his return to Switzerland, he started working for the Vita Company. At that time, he was the youngest ceramic demonstrator in the world - teaching ceramic courses all around the world.

Currently, he owns a state-of-the-art dental laboratory close to Basel, which he founded in 1990. This lab covers all aspects of modern dentistry. Various dental companies use his lab for testing new dental materials, mostly because of Vanik's knack for research and development of new techniques. Amongst others, he is named as one of the initiators of the Inlab CAD-CAM systems for dental labs.

Besides the activities in his own laboratory, Vanik has taught at the master technicians school in Switzerland and at the University of Greifswald in Germany for the CAD/CAM master course for dentists. Over the last few years, he has been teaching dentists how to achieve high quality restorations using chair-side units. He has published a book on this topic and wrote many articles for various dental magazines around the world. He is a well-known speaker at major symposiums. He with his partners developed the Twinsmile system. For this System they received the German medical award of 2015.

## Oral Presentations

Friday, October 13  
3:05-3:35

### Increase Dental Happiness More Patients Better Shades & Improved Aesthetics

**Vanik Kaufmann-Jinoian, MDT**

#### Lecture Description

What we must do, is to take the patient on a dental journey. A dental dream – shared between your patient, your team and yourself, which you are about to turn into a reality. A first requisite for this is a well-thought-out emotional visual concept. Most of us will be familiar with the DSD (Digital Smile Design), which is a really good concept. However, it is mostly a treatment plan talking to us, the dental professionals. It is much too complicated to implement in a general practice, let alone that it will mean anything at all to the patient.

Twinsmile is a proven concept in which several unique presentation tools are used. It starts off by carrying out a qualitative, yet simple digital Smile-analysis (ios App store). Then, the CAD/CAM produced Testeneers are created and fixed to the patient's teeth, and finally, the patient will experience his or her most attractive smile during the before and after video presentation.

The second part of the presentation will be showing you how to implement the fourth dimension of communication with the right materials and techniques in final high quality restoration.

#### Objective

- Increase patient case acceptance rate of up to 70%.
- Learn more about the lithium type and full Hybrid materials, and explain what you have to pay attention to in order to obtain the highest aesthetic quality.
- Easy shade communication and shade modification. Possible chair side solutions.

## Oral Presentations

Friday, October 13  
3:40-4:10

### Evolving Concepts for Integrating Esthetics and Structural Integrity in Clinical Practice

**Cherilyn Sheets, DDS**

#### Lecture Description

Great accomplishments have been made in the science of color and esthetics to reach the goal of naturally esthetic restorations that are strong and long lasting. Porcelain bonded to metal, zirconia, or other man made material substructures have strengths that are well studied and provide a predictability for long lasting restorations. Additionally, longevity and strength of bonded esthetic materials also rely upon the sound foundational strength of the dentin/enamel substructures. Yet, if detection of structural defects in the substructure is not a priority, the ultimate restoration may have a higher probability of fracture.

This presentation will highlight recent clinical research into the assessment of the structural strength of natural teeth blended with the clinical and technological realities that we encounter in oral rehabilitations. Thoughts for future assessment of material choices due to lack of quantity or quality of tooth structural integrity will be explored.

#### 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.



*Cherilyn Sheets, DDS*

Dr. Cherilyn Sheets maintains a full-time private practice in Newport Beach, California for esthetic rehabilitative dentistry. She is an international educator, clinician, author and researcher and received the 2002 Gordon Christensen Award for Excellence in Lecturing, the 2004 USC School of Dentistry Alumnus of the Year Award, the 2006 Section Honor Award from the California Section of the Pierre Fauchard International Honor Dental Academy, the 2012 AAED Lucy Hobbs Taylor Award for Lifetime Achievement, 2012 Honorary Membership in the American College of Prosthodontists and the 2012 Master of Innovation Award from the Academy of Microscopic Enhanced Dentistry. She holds Fellowships in the Academy of General Dentistry, the American College of Dentists, the International College of Dentists and the Academy of Dentistry International. She is a past president of the American Academy of Esthetic Dentistry and the American Association of Women Dentists.

Dr. Sheets is Co-Executive Director of the Newport Coast Oral Facial Institute, a Clinical Professor of Restorative Dentistry at the University of Southern California, Chairman Emeritus of The Children's Dental Center, and Founding Chairman of the National Children's Oral Health Foundation. With the Newport Coast Oral Facial Institute and the University of California Irvine (UCI) School of Engineering, she is leading research on energy dissipation in teeth and implants with James C. Earthman, Ph.D. She is on the Editorial Board for numerous peer-reviewed journals.



**Federico G. Ferraris, DDS**

Dr. Federico Ferraris received his D.D.S. from the Genoa University in 1999.

He is an Active Member of various prestigious Dental Academies: European Academy of Esthetic Dentistry (EAED), Italian Academy of Conservative (AIC), Society for Color and Appearance in Dentistry (SCAD), American Academy of Restorative Dentistry (AARD), Italian Academy of Esthetic Dentistry (IAED), of the International Academy for Adhesive Dentistry (IAAD). He is DSD (Digital Smile Design) Master. He is founder of Adhesthetics.

He is Member of the Editorial Board of IJED (International Journal of Esthetic Dentistry).

He is the Vice-president of AIC (Italian Academy of Conservative) for the biennium 2016-2017 and 2018-2019.

He was Regional Councillor for Europe of SCAD (Society for Color and Appearance in Dentistry) for the biennium 2013/14 and 2015/16 and he is Secretary of the same society for the biennium 2017-2018.

He has been a Visiting Professor in Esthetic Dentistry at some Universities in Italy: the University of Genoa, the Alma Mater University of Bologna, the University of Pisa and the Insubria University of Varese.

He is a Visiting Professor also at some Universities in Spain: the CEU University San Pablo of Madrid, the University of Almeria, and the European University of Madrid.

He was an invited speaker at the New York University.

He is author of several Italian and International scientific publications and speaker at dental congresses and courses in more than twenty different countries.

## Oral Presentations

Friday, October 13  
4:15-4:35

### Composite vs Ceramic: Shade Matching Protocols and Clinical Workflows

**Federico G. Ferraris, DDS**

#### Lecture Description

Nowadays, in dental esthetics very conservative morphological modification is possible both with indirect ceramic veneers and direct composite veneers. The color integration is one of the main aspects in these restorations and it is relevant for a sextant esthetic rehabilitation and it is much more important when we talk about the single anterior tooth.

Considering the different materials and approaches also in the shade matching there are some differences and during this lecture some of them will be presented with specific clinical protocols and workflows for this kind of different treatment.

#### Objective

- To approach morphological and color modifications with two different techniques: indirect ceramic veneers and direct composite veneers.
- To have a clinical protocol for the shade matching and clinical workflow.

## Oral Presentations

Saturday, October 14  
8:00-8:50

### Management of Withe and Pink Esthetics - An Interdisciplinary Approach

**Irena Sailer, Prof. Dr. Med. Dent & Vincent Fehmer, MDT**

#### Lecture Description

The restoration of a tooth or the replacement of a missing tooth in the esthetic area is very delicate, specifically in patient cases with high lip line. The current restorative material options offer many esthetic features to best copy the optical properties of teeth. The color, chroma and lightness of the esthetic materials (e.g. ceramics) are hereby important parameters. Furthermore, the translucency is a important both for the mimicking of teeth as also for the masking of discolorations. A structured approach for the evaluation and the establishment of the white esthetics helps reducing the risk for unpleasant surprises with the result.

Discolored non-vital abutment teeth are a specific challenge with this respect since they may not only be difficult to be masked, but they also may be associated with soft tissue discoloration. Recent studies have evaluated the threshold for the visibility of dental and of mucosal/gingival discoloration. These studies have shown that the human eye detects soft tissue discoloration at similar threshold values as it would detect tooth discoloration.

#### Objective

- Understand the criteria that influence the esthetics of teeth and of soft tissues.
- Learn about the visibility of discolorations.
- Learn about the restorative options, their possibilities and limitations.
- Learn to select restorative options for predictable white and pink esthetic.



