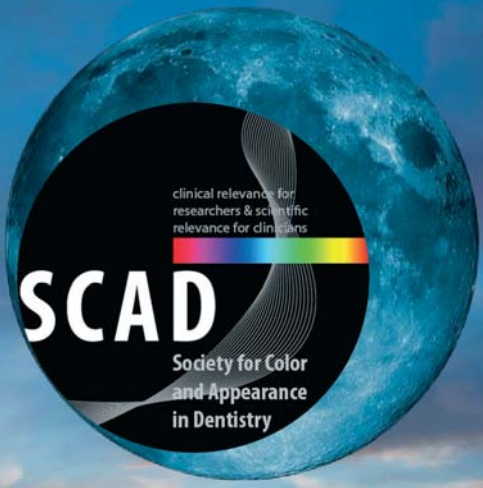
WHITE & PINK

Emulating Nature & Beyond



once in a blue moon…

4th Annual Conference of the Society for Color and Appearance in Dentistry (SCAD)

Chicago, Sep 28-29, 2012 • W City Center Hotel

www.scadent.org • info@scadent.org

White & Pink - Emulating Nature & Beyond

4th Annual Conference • W Chicago City Center Hotel, Sep 28-29, 2012

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Recommended Attire

Welcoming reception and educational sessions: Business casual
President's Dinner: Black tie optional

The formal continuing education programs of Vident are accepted by AGD and ADA CERP for Fellowship/Membership credit. The current term of acceptance extends from 7/1/2010 to 5/1/2013. This activity is designated for 16 continuing education credits.

ADA C·E·R·P® | Continuing Education Recognition Program

Academy of General Dentistry

The 4th Annual Conference of the Society for Color and Appearance in Dentistry (SCAD) will comply with appropriate disclosure policies as set forth by the American Dental Association's code of ethics and professional standards. The SCAD speakers will verbally disclose any material, financial or other relationships that pose a potential conflict of interest. Speakers will also disclose any unapproved use of products or devices that they will be discussing. Disclosure requirements are not intended to imply any impropriety, but rather to inform the audience that they exist.

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 4th Annual Conference at the W Chicago City Center Hotel on September 28-29, 2012. The meeting will feature high-quality, evidence-based information on color-related issues in dentistry presented by many of the leaders in this field.

Our poster session is an additional valuable source of evidence-based information. Please be sure to visit the poster area and interact with presenters.

This year we will have first recipients of newly established SCAD VITA Award for excellence in research related to color and appearance in esthetic dentistry. Stay tuned for the 2013 SCAD VITA Award application.

SCAD is the only IFED member that does not have a country, region, or continent associated with its name. To acknowledge our appreciation of the diversity of our members, the theme for President's dinner on Friday, September 28 is ***Ethnicities of the World***. We encourage you to wear or bring something that would symbolize country or region of your origin.

It is our pleasure to share with you the exciting news regarding the updated Dental Color Matcher, a free education and training program for esthetic dentistry, the increased impact factor of our journal, and the new ADA recommendation for predictable and credible monitoring of tooth whitening.

Welcome to Chicago.

Sincerely,

Stephen J. Chu DMD, MSD, CDT, MDT
President, Society for Color and Appearance in Dentistry

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SCAD Mission and Goals

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

- To serve as a uniting force in the profession by promoting and fostering greater awareness of color and appearance in dentistry;
- 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.

Boban Ilic, Chicago: Odyssey
www.masterpiecepublishing.com

SCAD Membership

The membership of this Corporation consists of dentists, researchers, and other persons whose qualifications and classifications are as established in the Bylaws.
The members of this Corporation are classified as follows:

Associate Member

Associate member shall be a person ineligible for any other type of membership in the Corporation.

Active Member

Active membership in the Corporation is a distinctive honor. It shall comprise persons invited by the Executive Committee or Associate Members nominated and endorsed by at least three (3) Active Members in good standing.

Fellows

A Fellowship may be bestowed on any Active Member by majority vote of the Board of Directors for such term as the Board of Directors may determine.

Corporate Members

Corporate memberships are available to organizations associated with color and appearance in dentistry, and which support the purposes of the Corporation.

For more details on SCAD membership classifications and requirements, please refer to our bylaws available online at http://www.scadent.org/about-scad/scad-bylaws

SCAD Governance

EXECUTIVE COMMITTEE

President (2010-2012): Stephen J. Chu
President-Elect (2011-2012): Edward J. Swift
Vice-President (2010-2012): William M. Johnston
Treasurer (2008-2012): John M. Powers
Secretary (2010-2012): Dan Nathanson

Board Members-at-Large
Shigemi Nagai (2010-2014)
Esam Tashkandi (2011-2015)
Joe Ontiveros (2011-2015)

Executive Director
Rade D. Paravina

REGIONAL COUNCILORS

Alvaro Della Bona (Latin America)
Alessandro Devigus (Europe)
Yumiko Hosoya (Asia - Pacific)
Gerard Kugel (North America)
Esam Tashkandi (Africa & Middle East)

E. BRUCE CLARK AWARD COMMITTEE

Stephen F. Bergen

FELLOWSHIP AND STUDENT AWARDS COMMITTEE

Franklin Garcia-Godoy

MEMBERSHIP COMMITTEE

Magda Eldiwany
Sudarat Kiat-amnuay

MARKETING AND WEB COMMITTEE

Joe Ontiveros

SCAD VITA Award - Funding Opportunities

The Society for Color and Appearance in Dentistry (SCAD) has established the VITA Award for Excellence in Research Related to Color and Appearance in Esthetic Dentistry (SCAD VITA Award) to acknowledge the successful professional collaboration with and the long-term support of VITA Zahnfabrik. The purpose of the SCAD VITA Award is to promote meaningful research related to color and appearance in esthetic dentistry.

Application Process: Applicants are required to submit an application and abstract following the instruction provided at the SCAD website (www.scadent.org). Applications will be judged by the members of the SCAD Executive Board based on perceived merit, feasibility, and relevance. The awardees will be notified in writing on the specified date. This schedule will allow approximately one month for the review and selection process to occur.

Award: Registration fees and three nights lodging for the Annual Meeting of the SCAD for presentation of the research results will be covered by SCAD. In addition, each recipient will receive a $1,000 stipend at the annual meeting.

Eligibility: Three categories of applicants are eligible for the awards: pre-doctoral students, graduate students, and non-tenured junior faculty (< 5 years) at the instructor or assistant professor levels. Only one award per category will be given annually, and only one award per recipient can be received (previous recipients not eligible).