*Irena Sailer,  
Prof. Dr. Med. Dent*



*Vincent Fehmer,  
MDT*

Prof. Dr. med. dent., Head Division of Fixed Prosthodontics and Biomaterials at the University of Geneva. She received her dental education and Dr. med. dent. Degree from the Faculty of Medicine, University of Tübingen, Germany in 1997/1998. In 2003 Dr. Sailer received an Assistant Professorship at the Clinic of Fixed and Removable Prosthodontics and Dental Material Sciences in Zurich. Since 2010 she is an Associate Professor at the same clinic. Irena Sailer is a Specialist for Prosthodontics (Swiss Society for Reconstructive Dentistry), and holds a specialization degree for Dental Implantology (WBA) of the Swiss Society for Dentistry. Since September 2013 she is the Head of the Division of Fixed Prosthodontics and Biomaterials at the University of Geneva.

Vincent Fehmer, Master Dental Technician (MDT), at the Clinic for Fixed Prosthodontics and Biomaterials, Center for Dental and Medicine, University of Geneva, Switzerland/ He received his dental technical education and degree in Stuttgart, Germany in 2002. In 2009 he received the degree as a MDT in Germany. From 2009 to 2014 he was the chief dental technician at the Clinic for Fixed and Removable Prosthodontics in Zurich, Switzerland. Since 2015 he is dental Technician at the Clinic for Fixed Prosthodontics and Biomaterials in Geneva, Switzerland and runs his own laboratory in Lausanne Switzerland. MDT Fehmer is a Fellow of the International Team for Implantology, and a member of the Oral Design group, the European Association of Dental Technology (EADT) and German Society of Esthetic Dentistry (Deutsche Gesellschaft für Ästhetische Zahnheilkunde, DGÄZ). He is active as speaker on a national and international level. Mr. Fehmer has published numerous articles within the field of fixed prosthodontics and dental technology



**Anja Zembic, Dr. Med. Dent, PHD**

Anja Zembic PhD. Dr. med. dent. is a senior teaching and research assistant at the Clinic for Fixed and Removable Prosthodontics and Material Sciences, University of Zurich, Switzerland.

Leadership of Prophylaxe Zentrum Zürich (School for Dental Hygiene) and private practitioner, Zahnmedizin Zürich Nord, Switzerland.

She received her dental education and Dr. med. dent. degree from the Faculty of Medicine, University of Tübingen, Germany in 1999/2004.

Since 2014, Dr. Zembic is a Swiss Specialist for Reconstructive Dentistry and since 2016, she was accredited Prosthodontic Specialist from the European Prosthodontic Association (EPA). In 2016 Dr. Zembic received an Assistant Professorship (PD) at the Clinic for Fixed and Removable Prosthodontics and Dental Material Sciences in Zurich.

Today, she works part-time both in a dental clinic involving an accredited school for dental hygienists and in the Clinic for Prosthodontics at the University of Zurich.

## Oral Presentations

Saturday, October 14  
8:50-9:15

### Ceramic Implant Abutments - Esthetic Benefit or Clinical Risk?

**Anja Zembic, Dr. Med. Dent, PHD**

#### Lecture Description

This lecture will present recent clinical data on zirconia abutments and give an overview of benefits and risks. In addition, recommendations for the clinician will be given when using zirconia abutments.

#### Objective

- The esthetic benefit of ceramic abutments over metal abutments has been well documented.
- The shortcoming of ceramic materials, however, is their brittleness. This might compromise the clinical outcome and result in fractures, especially in the long term.
- The high-strength ceramic zirconia is superior considering fracture toughness compared to all other dental ceramics and might be a promising material for implant abutments.

## **Oral Presentations**

Saturday, October 14  
9:20-9:50

### **Color Appearance in Dentistry and its Measurement**

**Stephen Westland, BSC, PHD**

#### Lecture Description

This talk will focus on the color appearance attributes of teeth (particularly whiteness and yellowness) and the relationship between physical properties and the visual attributes. Methods for color measurement will be described and assessment of whiteness will be discussed.

#### Objective

- To understand the perceptual attributes of whiteness and yellowness.
- To appreciate the CIE system of colorimetry and its application to the measurement of tooth color.
- To understand methods for assessment of tooth whiteness.



***Stephen Westland, BSC, PHD***

Stephen Westland is Professor of Color Science and Technology at the University of Leeds (UK). He has published work on the measurement of tooth color for application to tooth whitening and avulsion/replantation and is known for his research into computational methods for using digital cameras to measure color. He has published over 150 refereed papers, books and conference proceedings in the areas of color vision, color measurement and color imaging.



**Joe C. Ontiveros, DDS, MS**

Dr. Ontiveros received his D.D.S. degree from the University of Texas Health Science Center at San Antonio where he served as a Clinical Instructor in the Division of Esthetic Dentistry. He received his Master's in Oral Biomaterials from the University of Texas Graduate School of Biomedical Science at Houston. Dr. Ontiveros is past Scientific Editor for REALITY Publishing and past Director of Research for REALITY Research Lab. He is the author of numerous publications related to esthetic biomaterials and a contributor to text books, *Esthetic Color Training in Dentistry* and *Tooth Whitening Techniques*. Dr. Ontiveros is currently the John M. Powers, Ph.D., Endowed Professor in Oral Biomaterials and Head of Esthetic Dentistry at the University of Texas Health Science Center School of Dentistry at Houston, and Director of the Oral Biomaterials Division for the Houston Center for Biomaterials and Biomimetic.

## **Oral Presentations**

Saturday, October 14  
10:30-11:00

### **Tooth Whitening Efficacy: Monitoring and Interpreting**

**Joe C. Ontiveros, DDS, MS**

#### Lecture Description:

This presentation will focus on tooth whitening efficacy as it relates to color interpretation and shade change monitoring. Clinical trials will be reviewed and data interpreted in light of current research standards.

#### Objective

- To learn current methods used for interpretation and monitoring of bleach studies.
- To understand tooth whitening efficacy in terms of current findings.
- To apply color science for setting proper patient expectations for various bleaching methods.

## Oral Presentations

Saturday, October 14  
11.00-11:30

### eLABor\_aid® - Capture, Calibrate & Create!

**Sasha Hein, MDT**

#### Lecture Description:

Contemporary dental patients present with high expectations and demand seamless optical integration of restorative interventions. As a result, clinicians and technicians are required to develop methodologies that remain practical yet increase the accuracy and objectivity of shade analysis and estimation. This short lecture will provide an introduction to the essentials of the eLABor\_aid® System and showcase a few clinical cases utilizing a variety of material combinations.

#### Objective

Which DSLR set-up do I need?

- How to acquire Images?
- What is the digital work flow?
- How to evaluate target color?
- How to formulate a target shade recipe?
- What is the digital try-in and what can I do with it?
- How to finalise the restoration and control the accuracy of the result?.



*Sasha Hein, MDT*

Sascha Hein commenced his training in dental technology in Germany where he graduated in 1997. He subsequently worked in a number of dental laboratories in Europe and the United Arab Emirates. In 2001 he completed further studies in dental ceramics under Masahiro Kuwata in Tokyo, Japan. In 2004/05 he attended Master School in Freiburg, Germany. In 2007 Sascha Hein was inducted into the international Oral Design group by founder Willi Geller. Since 2011 he serves as editorial board member of the German Quintessence of Dental Technology. In 2012 he was inducted into the Bio-Emulation group where he currently serves as president together with Dr Javier Tapia Guadix. He lectures internationally and has authored numerous publications. After spending ten years in Perth Western Australia, in 2013 Sascha Hein returned to southern Germany where he now lives and works."



**Peter Pizzi, CDT, MDT**

As an educator of dental technology and operatory procedures Peter has found an easy transition into the lecture/clinician circuit. His personal appreciation and expertise on all phases of crown and bridge, porcelain, Implantology, muscle function, mandibular physiology, Ceramics and photography have made him a source of knowledge and motivation for his peers to draw from. Peter currently lectures nationally and internationally to both technicians and dentists for the communication process and a predictable outcome of success for the patient.

A member of the American Academy of Esthetic Dentistry.

Graduate, Recognized specialist and Mentor of The Kois Center for Dental Excellence.

Board member of ASMDT (Association of Master Dental Technicians)

Teacher and educator in Master Dental technician program (New York University)

Technical Fellow of the NGS (Northeastern Gnathological Society)

Faculty, NYU school of dentistry International Esthetics Program

Executive Board Member of the NGS

Co Editor and Chief of IDT, [Inside Dental Technology]

Editorial Board Of Spectrum Dialog International magazine

Peter has lectured to doctors and technicians throughout the United States, Europe and Asia on several different topics. He also continually studies with some of the world's top speakers and clinicians.

## Oral Presentations

Saturday, October 14  
11:20-12:00

### Nature, Light and Design for Ceramic Communication

**Peter Pizzi, CDT, MDT**

#### Lecture Description

Our educated patients and the advancement of materials have created a need for us to didactically move through the esthetic process. With Nature as our guideline and a rational methodology we can help to help eliminate the frustrations often encountered during the artistic process. Communication, Material Options, the importance of photography as an aid for ceramic builds and color communication can be incorporated into a routine regimen that will enable the dentist and technician to achieve a high level of predictability. The ability to understand each materials optical and functional parameter will be a key to future success.

#### Objective

- Case management.
- Diagnostic communication.
- Preparation guided Ceramic layering and contours.
- The use on new technologies.
- The importance of photographic communication and perception.
- Material choices for proper case management.

## Oral Presentations

Saturday, October 14  
1:00-1:45

### Paradigm Shift in Implant Dentistry: the Importance of Soft Tissue Grafting

**Inaki Gamborena, DMD, MSD**

#### Lecture Description

This lecture will focus on the difference on protocols when it comes to surgical and prosthetic criteria to treat anterior implants using as a volume maintainer only soft tissue grafting procedures.

#### Objective

Course attendees will learn

- The goal to create a harmonious “esthetic” outcome around dental implants that mimics the surrounding dentition and soft-tissue condition as well as morphology is indeed difficult to create and maintain long term.
- The subepithelial connective tissue graft (CTG) is a favored option to treat and prevent gingival and peri-implant soft-tissue recessions. It is usually placed in combination with a coronally advanced flap or with an envelope flap or pouch.
- Techniques and tools will be discussed in order to reach the best consistent results around anterior implant treatments.



*Inaki Gamborena, DMD, MSD*

Dr. Inaki Gamborena graduated in from the University Odontológica Dominicana, UOD 1989.

Certificate in Occlusion and Temporo-Mandibular Disorders at the Mexican Association of Occlusal Reconstruction in México City, 1989-90.

Certificate in Restorative Dentistry at the Autonomia of Nuevo León University in Monterrey, México, 1990-92.

Certificate in Prosthodontics & Master of Science in Dentistry. University of Washington-Seattle (USA), 1993-96 was awarded with the Bolender Contest Award for clinical and academic excellence.

Certificate in Oral & Craniofacial Implant Fellowship Program. University of Texas, Houston (USA), 1996-97.

Editor in Chief of Quintessence Técnica Journal (Spanish version).

Active Member of the European Academy of Esthetics Dentistry, since 2002.

Member of the American Academy of Restorative Dentistry, since 2011.

Founder member of “the Ponti Group”, Chicago 2012.

Author of the book “EVOLUTION : Contemporary Protocols for Anterior Single Tooth Implants”.

Gamborena/ M. B. Blatz by Quintessence Publishing Co Inc, 2014.

Inventor of the “slim temporary abutment concept: maximizing space for soft tissue growth” Nobelbiocare

November 2014. Maintains private practice in San Sebastian, Spain, dedicated to Aesthetics, Restorative Dentistry and Implants

## Oral Presentations

Saturday, October 14  
1:50-2:50

### Cubic Zirconia: Esthetic Potential, Physical Properties, and Effect of Firing Conditions on Translucency

**Edward A. McLaren, DDS, MDC & Nathaniel Lawson, DMD, PHD**



*Edward A. McLaren,  
DDS, MDC*



*Nathaniel Lawson,  
DMD, PHD*

Dr. McLaren is a Prosthodontist, Professor of clinical dentistry, and director of Post Graduate Esthetic Dentistry at the UCLA school of Dentistry. He is the director of the UCLA Center for Esthetic Dentistry, a full time didactic and clinical program for graduate dentists. He is also the founder and director of the UCLA/LACC Master Dental Ceramist program. The post graduate program is a full time master ceramist program for dental technicians featuring extensive experience with the newest esthetic restorative systems. Dr. McLaren maintains a private practice limited to prosthodontics and esthetic dentistry in which he does all of his own ceramics.

He is actively involved in many areas of prosthodontic and materials research and has authored or co-authored over 80 articles. He is performing ongoing clinical research on various restorative systems. He has presented numerous lectures, hands-on clinics and postgraduate courses on ceramics and esthetics across the nation and internationally. He recently published a book, on his ceramic techniques and features dental photographic art, entitled "The Art of Passion: Ceramics, Teeth, Faces, and Places."

Nathaniel Lawson received his DMD and PhD in Biomedical Engineering from UAB. He currently serves as the Program Director for a Master's in Biomaterials graduate program and the Director of the Division of Biomaterials at the UAB School of Dentistry. His research interest include both the clinical evaluation of dental materials in the UAB Research Clinic and the mechanical testing of materials in the laboratory.

#### Lecture Description

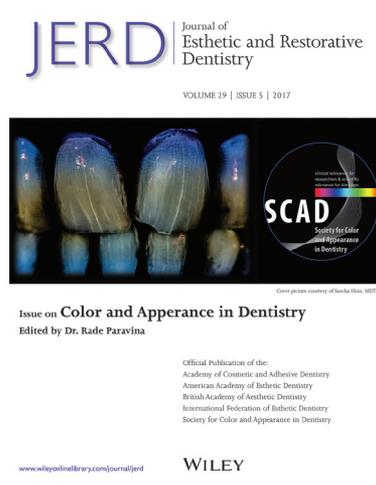
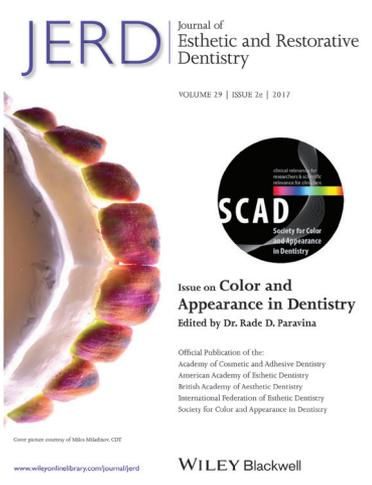
Zirconia is one of the fastest growing materials in dentistry. Original versions of Zirconia developed for dentistry are very opaqueish and were designed to be layered with porcelain to improve esthetics. Problems arose where frequently porcelain would chip or delaminate causing replacement. Second generation Zirconia which was "slightly" more translucent allowed for minimally acceptable esthetic molar use as a monolithic restoration. Recently, versions of Zirconia have been released that are much more translucent than the original Zirconia, with claims of esthetic potential to be use in mono-lithic form for incisors, and are also claimed to be as translucent as the translucent forms of well accepted lithium disilicates. This new zirconia material has an altered structure and increased amount of "dopant" that increases the amount of the cubic form of crystal.

#### Objective

- Explore some of the available products of this newer translucent Zirconia.
- Compare it to older versions of zirconia, compare physical properties of different zirconias.
- Discuss potential long term clinical situations related to physical properties, compare translucency differences from old and new materials, and demonstrate the very significant effect on final esthetics based on firing conditions.

## *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: 2E (electronic version only) and 5 (printed and electronic issue).