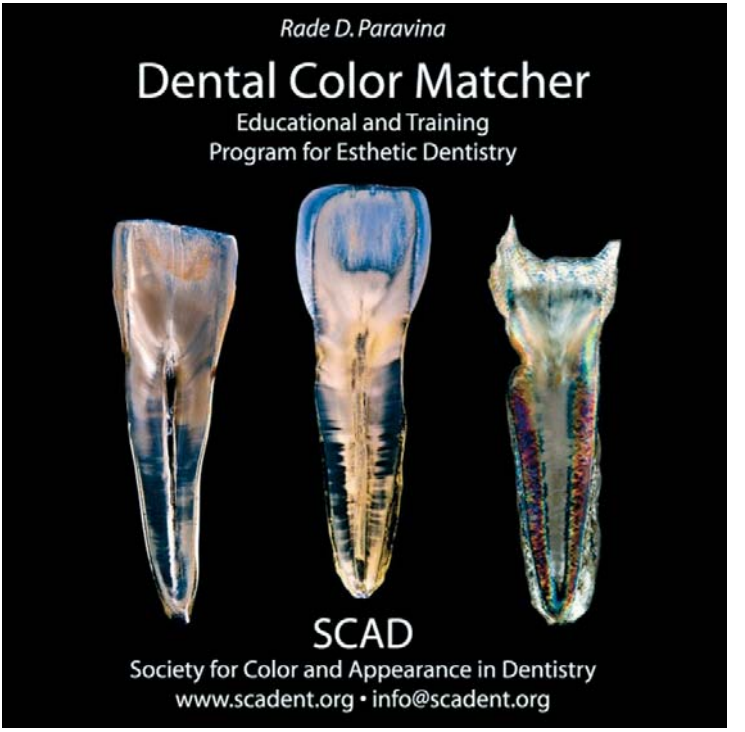
Scope of Research: The focus of the research must be within the scope of color and appearance esthetic dentistry. The Executive Board of the Society for Color and Appearance in Dentistry has the right and responsibility of verifying the appropriateness of the submitted abstracts.

Every effort will be made to avoid conflicts of interest. Members of the Executive Board will not be allowed to review or vote on applications submitted by faculty or students from their institution (employee or graduate thereof).

Dental Color Matcher - Free Color Training, 2 CE hours

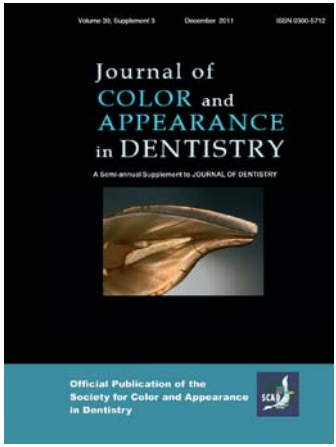
An updated Dental Color Matcher, an education and training program for esthetic dentistry, is now available online (www.scadent.org/dcm) and as a CD. This program is designed to help improving the appearance and overall esthetics of your clinical/lab work associated with color matching, communication and reproduction. Two Continuing Education hours are available to all users at no cost upon your request. Thanks to the support of Vita Zahnfabrik, the program is free for all users. The Society for Color and Appearance in Dentistry has generously provided sponsorship and Web hosting.

Dental Color Matcher already has thousands of users from over 100 countries. Please contact us at info@scadent.org for additional information or if you would like to use this program for undergraduate/postgraduate teaching or continuing education for dental professionals.



Journal of Color and Appearance in Dentistry – Impact Factor

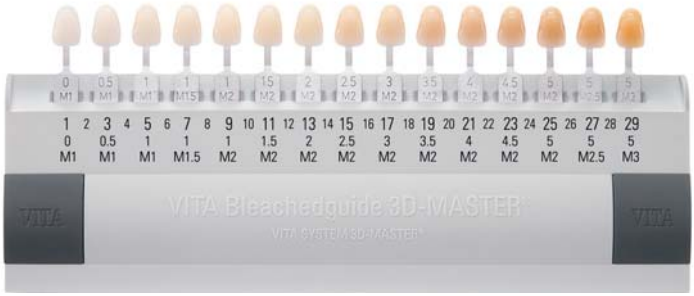
The Journal of Color and Appearance in Dentistry is a permanent semi-annual supplement to the Journal of Dentistry. According to the new listings, the impact factor of the Journal of Dentistry has increased from 2.12 to 2.95, while the ranking has increased from 18th out of 72 to 6th out of 81. We encourage you to submit your clinical and laboratory research where it counts!



New ADA Recommendation for Tooth Whitening Monitoring

The Council on Scientific Affairs of the American Dental Association decided to include VITA Bleachedguide 3D-Master instead of the Vita Classical shade guide as an example of an appropriate shade guide for the evaluation of whitening in the guidelines for Bleaching Products (both dentist dispensed and over the counter) and for Stain Removal Products as well.

Bleachedguide 3D-Master is the first shade guide designed specifically for tooth whitening monitoring. It has by far the widest color range (29 shade guide units – sgu) and the most consistent color distribution. Presence of very light shades enables the inclusion and monitoring of ALL bleaching patients, as opposing to selective inclusion of mainly darker teeth, which has been done in vast majority of cases using other shade guides.



Prototype of VITA Bleachedguide 3D-Master with additional numerical marking, photo courtesy of VITA Zahnfabrik

Program

Thu, Sep 27

5:00-6:00 pm SCAD Executive Board Meeting
7:00-10:00 pm Welcoming Cocktail

Fri, Sep 28

8:30-8:45	Opening Ceremony
8:45-9:10	Newton Fahl Jr.: *The Single Discolored Anterior Tooth – Color Matching Challenges with Composite Resins*
9:10-9:35	Jack L. Ferracane: *Light Interactions with Dental Composites: Only of Interest for Color?*
9:35-10:00	Brian LeSage: *CEREC: Challenges in an Esthetic Conscientious Society*
10:00-10:40	Q/A, Break, Poster Viewing
10:40-11:05	Dennis P. Tarnow: *Immediate vs. Delayed Socket Placement: What we Know, What we Think we Know and What we Don't Know*
11:05-11:30	Maurice A. Salama: *Bone and Tissue Interaction at the Implant-Abutment Junction and its Effect on Color*
11:30-11:45	Q/A
11:45-1:00	Lunch, Lunch & Learn
1:00-1:25	David A. Garber: *The Critical "Pink" Interface In Esthetic Dentistry: A Cross-Disciplinary Management of the Alternatives… Limitations… Solutions…*
1:25-1:50	Aris-Petros Tripodakis: *Are the Ceramic Abutments the Sole Way to Trans-Mucosal Implant Esthetics?*
1:50-2:15	John O. Burgess: *Ceramic Enamel Wear Opposing Ceramic Materials*
2:15-2:55	Q/A, Break, Poster Viewing
2:55-3:20	Cherilyn G. Sheets: *Quantitative Percussion Diagnostics – A New Form of Precision in Risk Assessment*
3:20-4:10	Shigemi Nagai & Stephen J. Chu: *Soft Tissue Esthetics - Optical Investigation of Gingival Color*
4:10-4:30	Q/A, mini-break
4:30-5:00	SCAD Open Meeting
7:00-10:00	President's Dinner. Theme: *Ethnicities of the World – Celebrating Diversity*

Sat, Sep 29

8:30-8:55 Stephen C. Bayne: *Clinical Evaluation of Color – What is the Horizon for Color Science in Dentistry?*

8:55-9:20 Michael Tholey: *Firing of Dental Ceramics and its Influence on Shade*

9:20-9:45 Kenneth A. Malament: *Integration of Esthetics Dentistry in Routine and Complex Prosthodontics*

9:45-10:15 Q/A, Break, Poster Viewing

10:15-10:40 Aki Yoshida: *Base Shade Selection and the Effect of Ceramic Modifiers in Achieving Superior Color Match*

10:40-11:05 Michael Bergler: *Digital Changes and Their Influence on the Dental Laboratory*

11:05-11:30 Claude Sieber: *Art & Experience®: Adapting the Optical Characteristics.*

11:30-11:45 Q/A

11:45-1:00 Lunch, Lunch & Learn

1:00-1:25 Linda Greenwall: *Advanced Tooth Whitening for Complex Discoloration*

1:25-1:50 Yiming Li: *Safety Issues of Tooth Bleaching – An Update*

1:50-2:15 Rade D. Paravina: *Whitening Monitoring: Pathways to Credible Results*

2:15-2:55 Q/A, Break, Poster Viewing

2:55-3:20 Didier Dietschi: *Free Hand Anterior Restorations*

3:20-3:45 Jane D. Brewer: *The Dark Side of All Ceramic Restorations*

3:45-4:25 Edward A. McLaren: Ceramic Wars: *The Return of the Ceramist Creating the Illusion of a Tooth in 3D.*

4:25-4:35 Q/A

4:35-4:45 Closing Remarks

Supplementary Lunch and Learn Sessions

Fri, Sep 28 12:00-1:00

Mark Baker: *Reliable Techniques for Improved Practical Shade Selection*

Sat, Sep 29 12:00-1:00

William M. Johnston: *Principles of Color Science for Appearance Matching*

Joe C. Ontiveros: *Power Bleaching*

John M. Powers: *CAD/CAM Ceramics – Selection, Priming and Cementation*

Esam Tashkandi: *The Psychological Aspects of the Observer and Dental Shade Matching*

Social Program

Thu, Sep 27: **Welcoming Cocktail**, 7:00-10:00 pm

Fri, Sep 28: **President's Dinner**, 7:00-10:00 pm
Ethnicities of the World

Explore Chicago

Walk Chicago Tours:
http://www.walkchicagotours.com/about/index.html

Navy Pier:
http://www.navypier.com/about/about_us.html

Chicago History Museum:
http://chicagohistory.org/

Chicago Museum of Science and Industry:
http://www.msichicago.org/

Broadway Theatre Chicago:
http://www.broadwayinchicago.com/

Lincoln Park Zoo:
http://www.lpzoo.org/

Emerald City Theatre:
http://www.emeraldcitytheatre.com/


ΑΓΔ
1904-2004
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1904-2004

Newton Fahl Jr., DDS, MS

Dr. Newton Fahl, Jr. received his DDS degree from Londrina State University, Brazil, in 1987. In 1989 he received the Certificate in Operative Dentistry and Master of Science degree from the University of Iowa, USA. Dr. Fahl maintains a private practice emphasizing esthetic and cosmetic dentistry in Curitiba, Brazil.

He is a member of the American Academy of Esthetic Dentistry, and founding member and past-president of the Brazilian Society of Aesthetic Dentistry. He is a MCG-Hinman Foundation fellow. He is the recipient of the American Academy of Esthetic Dentistry 2008 President´s Award for Best Teacher, and the recipient of the American Academy of Cosmetic Dentistry 2011 Excellence in Cosmetic Dental Education Award.

Dr. Fahl has published several articles on direct and indirect bonding techniques. He is on several editorial boards. He is an active consultant for several manufacturers in the development and refinement of new materials and techniques.

Since 1990, Dr. Fahl has dedicated himself to teaching esthetic restorative dentistry at a postgraduate level and has accumulated much experience in the art and science of teaching. Dr. Fahl is director of the FAHL CENTER in Curitiba, Brazil, where he conducts hands-on and courses on direct and indirect adhesive restorations.

Oral Presentations

Friday, September 28
8:45-9:10

The Single Discolored Anterior Tooth – Color Matching Challenges with Composite Resins

Newton Fahl Jr., DDS, MS

Matching the color of a single anterior tooth is a daunting task that requires proper diagnosis associated with correct materials and effective restorative techniques. Due to their excellent optical properties, composite resins can be used to successfully solve from minor to complex clinical situations, depending on correct case selection. The determination of a tooth color value baseline is fundamental in preparation design and the layering technique to be employed. This presentation will focus on how to diagnose and treat the single discolored tooth using state-of-the-art restorative systems and techniques for optimal clinical results.

Objectives:

- Diagnosing straight forward, borderline, and doomed-to-failure cases.
- Establishing the optical and color parameters needed for addressing the various types of clinical restorative challenges involving a single discolored anterior tooth
- Determining form and color interplay for achieving harmonious results.

Oral Presentations

Friday, September 28
9:10-9:35

Light Interactions with Dental Composites: Only of Interest for Color?

Jack L. Ferracane, PhD

New dental composites materials claim deeper depths of cure and enhanced optical characteristics as compared with previous formulations. The formulation of the material, specifically its monomer and filler composition, significantly controls light transport, affecting both its esthetic appearance and its degree of polymerization. Models of light transport and actual measurements of material properties have revealed the inefficiency of the curing process and highlight the complex nature of the interaction between light and structure for various types of dental composites. This presentation will explore these relationships.

Objectives:

- Identify compositional factors that affect light transport through dental composites
- Explain how degree of conversion and depth of cure in dental composites is affected by its composition and the characteristics of the curing light source.