The support of Harald Heymann, the Editor-in-Chief of the Journal of the Esthetic and Restorative Dentistry, was invaluable in compiling this issue. The same is true for Tom Pierson of Wiley Publishing and the publishing team.

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. 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 [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1708-8240](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1708-8240) 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

### **Aging Effect on Hydrolytic-resistance, Flexure-strength and Translucency of some CAD/CAM-Blocks**

**M. Adel, R.M. Abdel Raouf, A.N. El-Din Habib**

Department of Biomaterials, Faculty of Oral and Dental Medicine, Cairo University, Egypt

**Objectives:** Investigate aging effect of three ceramic CAD/CAM block materials: lithium disilicate (LD), translucent zirconia (TZ) and zirconia reinforced lithium silicate (ZLD) on their hydrolytic resistance, microstructure, flexure strength and translucency.

**Methods:** Fourteen disc shaped specimens were prepared from each material (12mm diameter and 1.2 mm thickness). Seven specimens per material were subjected to accelerated aging according to ISO standard:6872 which specifies boiling in 4% acetic acid at 80°C for 16 hours. While the other seven were considered as control. Weight loss was measured by weighing specimens before and after aging. Crystalline structure was investigated before and after aging by x-ray diffraction (XRD) while microstructure by scanning electron microscope (SEM). All specimens were subjected to translucency parameter testing using spectrophotometry then biaxial flexure strength testing. Statistical analysis performed with IBM®SPSS®Statistics, Windows Version20.

**Results:** No significant percentage loss of weight after aging of the three materials. LD had the highest translucency followed by ZLD and TZ was the least, in addition, LD translucency decreased by aging while translucency of the others was not affected. TZ had the highest flexure strength while there was no difference between the others. Flexure strength of the three materials was not affected by aging and XRD graphs showed no change after aging of the three materials.

**Conclusions:** Aging did not affect the hydrolytic resistance of the three materials. The translucency of LD which contains more glassy phase was decreased by aging. Aging did not affect the flexure strength and there was neither phase transformation nor change in the crystalline structure.

**Abstracts • Poster Presentations**

Abstract #2

**Intra-instrumental Reproducibility of Color Analysis in Dental Research****A. Alnahdi, Y. Fan, R. Giordano**

Department of Restorative Sciences &amp; Biomaterials

Henry M. Goldman School of Dental Medicine, Boston University, USA

**Objective:** Evaluate CIE L\*a\*b\* color value reproducibility of 3 different instruments.**Materials and Methods:** Four different shade blocks of Vita Mark II: 1M1, 1M2, 2M3 and 4M2 in 1.5mm thickness over neutral gray background were used for color measurement. CIELAB: L\*a\*b\* values were measured by Xrite i5 spectrophotometer, EasyShade advance 4.0, and Adobe Photoshop software. Five consecutive readings were recorded from both Spectrophotometer and Easysshade Advance 4.0 for each shade twice in two different days. Five pictures of specimens illuminated under light source D65 in X-rite Macbeth Judge II were taken by Canon EOS 550D with EF100mm Macro lens. Five random points in the middle of each sample from each picture were analyzed by Adobe Photoshop and color values recorded. Color deviation to average ( $\Delta E$ ) were calculated for each sample then each shade values grouped and average recorded to compare among the measurement methods. L\*a\*b\* values from each method were used to generate colors and evaluate if the produced color is similar or close to tooth colors or shade.**Results:** For each method, color difference  $\Delta E$  calculated for each shade color values to the mean values of the same method. Root Mean Square deviation (RMS) calculated for each method to show the repeatability of color measurement as presented in Table 1.

Table 1: Repeatability of Color Measurement

RMS		1M1	1M2	2M3	4M2
Xrite i5 spectrophotometer	1 <sup>ST</sup>	0.0176	0.0162	0.0155	0.0210
	2 <sup>ND</sup>	0.0152	0.0151	0.0157	0.0110
Easyshade Advance 4.0	1 <sup>ST</sup>	0.1356	0.0632	0.0894	0.0980
	2 <sup>ND</sup>	0.0683	0.0632	0.0632	0.0849
Adobe Photoshop		0.5741	0.6119	0.6499	0.4630

Color generation using CIE L\*a\*b\* values from the spectrophotometer were in the gray scale and different from the tooth color range compared to values retrieved from EasyShade Advance 4.0 and Adobe Photoshop.

**Conclusion:**

- X-rite i5 Spectrophotometer has higher repeatability in color values analysis followed by EasyShade Advance 4.0 compared to Adobe Photoshop.
- There is a significant difference in color generation between values from X-rite i5 Spectrophotometer, Vita EasyShade Advance 4.0 and Adobe Photoshop of the same shade.

## Abstracts • Poster Presentations

Abstract #3

### The Influence of Illumination on CIE L\*a\*b\* Color Coordinates of Different Shade Matching Devices

J-P. Brüggemann, C. Igiel, M. Bayadse, K-M. Lehmann, H. Scheller

Department of Prosthetic, Jan-Philipp Brüggemann, University of Mainz, Mainz, Germany

**Objectives:** The use of different dental color measurement devices can lead to different results. The measuring results are influenced of measurement geometry, sensor technology, data transmission and ambient lighting. This in vitro study compares four commercial dental color measurement devices and a spectrophotometric reference system as well as the influence of different ambient illumination on the CIE L\*a\*b\* color coordinates.

**Methods:** The measurement series was carried out on 26 ceramic specimens (Vita VM13 dentin ceramics) positioned in the Macbeth Judge2 viewing box. The devices Olympus Crystaleye (CE), Degudent Shadepilot (SP), Vita Easyshade Advance (ESA), Vita Easyshade V (ESV) and the Thermo Scientific spectrophotometer (SF) were calibrated according to the manufacturer. It was distinguished between two different neon lights CWF and U30/TL84, daylight (DAY), light bulb (A), UV tube (UV) and a glaring light. For the evaluation, the mean value from the three repeated measurements per exposure type was determined and compared with the mean value determined in daylight. The resulting color differences ( $\Delta E$ ) were analyzed with respect to their statistical significance with the one-way ANOVA.

**Results:** The measured values for SP, ESA and ESV are below the threshold value for a clinically acceptable color difference of  $\Delta E=3.7$ . The CE shows significant differences ( $p<0.05$ ) in comparison to the devices and a clinically unacceptable color difference of  $\Delta E=12.46$  in glare light. Furthermore, significant differences ( $p<0.05$ ) were found for clinically acceptable color differences between ESA and CE, SP, ESV when used under U30/TL84, UV and A, as well as between SP and ESV when used under U30/TL84 and CW.

**Conclusion:** The results of this study are, that the used measurement devices show comparable  $\Delta E$  values under different illuminations, with the exception of the Crystaleye under glare.

**Abstracts • Poster Presentations**

Abstract #4

**Bond Strength to Translucent Zirconia after Thermocycling****L. Chen, J. Yang, B.I. Suh**

Department of Research and Development, Bisco Inc, Schaumburg, USA

**Objectives:** Recently, a new type of zirconia - translucent zirconia, has been used in dental restorations. Translucent zirconia has a slightly different chemical composition, and higher translucency but lower physical strength than traditional zirconia. Many studies have been done on the bonding of traditional zirconia. However, the bonding to translucent zirconia has not been well investigated. The purpose of this study is to test the bond strength to translucent zirconia before and after thermocycling.

**Methods:** Dental zirconia ceramics were manufactured and sintered by Aidite High-Technical Ceramics Co. Ltd. (Qinhuang Dao, China). Traditional zirconia ceramics (Rongyao, white, opaque), and translucent zirconia (ATW, white, translucent) were included in this study. Zirconia ceramic discs were sandblasted with alumina sand (50 micron), rinsed with water, and dried. Then the ceramics were treated with one coat of MDP-containing zirconia primer Z-Prime Plus (Bisco), and air dried. Shear bond strength was tested using Notched-edge shear bond strength test method (ISO 29022:2013). A resin cement material, Duolink (Bisco), was used to fabricate the posts (2mm-high), and light cured (40sec/500mW/cm<sup>2</sup>). The specimens were then stored in water at 37°C/24hours or thermally cycled (5 and 55 degrees C; dwell time 30 seconds; 12,750 cycles). The specimens were then tested by Instron tester (crosshead-speed 1mm/min) until failure. Data were converted from kG to MPa (n=12).