Jack L. Ferracane, PhD

Dr. Ferracane received a B.S. in Biology from the University of Illinois, and an M.S. and Ph.D. in Biological Materials from Northwestern University. His current position is Professor and Chair of Restorative Dentistry, and Division Director of Biomaterials and Biomechanics at Oregon Health & Science University, Portland, Oregon. He is a founding fellow and past-President of the Academy of Dental Materials. He is a past-President of the Dental Materials Group of the International Association for Dental Research. He serves on the editorial board of 10 journals, and is Associate Editor of the Journal of Dental Research and Odontology. He has authored a textbook entitled "Materials in Dentistry - Principles and Applications." He has published and lectured extensively on dental materials, including dental composites, adhesives, amalgam, and practice-based dental research. His current research interests are in dental composites and the use of bioactive glasses in resin-based dental materials. His research is funded by the NIH/NIDCR as well as private industry. He has provided continuing education at annual meetings of the ADA, British Dental Association, California Dental Association, Chicago Midwinter, Midwest Dental Conference, Oregon Dental Conference, Pacific NW Dental Conference, Southwest Dental Conference, Yankee Dental Congress, and to other organizations.

Brian LeSage, DDS

Dr. Brian LeSage graduated magna cum laude with the Omicron Kappa Upsilon Honor Dental Society award from the University of Maryland, Baltimore College of Dental Surgery in 1983.

Dr. LeSage has actively integrated academic pursuits with a private practice, first in Washington D.C., and now for the last 21 years in Beverly Hills, California, emphasizing aesthetic and reconstructive dentistry.

His national, as well as international symposia lectures, offer the most current inroads in cosmetic dentistry. His presentations range from ½ day or 1 day lectures, as well as hands-on sessions and courses. Dr. LeSage teaches practical, attainable techniques in adhesive and cosmetic dentistry, to help clinicians raise their level of expertise and change their dental practice philosophy.

Dr. LeSage is one of 327 accredited cosmetic dentists in the worldwide American Academy of Cosmetic Dentistry (AACD). In 1995, he was appointed a Consultant and Examiner for the AACD accreditation process. He was awarded the status of Fellow in the AACD, in 2002, he is presently the Fellowship Chair for the academy. He was awarded the Excellence in Cosmetic Dental Education Award by the academy in 2009, and was inducted as a member of the American Academy of Esthetic Dentistry also in 2009.

Dr. LeSage is the founder and director of the University of California, Los Angeles, (UCLA) Aesthetic Continuum Levels I and II, This program teaches practicing dentists the art and science of cosmetic dentistry. He is also the director of The Beverly Hills Institute of Dental Esthetics. The institute offers small study clubs and mentoring.

Oral Presentations

Friday, September 28
9:35-10:00

CEREC: Challenges in an Esthetic Conscientious Society

Brian LeSage, DDS

CAD/CAM technology is here to stay. How and when will you integrate it into your esthetic practice? Routine, predictable posterior restorations will be shown but emphasis will be placed on creative and off-market usage of this technology. CEREC and it's appearance enhancement potential will be highlighted from a comprehensive, esthetic, private practitioners perspective.

Objectives:

- See preparation design for posterior all-ceramic restorations
- Alternative ways of using CEREC
- How esthetic are CEREC restorations and what are the challenges?

Oral Presentations

Friday, September 28
10:40-11:05

Immediate vs. Delayed Socket Placement: What We Know, What We Think We Know and What We Don't Know

Dennis P. Tarnow, DDS

Immediate placement of implants into extraction sockets is an exciting treatment alternative for our patients. However, there are many potential short and particularly long-term risks that the practitioner must be fully aware of. This presentation will focus on the potential problems and benefits both clinically and biologically when the choice of immediate socket placement is made for single and multiple sites.

Objectives:

- Identify what type of healing takes place against the implant in immediate socket placement
- Know how to minimize recession with immediate provisionalization
- Know the proper crown contour for immediate provisionals
- Know if the gap distance really matters
- Know if primary closure should be attempted or should it be left open?
- Know if membranes should be utilized?
- Know what type of graft material if any should be utilized?
- Identify what are the potential short and long term risks involved with immediate placement of implants?

Dennis P. Tarnow, DDS

Dr. Dennis P. Tarnow is currently Clinical Professor of Periodontology and Director of Implant Education at Columbia School of Dental Medicine. He is the former Professor and Chairman of the Department of Periodontology and Implant Dentistry at New York University College of Dentistry. Dr. Tarnow has a certificate in Periodontics and Prosthodontics and is a Diplomat of the American Board of Periodontology. He is a recipient of the Master Clinician Award from the American Academy of Periodontology and Teacher of the Year Award from New York University. Dr. Tarnow has a private practice in New York City, and has been honored with a wing named after him at New York University College of Dentistry. He has published over one hundred articles on perio-prosthodontics and implant dentistry and has coauthored three textbooks including one titled Aesthetic Restorative Dentistry. Dr. Tarnow has lectured extensively in the United States and internationally in over 30 countries.

Maurice A. Salama, DMD

Dr. Maurice A. Salama completed his undergraduate studies at the State University of New York at Binghamton in 1985, where he received his BS in Biology. Dr. Salama received his DMD from the University of Pennsylvania School of Dental Medicine, where he later received his dual specialty certification in Orthodontics and Periodontics, as well as his implant training at the Branemark Center at Penn.

Dr. Salama is currently on the faculties of the University of Pennsylvania and the Medical College of Georgia as Clinical Assistant Professor of Periodontics. Dr. Salama is a permanent member of the Scientific Committee of the world's leading online Dental Education Website DENTALXP.com

He is also a member of the Team Atlanta Dental Practice which is a multidisciplinary practice world renowned for their clinical research in reconstructive and esthetic dentistry.

Oral Presentations

Friday, September 28
11:05-11:30

Bone and Tissue interaction at the IMPLANT-ABUTMENT Junction and its Effect on Color

Maurice A. Salama, DMD

With the advent of new technologies, techniques and materials, the ability to replace missing teeth with the form, function and COLOR of the natural dentition is now possible. Resin-bonded bridges, porcelain-fused-to-metal and all-ceramic restorations as well as implants can be offered as solutions to patients suffering from the loss of teeth in the "Esthetic Zones." This presentation will focus on the interdisciplinary relationship of the restorative dentist, periodontist and orthodontist to reconstruct the soft tissue foundation for all of these restorative options in anterior tooth replacement. The diagnosis of deficiencies and varied treatment options will be discussed in detail.

Objectives:

- What are the risk factors in anterior implant therapy?
- What are the four most important diagnostic components leading to a successful treatment design for an esthetic restoration?
- How and when to successfully incorporate minimally invasive protocols?
- How do new Macro and Micro-geometry of implant designs effect treatment planning?
- How do new Digital and CAD/CAM technology optimize minimally invasive anterior implant therapy?
- How to integrate abutment selection and new ceramic components with soft tissue augmentation procedures to create ideal emergence and color for our implant restorations?