**Results:** Mean (standard deviation) shear bond strengths on zirconia ceramics in MPa. Means with different letters are statistically different (p<0.05, n=12).

Zirconia	Traditional	Translucent
Initial (37°C for 24 hours)	30.2(4.2)a	22.0(2.0)b
Aging (Thermocycle 12,750x)	23.7(4.7)b	24.5(4.2)b

**Conclusions:** Within the limit of this study, it could be concluded that high and stable bond strengths can be achieved between resin cements and both translucent and traditional zirconia ceramics, after thermocycling aging, as long as the zirconia ceramics were air-abraded with alumina sand followed by the treatment of Z-Prime Plus.

## Abstracts • Poster Presentations

Abstract #5

### Systematic Evaluation of Fluorescence in CAD/CAM Ceramic Materials

S. Florencio<sup>1,2</sup>, M. Maeno<sup>2</sup>, J. Jiao<sup>2</sup>, J. Da Silva<sup>2</sup>, S. Nagai<sup>2</sup>

<sup>1</sup> University of Missouri, Kansas City, Missouri, USA

<sup>2</sup> Harvard School of Dental Medicine, Boston, Massachusetts, USA

**Objectives:** While measurements of color and translucency have been well established in dentistry, fluorescence measurements have been mostly subjective. By utilizing a microplate reader to quantify fluorescence intensity of restorative materials and natural teeth, this study can provide a method for future research in fluorescence of dental materials. The purpose of this study was to establish a clinical guideline for material selection to achieve optimal esthetic results when utilizing Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) ceramic materials for a dental prosthesis.

**Methods:** The intensity of fluorescence in extracted natural teeth, dentin, core materials, luting cements, and CAD/CAM ceramic materials, was initially measured. A second measurement of the fluorescence intensity was done with core materials and luting cements placed underneath the CAD/CAM ceramic materials as a layered compound. Finally, glaze was applied to the CAD/CAM ceramic materials and a third measurement of fluorescence intensity obtained.

Simple descriptive statistics, mean, and standard deviations were used to describe the fluorescence intensity of extracted natural teeth, dentin substructure, core build-up materials, luting cements, and different CAD/CAM ceramic restorative materials. One-way ANOVA ( $\alpha = 0.05$ ) was used to test if there was a statistically significant difference between the fluorescence intensity of natural teeth and CAD/CAM ceramic materials, also comparing glazed materials and layered compounds.

**Results:** There was a significant difference in the fluorescence intensity of extracted natural-teeth when compared to dentin, core materials, luting cements, and CAD/CAM ceramic materials. The fluorescence intensity of dentin was higher than natural teeth. Only e.max BL1 (LT and HT) had similar fluorescence intensity to natural teeth. Fluorescence of ENAMIC was similar to dentin, and Katana zirconia had no fluorescence.

**Conclusions:** Fluorescent dyes and glazes improved the fluorescence intensity of CAD/CAM ceramic materials. Fluorescent core materials and luting cements can also improve the fluorescence intensity of a complex restoration to help mimic natural teeth when used properly.

**Abstracts • Poster Presentations**

Abstract #6

**Vita Classical Shade Perception Differences between Categorical and Standard Observers****R. Ghinea<sup>1</sup>, A.M. Ionescu<sup>1</sup>, J.C. Cardona, L.J. Herrera<sup>2</sup>, M.M. Pérez<sup>1</sup>**<sup>1</sup> Department of Optics, University of Granada, Granada, Spain<sup>2</sup> Department of Computer Architecture and Computer Technology. ETSIIT, University of Granada, Granada, Spain

**Objectives:** Objectives: The main objective of this study was to determine theoretical Vita Classical shade perception differences among 10 categorical observers (observer functions that would represent color-normal populations) and the CIE 2° Standard Colorimetric Observer.

**Methods:** Spectral Reflectance of VITA Classical Shade tabs was measured using a Spectroradiometer (SpectraScan PR-670) using a bi-directional 45°/0° illuminating/measuring geometry. CIEL\*a\*b\* color coordinates of all samples were calculated using the CIE D65 Standard illuminant and the CIE 1931 2° Standard Observer as well as other 10 recently proposed Categorical Observers (observer functions that would represent color-normal populations). CIELAB color differences ( $\Delta E^*_{ab}$ ) were calculated between CIE L\*a\*b\* values obtained for each of the shade tabs with the Standard Observer and each of the ten categorical observers. For clinical relevance, these differences were compared with 50:50% Perceptibility (PT) and Acceptability (AT) thresholds for dentistry (50:50% PT = 1.2 units; 50:50% AT = 2.7 units).

**Results:** It was recently proposed that, instead of the CIE Standard Colorimetric Observer, ten specific Categorical Observers are good for general use and convenience to represent color normal populations. In Table are presented the mean values of CIELAB differences ( $\Delta E^*_{ab}$ ) between the Standard Observer and all of the ten Categorical Observers when evaluating VITA Classical tabs. Color differences equal or higher than the 50:50 PT but smaller than the 50:50% AT for all shades were found. Higher differences were registered for the B group. The overall mean  $\Delta E^*_{ab}$  was 1.30 units.

Shade	A1	A2	A3	A3.5	A4	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
Mean	1,31	1,25	1,32	1,35	1,24	1,33	1,41	1,41	1,38	1,25	1,27	1,25	1,20	1,23	1,21	1,43
$\Delta E^*_{ab}$																

Overall mean  $\Delta E^*_{ab}$ : 1.30; CIELAB 50:50% PT:  $\Delta E^*_{ab} = 1.2$ ; CIELAB 50:50% AT:  $\Delta E^*_{ab} = 2.7$

**Conclusions:** CIELAB mean color differences higher than the PT threshold were found between the 10 Categorical Observers and the Standard Colorimetric Observer for all shades of the VITA Classical guide. These results suggest that the use of several colorimetric observers when assessing color differences in dentistry are more likely to provide increased clinical success to highly aesthetic restorations.

## Abstracts • Poster Presentations

Abstract #7

### Color Stability of Resin Cements upon Accelerated Artificial Aging

**M. Gonzalez, N. Pereira Sanchez, N. Mistry, J.M. Powers, R.D. Paravina**

Department of Restorative Dentistry and Prosthodontics  
University of Texas School of Dentistry at Houston, Houston, TX

**Purpose:** To compare aging-dependent changes in color of resin cements.

**Materials and Methods:** Light cured (L) and dual cured (D) resin cements: Variolink Esthetic (V-L/V-D, Ivoclar Vivadent); RelyX Veneer and RelyX Ultimate (R-L/R-D, 3M); Nexus 3 (N-L/N-D, Kerr); and Calibra Base and Calibra Automix (C-L/C-D, Dentsply Sirona), were tested. Disc-shaped specimens (10 mm-diameter and 2 mm-thick) were polymerized and polished for 40 seconds. Color was measured at baseline (T0) and after exposure to accelerated aging of 150 kJ/m<sup>2</sup> (T1) and 300 kJ/m<sup>2</sup> (T2), using a spectrophotometer. The data were analyzed by analysis of variance and Fisher's PLSD intervals were determined ( $\alpha=0.05$ ). Color differences were compared with the 50:50% acceptability threshold (AT) of  $\Delta E^*=2.7$ .

**Results:** Means (sd) of differences in color coordinates ( $L^*a^*b^*$ ) and color differences ( $\Delta E^*$ ) between baseline and aging of 150 kJ/m<sup>2</sup>, and between baseline and aging of 300 kJ/m<sup>2</sup>, are presented in the Table.