Oral Presentations

Friday, September 28
1:00-1:25

The Critical "Pink" Interface In Esthetic Dentistry… A Cross-Interdisciplinary Management of the Alternatives… Limitations…Solutions…

David A. Garber, DMD

This program is a perspective into how multidisciplinary "interface planning" has become an integral part of clinical esthetic dentistry, particularly implant, and why in 2012 has become essential to combine not only "white" tooth esthetics but also "pink" gingival aspects. Today, understanding the prosthetic, surgical and biological limitations, is part of new treatment planning therapeutic protocols in an approach to simplify, and provide predictable minimally invasive esthetic outcomes.

Topics will include:

- The 4 Key Aspects to Gingival Harmony, color, "Artificial gingivae", hybrid innovations of ceramic and composite.
- The critical abutment/implant interface in esthetic restorations.
- Solving the adjacent implant dilemma.

David A. Garber, DMD

Dr. David Garber is one of the internationally recognized multidisciplinary educators well known as "Team Atlanta." Dr. Garber is the recipient of "The 2005 Gordon J. Christensen Lecturer Recognition Award," "The American College of Prosthodontics Distinguished Lecturer Award," "The Northeastern Periodontal Society Isador Hirschfeld Award for Clinical Excellence," "The Greater New York Academy of Prosthodontics Distinguished Lecturer Award," and "The David Serson Medal of Research."

He is a past president of the American Academy of Esthetic Dentistry and has served on the boards of both the AAED and the American Academy of Fixed Prosthodontics.

Dr. Garber is dual trained clinician and professor in the Department of Periodontics as well as in the Department of Oral Rehabilitation at the Medical College of Georgia. He is a Clinical Professor in the Department of Prosthodontics at Louisiana State University and a Clinical Professor in the Department of Restorative Dentistry at the University of Texas in San Antonio.

He is past editor of the Journal of Esthetic Dentistry, past president of the AAED, and co-author of Porcelain Laminate Veneers, Bleaching Teeth, Porcelain and Composite Inlays and Onlays, and Complete Dental Bleaching, and has published in excess of 60 articles and textbooks chapters.

Aris-Petros Tripodakis, DDS, MS

Dr. Tripodakis received his Dental Degree (1973) and his doctorate (1994) from the National and Kapodistrian University of Athens, Greece, and a Certificate of Prosthodontics (1979) and a Master of Science (1981) from Tufts University, Boston, MA. He is currently an associate professor at the University of Athens, and a visiting associate professor at Tufts University. Dr. Tripodakis has received two research awards from the Academy of Osseointegration (1995, 1998). He is an international lecturer, a published author, and an associate editor of the Journal of Japan Prosthodontic Research & Practice, and the Journal of Osseointegration. Having served as president for several prestigious dental organizations including the American Dental Society of Europe, and the International College of Prosthodontists, he is currently president-elect, European Academy of Esthetic Dentistry.

Oral Presentations

Friday, September 28
1:25-1:50

Are the Ceramic Abutments the Sole Way to Trans-mucosal Implant Esthetics?

Aris-Petros Tripodakis, DDS, MS

The esthetics in the peri-implant/restorative interface depend on the cervical morphology of the restoration, the healthy and harmonious mucosal contour and the cervical optical behavior of the abutment that provides the overlying soft tissue with internal lighting. Although, upon excellent clinical management, the custom-made all-ceramic trans-mucosal zirconia abutments provide the restorative site with these characteristics resulting to acceptable esthetic outcomes, in certain aspects their application contains some limitations. The presentation after covering the historical development of esthetic abutments since the 90s of last century, will present the alterative solution found in the application of the ceramo-metal trans-mucosal abutments.

Objectives:

- To draw the attention to the esthetic parameters of the transmucosal area.
- To evaluate the limitations in applying prefabricated or custom-made CAD CAM zirconia abutments
- To explore the clinical application of the ceramo-metal abutments, and discuss the existing scientific evidence in evaluating their performance.

Oral Presentations

Friday, September 28
1:50-2:15

Ceramic Enamel Wear Opposing Ceramic Materials

John O. Burgess, DDS, MS

Ceramic materials used for esthetic restorations are becoming increasingly popular with glass containing materials used in the anterior and high strength core materials used in posterior applications. These materials are evolving with changes in the indications and contraindications for their use changing as translucency and strength of the restorations are balanced. This presentation will focus on enamel wear opposing all-ceramic materials (veneering porcelains, e.max and zirconia). Methods to decrease wear are given. These results have direct clinical application to your practice of dentistry.

Objectives:

- Discover how to effectively reduce opposing enamel wear with all ceramic restorations
- Learn when and where to glaze all ceramic restorations.
- See if enamel wear increases as zirconia ages.

John O. Burgess, DDS, MS

Dr. John O. Burgess is a graduate of Emory University School of Dentistry. He received his MS in Biomedical Sciences from the University of Texas Health Science Center in Houston, Texas, completed a one-year General Practice Residency and a two-year General Dentistry Residency.

Currently Dr. Burgess is the assistant Dean for Clinical Research at the University of Alabama at Birmingham and Director of the Graduate Biomaterials Program. He received certification from the American Board of Dentistry and is a diplomat of the Federal Services Board of General Dentistry. He is a member of the American Academy of Esthetic Dentistry, The Academy of Restorative Dentistry, the American Dental Association, the American and International Association for Dental Research, and the Academy of Operative Dentistry. Dr. Burgess is a fellow of the Academy of Dental Materials and the American College of Dentists. Dr. Burgess has authored more than 400 articles, abstracts and textbook chapters. Currently he is a member of the American Dental Association's Council on Scientific Affairs and a member of two ADA committees for specification development for materials and devices. He is active in clinical evaluations of dental materials and is an investigator on clinical protocols evaluating adhesives, ceramic restoratives, fluoride releasing materials, low shrinkage posterior composites and impression materials. Dr. Burgess lectures extensively nationally and internationally and has presented more than 900 continuing education courses.

Cherilyn G. 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 lecturer, 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 (Distinguished Dentist Award) from the California Section of the Pierre Fauchard International Honor Dental Academy, and the 2008 Dr. Edward B. Shils Entrepreneurial Education Fund Award. 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 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.

Oral Presentations

Friday, September 28
2:55-3:20

Quantitative Percussion Diagnostics – A New Form of Precision in Risk Assessment

Cherilyn G. Sheets, DDS

Quantitative percussion testing allows a clinician to evaluate the structural stability of natural teeth or dental implants by measuring the way it responds to a light impact on the buccal surface. The energy that is returned to the handpiece is analyzed in a manner that provides two pieces of information – the loss coefficient (LC) and an energy response graft (ERG) of the structure tested . These two pieces of information can give the clinician indications of how sound the tested structure is and whether there are problems such as dentinal cracks and fractures, microleakage, recurrent decay, loose post and cores and other structural defects. By having an indication as to how a tooth or implant responds to mechanical stress prior to starting restorative care, the clinician will be prepared to look for potential problems where abnormal ERG's are observed. Other technologies will also be discussed which help increase precision in dentistry.