Product	$\Delta L^*T0-T1$	$\Delta L^*T0-T2$	$\Delta a^*T0-T1$	$\Delta a^*T0-T2$	$\Delta b^*T0-T1$	$\Delta b^*T0-T2$	$\Delta E^*T0-T1$	$\Delta E^*T0-T2$
V-L	0.2(0.1)	0.0(0.1)	-1.2(0.1)	-1.3(0.1)	0.9(0.3)	1.0(0.2)	1.5(0.3)	1.7(0.2)
V-D	-0.4(0.5)	-0.7(0.6)	-0.1(0.2)	-0.3(0.2)	-1.6(0.5)	-0.2(0.5)	1.8(0.4)	2.3(0.4)
R-L	0.6(0.2)	0.6(0.1)	-1.0(0.1)	-1.0(0.1)	-0.3(1.0)	-1.0(0.5)	1.5(0.4)	1.6(0.3)
R-D	-0.7(0.9)	0.0(0.8)	0.5(0.3)	0.4(0.2)	-0.9(0.3)	-4.5(1.2)	1.4(0.3)	4.6(1.1)
N-L	-0.1(0.6)	-0.6(0.7)	0.1(0.6)	0.7(0.1)	3.2(1.0)	2.1(1.0)	3.4(1.0)	2.5(0.9)
N-D	0.4(0.6)	0.0(0.5)	0.7(0.1)	0.8(0.1)	-0.9(0.8)	-0.5(0.2)	1.4(0.6)	1.1(0.1)
C-L	-0.2(0.4)	0.1(0.4)	-0.1(0.1)	0.1(0.1)	-0.5(0.3)	-1.3(0.4)	0.7(0.2)	1.4(0.4)
C-D	3.0(0.3)	2.8(0.2)	0.0(0.1)	0.4(0.1)	-1.5(0.4)	-2.4(0.1)	3.4(0.3)	3.7(0.2)

Fisher's PLSD intervals for comparisons between two aging cycles were  $\Delta L^*=0.2$ ,  $\Delta a^*=0.1$ ,  $\Delta b^*=0.3$ , and  $\Delta E^*=0.2$ . Corresponding Fisher's PLSD intervals for comparisons between products were 0.5, 0.2, 0.6, and 0.5, respectively. All differences except comparison between aging cycles for  $\Delta L^*$ , were significant ( $p<0.05$ ). Five materials exhibited aging-dependent color difference below AT at both 150 and 300 kJ/m<sup>2</sup>: V-L, V-D, R-L, N-D, and C-L. The same is true for R-D at 150 kJ/m<sup>2</sup> and N-L at 300 kJ/m<sup>2</sup>:

**Conclusions:** Color changes of resin cements were aging cycle and material dependent.

**Abstracts • Poster Presentations**

Abstract #8

**Comparison of the Optical Properties of Pre-colored Dental Monolithic Zirconia Ceramics Sintered in a Conventional Furnace versus a Microwave Oven****H-K. Kim<sup>1</sup>, S-H. Kim<sup>2</sup>, S.-Ryong Ha<sup>3</sup>**<sup>1</sup> Department of Dentistry, Ajou University School of Medicine, Suwon, Republic of Korea<sup>2</sup> Department of Prosthodontics and Dental Research Institute, School of Dentistry, Seoul National University, Seoul, Republic of Korea<sup>3</sup> Department of Prosthodontics, Dankook University College of Dentistry Jukjeon Dental Hospital, Yongin, Republic of Korea

**Objectives:** The purpose of this study was to compare the optical properties of pre-colored dental monolithic zirconia ceramics of various thicknesses sintered in a microwave and a conventional furnace.

**Methods:** A2-shade of pre-colored monolithic zirconia ceramic specimens (22.0 mm x 22.0 mm) in 3 thickness groups of 0.5, 1.0, and 1.5 mm were divided into 2 subgroups according to the sintering methods (n=9): microwave and conventional sintering. Spectrophotometer was used to obtain CIELab color coordinates, and translucency parameters and CIEDE2000 color differences ( $\Delta E_{00}$ ) were measured. The relative amount of monoclinic phase ( $X_m$ ) was estimated with x-ray diffraction. The surface topography was analyzed by atomic force microscope and scanning electron microscope. Statistical analyses were conducted with two-way ANOVA ( $\alpha=.05$ ).

**Results:** There were small interaction effects on CIE  $L^*$ ,  $a^*$ , and TP between sintering method and thickness ( $p<.001$ ):  $L^*$  (partial eta squared  $\eta_p^2=.115$ ),  $a^*$  ( $\eta_p^2=.136$ ), and TP ( $\eta_p^2=.206$ ), although higher  $b^*$  values were noted for microwave sintering regardless of thickness. Color differences between two sintering methods ranged from 0.52 to 0.96  $\Delta E_{00}$  units. The  $X_m$  values ranged from 7.03% to 9.89% for conventional sintering, and from 7.31% to 9.17% for microwave sintering. The microwave-sintered specimen demonstrated a smoother surface and a more uniform grain structure compared to the conventionally-sintered specimen.

**Conclusions:** Microwave-sintered pre-colored dental monolithic zirconia ceramics can exhibit similar color perception and translucency to those by conventional sintering with reduced processing time.

## Abstracts • Poster Presentations

Abstract #9

### Assessment of Brittleness-Index of Translucent-zirconia, Zirconia-reinforced-lithium-silicate and Lithium-disilicate-glass Ceramic Blocks

**M.M. Mansour , R.M. Abdel Raouf, A.N. El-Din Habib**

Department of Biomaterials, Faculty of Oral and Dental Medicine, Cairo University, Egypt

**Objectives:** The aim of this study was to assess the brittleness index of: zirconia reinforced lithium silicate ceramic, translucent zirconia and lithium disilicate glass ceramic blocks, by measuring the fracture toughness and hardness.

**Methods:** A total of thirty-nine rectangular specimens were cut from three different CAD-CAM ceramic blocks (n=13/ceramic material): partially crystalline zirconia reinforced lithium silicate ceramic, pre-sintered translucent zirconia and partially crystalline lithium disilicate glass ceramic. Fracture toughness ( $K_{IC}$ ) and hardness (H) were measured and brittleness index (B) was then calculated according to the following equation  $B=H / K_{IC}$ .

**Results:** The lithium disilicate blocks showed the highest values for brittleness index ( $0.24 \mu\text{m}^{-1/2}$ ), followed by the zirconia reinforced lithium silicate blocks ( $0.22 \mu\text{m}^{-1/2}$ ), whereas the translucent zirconia showed the least value for brittleness index ( $0.05 \mu\text{m}^{-1/2}$ ).

**Conclusions:** The translucent zirconia revealed the lowest brittleness index, indicating that it might have superior machinability.

**Abstracts • Poster Presentations**

Abstract #10

**Aging-related Color Stability of Experimental Resin Composite****N. Pereira Sanchez, V. Bueso, J.M. Powers, R.D. Paravina**Department of Restorative Dentistry and Prosthodontics  
University of Texas School of Dentistry at Houston, Houston, TX**Objective:** To analyze aging-dependent color stability of experimental resin composite.**Materials and Methods:** Twenty disc-shaped specimens (10mm in diameter, 2mm thick, n=5) were fabricated from three dentin shades (A1, A2, B1), and one neutral enamel shade (EN) of UPI Experimental Composite 1 (Ultradent Products). Each specimen was polymerized per manufacturer's instruction through a 1 mm glass slide using a LED curing light (VALO, Ultradent Products). Specimens were polished using coarse, medium and fine polishing discs (Jiffy, Ultradent Products), 20 sec per disc (60 sec total). Color was recorded using a contact-type spectrophotometer (Color-Eye 7000, X-Rite) at baseline (T0) and after exposure to controlled irradiance of 150 kJ/m<sup>2</sup> and 300 kJ/m<sup>2</sup> (T1 and T2, respectively) in an accelerated aging chamber (SUNTEST XXL, Atlas Material Testing Technology). Means and standard deviations were determined. The data were analyzed by analysis of variance. Fisher's PLSD multiple comparison test was calculated at the 0.05 level of significance.**Results:** Means (s.d) of color differences ( $\Delta E^*$ ) between T0-T1, T0-T2 and T1-T2 are listed in table.