The participants will learn:

- What dental quantitative percussion diagnostics (QPD) reveals.
- The benefits of QPD for the evaluation of teeth and implants.
- How clinical treatment plans can be more powerful with a quantifiable evaluation of implant stability rather than a qualitative evaluation.
- The significance of knowing the different impact responses of teeth and implants and the potential interpretations of these responses.
- How high level magnification and illumination enhances patient care.

Oral Presentations

Friday, September 28
3:20-4:10

Soft Tissue Esthetics - Optical Investigation of Gingival Color

Shigemi Nagai, DDS, MDS, PhD & Stephen J. Chu, DDS, MSD, CDT, MDT

Soft or hard tissue deficiencies of the anterior edentulous space are the defining obstacles to achieving optimal gingival esthetics surrounding the final restoration. Thin peri-implant mucosa leads to a shine through effect of the underlying titanium implant with a grayish appearance of the gingival cuff. This lecture will present the color and optical values and properties of gingiva based upon current research and clinical cases related to gingival color.

Objectives:
- Optical and histological background of gingiva.
- Appropriate assessment technique of gingival phenotype.
- Clinical approach to achieve soft tissue esthetics.

Shigemi Nagai, DDS, MDS, PhD

Stephen J. Chu, DMD, MSD, CDT, MDT

Shigemi Nagai, DDS, MDS, PhD is an Assistant Professor, Department of Restorative Dentistry and Biomaterial Sciences, Harvard School of Dental Medicine. She has numerous publications on color science and clinical studies. Dr. Nagai's current research interests include a computer color matching system in dental ceramics, NIR fluorescence imaging for clinical dentistry, and biological approach of the soft tissue esthetics.

Dr. Stephen J. Chu is an Associate Professor in the Department of Prosthodontics, Director of Esthetic Education at Columbia University School of Dentistry. He also maintains a private practice in fixed prosthodontics in New York City. He has co-authored The Fundamentals of Color: Shade Matching and Communication in Esthetic Dentistry [Chu, S.J., Devigus, A., Mieleszko, A., Quintessence Publishing Co, 2004] and Aesthetic Restorative Dentistry: Principles and Practice [Tarnow, D.P., Chu, S.J., Kim, J.J., Montage Media Corp., 2008]. Dr. Chu is a chapter contributor to The Science and Art of Porcelain Laminate Veneers [Gurel, G., Quintessence Publishing, 2003] and has published 23 articles and given over 100 lectures nationally and internationally on the subjects of aesthetic, restorative, and implant dentistry. Dr. Chu is on the editorial review board of the European Journal of Esthetic Dentistry, IJOMI, Compendium, Journal of Esthetic and Restorative Dentistry. Dr. Chu is the creator of Chu's Aesthetic Gauges manufactured by Hu-Friedy Co., Inc.

Stephen C. Bayne, MS, PhD

Dr. Bayne is Professor Chair of the Department of Cariology, Restorative Sciences, and Endodontics at the University of Michigan's School of Dentistry. He received his M.S. and Ph.D. in Biological Materials from Northwestern University. He taught at the University of Mississippi School of Dentistry from 1977-1984. He taught at UNC from 1984-2005. Late in the fall of 2005, he joined the University of Michigan. He has received the Award of Merit from the Academy of Dentistry International in 1999, Lecturer-of-the-Year Award by the Greater New York Society of Prosthodontics in 2000, the 2003 Distinguished Alumni Achievement Award from Carleton College, the 2004-2006 UNC Distinguished Professor of Teaching Excellence (the highest teaching award the University bestows), the 2005 Academy of Operative Dentistry Hollenback Prize, the 2005 ADEA/Smith-Kline-Glaxo/Sensodyne Faculty Teaching Excellence Award for Dental School Faculty, the 2007 Founder's Award from the Academy of Dental Materials, the 2010 Dental Materials Group Clinical Research Award, an honorary PhD in 2010 from the University of Athens for his work in Greece, and the IADR Distinguished Scientist Award for Dental Materials (Souder Award) in 2011. He is past-President of the Academy of Dental Materials, Past-President of the Dental Materials Group of the IADR, Past-President of the AADR, and Past-President for the IADR. He has been involved in funded clinical research trials involving posterior composites, CAD/CAM CEREC inlays, bonded Class V restorations, and bleaching materials. His research has been published in 50 chapters, transactions, and symposia, 120 journal articles, and 246 abstracts. He has made 221 scientific and 272 continuing dental education presentations.

Oral Presentations

Saturday, September 29
8:30-8:55

Clinical Evaluation of Color – What is the Horizon for Color Science in Dentistry?

Stephen C. Bayne, MS, PhD

Color of both dental tissues and dental restorative materials both change over time – challenging the planning and management strategies for esthetics. We are currently immersed in "evidence-based dentistry" with demands for more clinical evaluation of esthetic strategies, their efficacy/effectiveness, new rational designs for clinical trials, and a plan for future focus of color science. This presentation will focus on framing the current situation across all materials for color evaluation and identify the clinical evaluation paths for the future.

Oral Presentations

Saturday, September 29
8:55-9:20

Influence on Properties of the Veneering Porcelain

Michael Tholey, Dipl.-Ing.

Influence on properties of the veneering porcelain, such as shade, flexural strength, CTE etc., produced by firing in the dental porcelain furnace. The main focus will be on the shade. We have measured a ΔE up to 10 by a wrong firing schedule. Also a wrong firing is producing lots of thermal stresses within the porcelain layer leading to a higher risk of "chipping."

Michael Tholey, Dipl.-Ing.

Michael J. Tholey is a team leader/project manager research & development VITA Zahnfabrik responsible for veneering materials. He has Engineer Dental technology Diploma.

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Oral Presentations

Saturday, September 29
9:20-9:45

Integration of Esthetic Dentistry in Routine and Complex Prosthodontics

Kenneth A. Malament, DDS, MS

Dr. Malament received his DDS from N.Y.U. College of Dentistry and a specialty certificate and Master's degree from Boston University School of Graduate Dentistry. He has a full-time practice limited to prosthodontics in Boston that includes a dental laboratory with master dental technologists. He is a Clinical Professor at Tufts University and a Course Director in postgraduate department of Prosthodontics. He is a Past-President of the American Board of Prosthodontics, Greater New York Academy of Prosthodontics, Northeastern Gnathological Society and Northeast Prosthodontic Society. Dr. Malament is a Fellow of the American College of Prosthodontists, Academy of Prosthodontics, Greater New York Academy of Prosthodontics and Northeastern Gnathological Society. He is an active member of the International College of Prosthodontists, American Academy of Fixed Prosthodontics, American Academy of Esthetic Dentistry and Academy of Osseointegration.