Shade	T0-T1	T0-T2	T1-T2
A1	3.9(0.2)	5.4(0.1)	1.5(0.2)
A2	3.1(0.2)	4.3(0.2)	1.3(0.3)
B1	4.7(0.2)	6.5(0.2)	1.8(0.1)
EN	4.7(0.2)	6.5(0.2)	1.8(0.3)

Color differences increased as follows: A2<A1<B1=EN. Fisher's PLSD intervals for comparisons of color differences among shades and aging cycles were 0.36 and 0.31, respectively ( $p<0.0001$ ). The only exception was between T1 and T2 comparison, where no significant difference was recorded. Fisher's PLSD intervals for comparisons of  $\Delta L^*$ ,  $\Delta a^*$ , and  $\Delta b^*$  between aging cycles were 0.31, 0.63 and 0.21, respectively ( $p<0.0001$ ). Corresponding values between shades were 0.36, 0.72 and 0.25, respectively ( $p<0.0001$ ).

**Conclusions:** Statistically significant color differences between baseline and two aging intervals were recorded. No significant change in color was recorded between T1 and T2 aging cycles. All shades became darker, redder and more chromatic upon aging.

## Abstracts • Poster Presentations

Abstract #11

### Fluorescence of Resin Composites

**N. Pereira Sanchez, A. Aleksic, M. Eldiwany, R.D. Paravina**

Department of Restorative Dentistry and Prosthodontics  
University of Texas School of Dentistry at Houston, Houston, TX

**Objectives:** To analyze fluorescence of resin composites. Null hypothesis: there was no difference fluorescence of resin composite dentin and enamel shades.

**Methods:** A total of 12 rectangular composite specimens (15×15 mm, 1 mm-thick) of A1, A2 and B1 dentin shades and EN enamel shade (n=3) of UPI Experimental Composite 1 (Ultradent Products, South Jordan, UT), were fabricated. Each specimen was polymerized per manufacturer's instruction through a 1 mm glass slide using a Valo Grand LED curing light (Ultradent Products). Lamp output was constantly monitored. After polymerization, each specimen was polished with a three step polishing system, coarse (green), medium (yellow) and fine (white) Jiffy composite polishing discs (Ultradent Products), 20 sec per disc (60 sec total), with mild hand pressure. Samples were kept in distilled water and stored at 37°C for 24h prior testing.

Maximum Excitation ( $Ex_{Max}$ , nm), Maximum Emission ( $Em_{Max}$ , nm) and Maximum Intensity ( $I_{Max}10^6$ , ct/s), was carried out using a steady state spectrofluorometer (QuantaMaster400, Horiba Scientific, Edison, NJ). The specimens were positioned in the holder allowing the excitation monochromatic beam to reach the center of the specimen. Angle ( $\alpha$ ) and length (l) were adjusted in order to record the highest intensity of fluorescence. A control sample was used to monitor the intensity of the light source at the beginning and end of measurement. Means and standard deviations were calculated.

**Results:** Means (sd) for  $I_{Max}10^6$ ,ct/s, area under the curve (A), and spectra shoulders are presented in the Table.

Shade	$I_{Max}10^6$ ,ct/s	Area	Shoulders
A1	1.92 (0.09)	2.71 (0.18)	415, 444
A2	1.91 (0.10)	2.76 (0.18)	415, 444
B1	1.95 (0.01)	2.58 (0.07)	415, 444
EN	1.13 (0.06)	1.45 (0.07)	

Excitation and emission spectra of dentin and enamel were different. Excitation spectra of dentin shades contain two peaks ( $Ex_{Max}$ ), at 328 nm and 383 nm, while the excitation spectrum of enamel shade had only one peak, at 383 nm. The excitation wavelength was 383 nm, while the emission maximum ( $Em_{Max}$ ), ranged from 466–472 nm. Emission spectra of dentin shades exhibited two shoulders, at 415 nm and 444 nm and do not differ significantly in shape based on total peak area ( $Em_{Max}$ ) and intensity ( $I_{Max}$ ). Enamel shade had no shoulders.

**Conclusions:** Fluorescence of resin composite dentin and enamel shades was different. This encompasses differences in shape (fluorescence) and intensity.

**Abstracts • Poster Presentations**

Abstract #12

**Whiteness Thresholds in Dentistry Based on Wid Index: Preliminary Results****M.M. Pérez<sup>1</sup>, D. Ducea<sup>2</sup>, L.J. Herrera<sup>3</sup>, F. Carrillo<sup>1,3</sup>, C. Gasparik<sup>2</sup>, R. Ghinea<sup>1</sup>**<sup>1</sup> Department of Optics., University of Granada, Granada, Spain<sup>2</sup> Department of Prosthodontics and Dental Materials, Iluliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania<sup>3</sup> Department of Computer Architecture and Computer Technology. ETSIT, University of Granada, Granada, Spain

**Objectives:** The main objective of this study was to determine the perceptibility and acceptability whiteness thresholds in dentistry using the new customized CIELAB –based whiteness index (WID) and a TSK Fuzzy Approximation.

**Methods:** A 20-observer panel (10-dentists and 10-no-dentist) performed independent observations of whiteness perceptibility and acceptability using 60 computer generated pairs of teeth with simulated gingiva displayed on a calibrated color monitor. Whiteness differences among the tooth pairs, calculated using the WID index ( $WID = 0.511L^* - 2.324a^* - 1.100b^*$ ), ranged from 0.22 to 6.02. TSK Fuzzy Approximation was used as fitting procedure. For threshold determination, from the resultant fitting curves, the 95% confidence intervals were estimated and the 50:50% thresholds were calculated (50% positive and 50% negative answers).

**Results:** In Table are presented the values of both whiteness perceptibility and acceptability thresholds, as calculated with the WID index. Acceptability threshold was higher than Perceptibility threshold for both groups of observers. Also, lower values for both thresholds were found for the panel that included dental specialists.

$\Delta WID$ values			
Acceptability	TSK Fuzzy Approximation		$r^2$ values
Dentist	2.15		0.57
No-dentist	2.90		0.45
Perceptibility	TSK Fuzzy Approximation		$r^2$ values
Dentist	0.44		0.47
No-dentist	0.61		0.46

**Conclusion:** The CIELAB –based whiteness index (WID) and the TSK Fuzzy Approximation have been proved to be a good approach for bleaching threshold calculation procedure in dentistry. The perceptibility and acceptability whiteness thresholds can be used to assess in office bleaching treatments, as well as to quantify effectiveness of different types of bleaching procedures.

**Acknowledgments:** The authors acknowledge funding support from research projects JA TEP-1136 from Junta de Andalucía and MAT2013-4396R from the Spanish Ministry of Economy and Competitiveness.

## Abstracts • Poster Presentations

Abstract #13

### Translucency Parameter and Color of CAD/CAM Resin Ceramics

D. Raghavan<sup>1</sup>, M. Cowen<sup>1</sup>, R.D. Paravina<sup>2</sup>, J.M. Powers<sup>1</sup>

<sup>1</sup> The Dental Advisor, Dental Consultants, Inc., Ann Arbor, MI, USA

<sup>2</sup> Department of Restorative Dentistry and Prosthodontics

University of Texas School of Dentistry at Houston, Houston, TX

**Objective:** To measure the translucency parameter (TP) and color ( $\Delta E^*$ ) at two thicknesses of several CAD/CAM resin ceramic products.

**Methods:** The following resin ceramics were tested: A2 Lava Ultimate HT (LU, 3M), A2 CERASMART HT (CS, GC America), 2M2 Enamic HT (EN, Vita North America), A2 Camouflage NOW HT (CN, Glidewell Laboratories), and A2 Shofu Block HC HT (SB, Shofu Dental Corp.). Specimens (n=5) were rectangular (14 mmx12 mm) with thicknesses of 1.0 and 1.5 mm $\pm$ 0.05 mm. Translucency parameter (TP, color difference the same specimen recorded against white and black backgrounds),  $\Delta TP$ , and color ( $\Delta E^*$ ) measurements were performed using a Color-Eye 7600 spectrophotometer (X-Rite).  $\Delta TP$  and  $\Delta E^*$  (white background) were the difference of those variables at 1.0 and 1.5 mm thickness. Means and standard deviations were determined. The data were analyzed by analysis of variance. Fisher's PLSD multiple comparison test was calculated at the 0.05 level of significance.

**Results:** Means (SD) of TP,  $\Delta TP$ ,  $\Delta E^*$  are listed in the Table. Fisher's PLSD intervals for TP (product), DTP (between different thicknesses) and  $\Delta E^*$  (between different thicknesses against white background) were 0.2, 0.1 and 0.4 respectively.

Resin Ceramic	TP (SD)	$\Delta TP$ (SD)	$\Delta E^*$ (SD)
LU1.0	19.0 (0.5)		
LU1.5	13.8 (0.3)	5.1 (0.6)	6.1 (0.5)
CS1.0	19.4 (0.3)		
CS1.5	14.0 (0.2)	5.4 (0.4)	5.2 (0.5)
EN1.0	17.2 (0.2)		
EN1.5	12.1 (0.3)	5.1 (0.3)	6.2 (0.2)
CN1.0	20.5 (0.2)		
CN1.5	15.0 (0.4)	5.5 (0.4)	5.5 (0.3)
SB1.0	18.9 (0.3)		
SB1.5	13.2 (0.1)	5.7 (0.3)	5.5 (0.3)

**Conclusion:** Specimens of the resin ceramic products were more translucent at 1.0 mm thickness (range 17.2 to 20.5) than at 1.5 mm thickness (range 12.1 to 15.0). Color change ( $\Delta E^*$ ) was affected by thickness and highly influenced by change in lightness when measured on a white background.

**Abstracts • Poster Presentations**

Abstract #14

**Bleaching Efficacy between VOCO Perfect Bleach 16%® and Perfect Bleach Office+®****M. Bayadse, M. Bayadse, C. Igiel, M. Weyhrauch, H. Scheller**

Department of Prosthodontics, University Medical Center of Johannes Gutenberg-University Mainz, 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 efficacy of two different external tooth-whitening agents of VOCO (VOCO GmbH, Cuxhaven, Germany).

**Methods:** After positive approval of IRB, 100 patients were randomly divided into two groups. The inclusion criterions were: no restorations, fillings, increased tooth sensitivity or internal/external tooth structure anomalies. After the initial professional tooth cleaning 50 patients were bleached in office und the second group of 50 patients were bleached at home. The in office bleaching was performed once for 15 minutes with Perfect Bleach Office+® 35% hydrogen peroxide. The at home bleaching group was bleached using Perfect Bleach 16%® for 7 days and 2 hours a day after individual instruction. The shade determination was performed 4 times with a spectrophotometric device (VITA esayshade advanced, VITA Zahnfabrik, Bad Säckingen, Germany); baseline ( $t_0$ ), after bleaching ( $t_1$ ), after two weeks ( $t_2$ ), after four weeks ( $t_3$ ). The color changes were recorded in VITA classic shade tabs information and cross tables were calculated before and after the bleaching procedure.

**Results:**

Upper jaw ront teeth in office bleaching

Afterwards	B1	A1	B2	C1	Total
Baseline					
B1	12	3			15
A1	18	65			83
B2		31	21	3	55
D2		3			3
A2			6		6
C1		5			5
A3			8		8
Total	30	107	35	3	175

**Conclusion:** The results of the investigated methods show continuous whitening of teeth during the observation period. Changes into a lighter shade group occurs more often using the at home bleaching agents compared to the in office method. 70% of at home bleached teeth became lighter, respectively 40% of in-office teeth. Within the limitations of the study it could be summed up that the duration and repetition is more crucial than the concentration.

## Abstracts • Poster Presentations

Abstract #15

### Parameters that Influence the Final Color of CAD-CAM Nanoceramic Veneers

**P. Ceolin Meneghetti , M. Tomazoni Peixoto, E. Gonçalves Mota, L.H. Burnett Junior, A.M. Spohr**

Department of Restorative Dentistry, PUCRS, Porto Alegre, Brazil

**Objective:** The objective of this study was to investigate, *in vitro*, the aspects that may influence the final color of CAD/CAM veneers by varying translucency and thickness and using different types of luting cements on a darkened substrate over the time.

**Methods:** Sixty upper right central incisors, C3 shade, produced in epoxy resin were used, and veneers were manufactured in A1 shade using CEREC SW 4.2 System. The veneers were divided into 12 groups (n=5) according to the degree of translucency (Lava Ultimate HT, high translucence; LT, low translucence), veneer thickness (0.3 mm / 0.6 mm / 1.0 mm), and luting cement (RelyX Ultimate and RelyX Veneer). After cementation, the colors of the samples were assessed using spectrophotometer (Easyshade Advanced 4.0) to obtain the color values ( $\Delta E$ ) at 6 different times up to 6 months.

**Results:** There were significant differences in the Generalized Estimating Equation (GEE) with post hoc Bonferroni test,  $p < .05$ . Differences were recorded for the  $\Delta E$  values when veneers were produced with 0.3 mm, luted with RelyX Ultimate in both translucencies (HT and LT, groups 1 and 4); and between HT (groups 7 and 9) and LT (groups 10 and 12) samples were produced with 0.3 and 1.0 mm luted with RelyX Veneer.

**Conclusions:** The results were not significant with respect to the masking of the darkened substrate over time ( $p > .05$ ). The variables that significantly influenced the final shade of nanoceramic CAD/CAM produced veneers were translucency ( $p = .001$ ), luting cement ( $p = .005$ ), and time ( $p = .001$ ).

# VITA Linearguide 3D-MASTER®

Precise shade determination and reproduction made easy



**#SIMPLE #SCIENTIFIC #SYSTEMATIC**

The VITA Linearguide 3D-MASTER enables the quick determination of precise tooth shades using scientific principles. Even difficult intermediate shades can be precisely determined in two simple steps.

- Easy-to-use, linear arrangement of 29 VITA 3D-MASTER shades including shades for tooth whitening
- Measure precise VITA shades in two simple steps
- Prescribe a full range of precisely matched VITA restorative materials

[vitanorthamerica.com](http://vitanorthamerica.com) | 800-828-3839

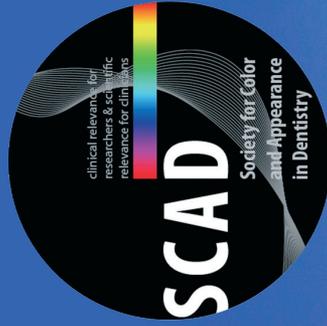
VITA - perfect match.

**VITA**

# SAVE THE DATE

## SCAD 2018, October 18-20

### Hotel Duke Newport Beach, CA



#### Contact info:

SCAD  
5233 Bellaire Blvd Ste B, #394  
Bellaire, TX 77401  
+1.281.687.8752 (Phone)  
+1.877.255.6075 (Fax)  
[www.scadent.org](http://www.scadent.org)  
[info@scadent.org](mailto:info@scadent.org)

#### Presenters:

Markus B. Blatz (USA) • August Bruguera (Spain) • Julian Conejo (USA) • Jon Gurrea (Spain) • Stephen J. Chu (USA)  
Petra Gness-Gierhühlen (Germany) • Linda Greenwell (UK) • Ernesto A. Lee (USA) • Brian LeSage (USA) • Jacinthe Paquette  
(USA) • Patrick Rutten (Belgium) • Christian Stappert (Switzerland) • Sulaiman Taiseer (USA) • Marcos Vargas (USA) • Bobby  
Williams (USA) • Aki Yoshida (USA) • *more to come*