Kenneth A. Malament, DDS, MS

All-ceramic materials were developed to improve ceramic color and marginal fit. Until recently few research reports attempted to study their long-term use or factors that relate to their performance without modeling the data. This presentation will provide a comprehensive look at failure modes and effects in bilayer all-ceramic crown-cement-tooth systems, tying together the influences on resistance to fracture initiation and propagation of ceramic material properties and thickness; crown/tooth geometry; cement modulus and layer thickness; damage induced by shaping, fabrication, clinical adjustments, and sandblasting; and fatigue in the wet intraoral environment. Original research will be presented that studied the clinical behavior of over five thousand all-ceramic restorations.

Objectives:

- To understand what factors and concerns a prosthodontist/dentist would have treating patients that require "esthetic procedures"
- To understand the problems and controversies that exists with modern dental materials
- To understand what clinical factors impact on long-term survival of dental ceramic materials
- To understand the science of dental ceramic materials with a look to the future.

Oral Presentations

Saturday, September 29
10:15-10:40

Base Shade Selection and the Effect of Ceramic Modifiers in Achieving Superior Color Match

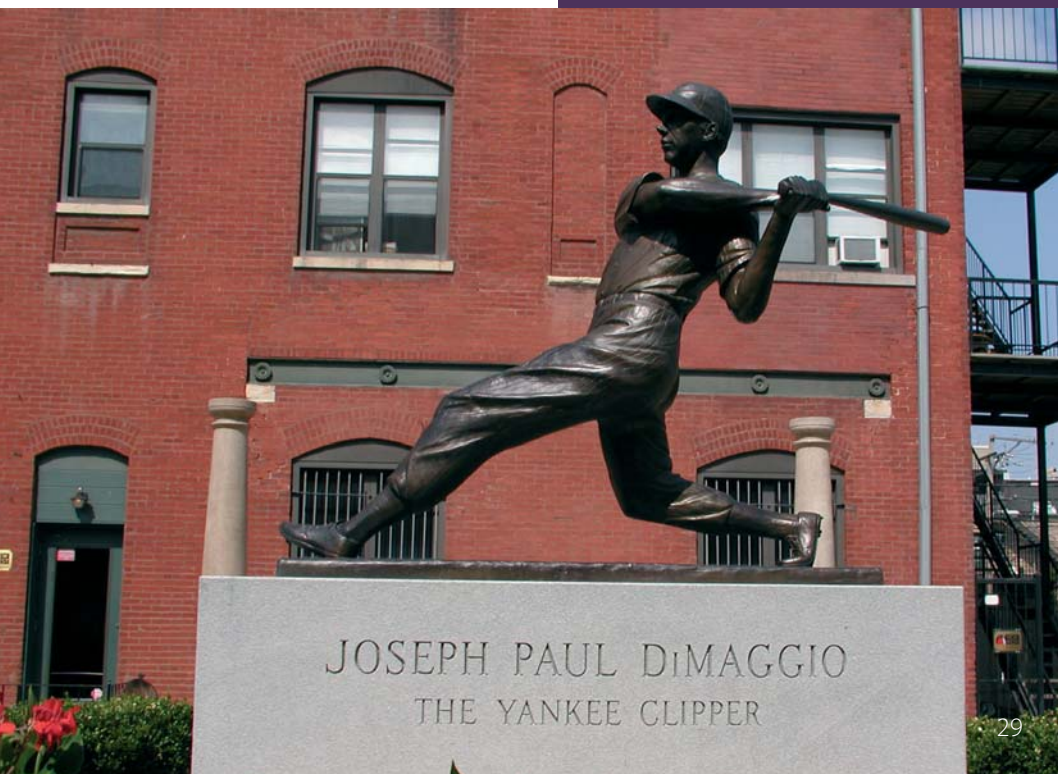
Aki Yoshida, MDT

In order to precisely reproduce natural tooth color, it is critical to determine the proper base shade and to use modifiers efficiently. In this lecture, spectrophotometric data will be used to present a step-by-step process of color reproduction from a base shade selection, layering techniques with modifiers and finalization.

Objectives:
- How to determine a basic shade
- Objective and efficient usage of modifiers.

Aki Yoshida, MDT

Aki Yoshida started his career at Tanaka Dental Clinic in Tokyo, Japan after graduating from the Dental Technician School of Nihon University in 1983. He came to the United States to accept a position at Gnathos Dental Laboratory, which the renowned prosthodontist, Lloyd L. Miller, D.M.D in 1991. In addition he serves as technical instructor at Tufts University, Dept. of Post-Graduate Prosthodontics in Boston, instructor for Noritake Dental Supply, an associate member of the American Academy of Esthetic Dentistry.



Oral Presentations

Saturday, September 29
10:40-11:05

Digital Changes and their Influence on the Dental Laboratory

Michael Bergler, MDT

This lecture will present and discuss the possibilities and limitations of various CAD/CAM-Systems and will detail the capabilities of modern scanners and software and their influence on the daily lab business. Differences in scanning technology and the various possibilities for the design of tooth- and implant-supported restorations ranging from single-crowns to complex full-mouth-reconstruction frameworks will be outlined and explained. Furthermore, details about the properties and handling requirements of ceramic frame materials will be discussed and exemplified with a variety of clinical cases.

Michael Bergler, MDT

Mr. Michael Bergler is internationally recognized in the area of esthetic ceramic restorations and CAD/CAM-technology. Furthermore he is co founder of the CAD/CAM-Ceramic-Center at University of Pennsylvania, School of Dental Medicine. He has published and lectured extensively on restorative materials and dental technology. He trained in Germany at the University of Erlangen-Nuernberg, Department of Prosthodontics, and earned his Certificate of Master Dental Technician (MDT) at the Masterschool of Freiburg, Germany. In addition to holding numerous appointments within the Department of Prosthodontics at the School of Dentistry, University of Erlangen-Nuernberg, Germany, he served as a Master Dental Technician with Dental Laboratory Rainer Semsch, Freiburg im Breisgau, Germany. His dental laboratory training has included study under Kazunobu Yamada, CUSP Dental Laboratory, Nagoya City, Japan; Hitoshi Aoshima, Pearl Laboratory, Tokyo, Japan; and Dr. Gerad Chiche, Chairman of the Prosthodontic Department, Louisiana State University School of Dentistry, New Orleans, LA.

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Oral Presentations

Saturday, September 29
11:05-11:30

Art & Experience®: Adapting the Optical Characteristics

Claude Sieber, MDT

What does AESTHETICS mean today? The importance of light and how to use the right frame. The primary determinants of natural tooth aesthetics will be explored including light transmission, absorption and reflection, the visual aspects of internal and external tooth structure especially relating to the incisors and the lip and gingival contribution.

Topics covered include:

- Methods to incorporate these determinants into restorations will be shown with various clinical cases.
- The new VM Material and its application.
- Techniques for excellent dental views.
- Various aspects of intra-oral dental photography.

Claude Sieber, MDT

Mr. Claude Sieber began his career by completing his studies in Art. During the early 1970 s he earned his professional certification from the government of Switzerland, completing his apprenticeship in a small dental laboratory in Basel.

Over the next years, he worked for several dental laboratories gaining additional work experience. His practicum took him as far as Rio de Janeiro, Brazil, where he worked at lenght with Professor Olympio Pinto, perfecting his style of natural tooth simulation.

Claude Sieber has been the owner of a specialised dental laboratory in Basel Switzerland since 1984 and in 1990 he dedicated a training facility to the advancement of Expert Dental Ceramists. He is working for dentists worldwide and focuses special interest on interior tooth replacement.

Claude has lectured extensively throughout the world and his original work in the fine Arts and Photography are prominent in his visual and physical presentations.

Claude Sieber was instrumental in the development of Vitas Spinell porcelain, Vitadur Alpha, Akzent Stains, Interno Colour Effects, Omega 900 Porcelain Systems, the 3-D Master Color Shade Guide, and the new VM Material.

Linda Greenwall, DDS

Dr. Linda Greenwall is a well-known lecturer and an authority on tooth whitening and aesthetic dentistry. She has combined an innovative and award winning, multidisciplinary private practice in London, UK, which has been awarded the Investor in People status, with research in the field of tooth bleaching. She is a Fellowship Examiner for the Royal College of Surgeons of England and a specialist in Restorative Dentistry and Prosthodontics and Honorary Clinical Teacher, King's College London Dental Institute. Dr. Greenwall launched the British Dental Bleaching Society (BDBS), which aims to lobby for changes in the controversial bleaching legislation and to educate dentists in tooth whitening. Dr. Greenwall chairs this organization. She is an Associate Course Director for the Advanced Certificate in Aesthetic Dentistry for the Royal College of Surgeons Faculty of General Dental Practices. Dr. Greenwall is an associate member of BDA, FGDP, BGDS, BSRD, BASD, BDHF, BAAD, AO, Women in Dentistry, The Dental Journal Club of North West London, and the Mike Wise Study Group.

Oral Presentations

Saturday, September 29
1:00-1:25

Advanced Tooth Whitening for Complex Discolouration

Linda Greenwall, DDS

This lecture will focus on those patients suffering from severe discoloration and multiple tooth discolorations within the same tooth and discuss how to modify the existing tooth whitening techniques. Management of fluorosis discoloration with brown, white and orange lesions will be discussed as well as microabrasion techniques and use of amorphous calcium phosphate.

Objectives:

- To provide the delegates with in depth knowledge of Advanced Tooth Whitening Techniques and as it relates to complex discoloration issues such as tetracycline, fluorosis, calcific metamorphosis following tooth trauma.
- To learn about the process and indications for microabrasion after tooth whitening.
- To learn about the use of amorphous calcium phosphate for soothing and fading white marks on teeth.

Oral Presentations

Saturday, September 29
1:25-1:50

Safety Issues of Tooth Bleaching – An Update

Yiming Li, DDS, MSD, PhD

There has been little dispute on the efficacy of tooth bleaching; with the accumulation of scientific data, the initial concerns with the safety have also largely dissipated. However, controversies on potential adverse effects associated with peroxides used for bleaching still exist, and there have been safety concerns with certainly bleaching materials, procedures and practices. This presentation will provide an update on safety issues and discuss roles of dental professionals in tooth bleaching to maximize its benefits while minimizing potential risks.

Objectives:
- Explain sources of safety concerns associated with peroxide-based tooth bleaching
- Discuss measures to minimize potential risks of tooth bleaching
- Describe roles of dental professionals in tooth bleaching.

Yiming Li, DDS, MSD, PhD

Dr. Yiming Li is Professor of Restorative Dentistry and Director of Center for Dental Research, Loma Linda University School of Dentistry. He is also a Professor of Microbiology and Molecular Genetics at Loma Linda University School of Medicine. Dr. Li served on the FDA Dental Products Panel between May 2006 and October 2009. Since 1999 he has been Chairman for the American National Standard/ADA Specification 41 for biological evaluation of dental materials. Dr. Li also chairs the ISO committee that has produced the first edition of international standard for tooth bleaching products (ISO 28399). He is currently a consultant to the FDA and ADA. Dr. Li has more than 250 publications in scientific journals and books, and he has lectured in Asia, Australia, Europe, and America.

Rade D. Paravina, DDS, MS, PhD

Rade D. Paravina, DDS, MS, PhD is a tenured Associate Professor at the University of Texas School of Dentistry at Houston and Director of Houston Center for Biomaterials and Biomimetics (HCBB). He has authored/co-edited two books: Fundamentals of Color: Shade Matching and Communication in Esthetic Dentistry (Quintessence Publishing 2011) and Esthetic Color Training in Dentistry (Elsevier 2004), two software programs, one educational CD, and more than 180 other peer-reviewed publications.

Dr. Paravina designed/developed several dental products and tests. Together with Vita Zahnfabrik he designed two shade guides, Linearguide 3D Master and Bleachedguide 3D Master. The University of Texas Health Science Center at Houston has executed licensing agreements with Vita Zahnfabrik dealing with commercialization of these two shade guides. He has developed Dental Color Matcher, a free online and offline educational and training program for esthetic dentistry, and the scientific protocol for evaluating "chameleon effect" of dental materials.

Dr. Paravina is Founder and Past President of the Society for Color and Appearance in Dentistry (SCAD) and recipient of the 2011 E. B. Clark Award, SCAD award for lifetime achievement. He serves as Editor of the Journal of Color and Appearance in Dentistry, a permanent semi-annual supplement to Journal of Dentistry, and editorial board member for the Journal of Dentistry, Journal of Esthetic and Restorative Dentistry, Journal of Prosthodontics, Clinical Oral Investigations, and the American Journal of Dentistry.

Dr. Paravina lectures nationally and internationally on various topics associated with color and appearance in esthetic dentistry.

Oral Presentations

Saturday, September 29
1:50-2:15

Whitening Monitoring: Pathways to Credible Results

Rade D. Paravina, DDS, MS, PhD

Some of the challenges of visual monitoring of tooth whitening are associated with observer and patient recruitment, and color matching tools, conditions and method. The so-called Value scale of the VITA Classical shade guide, that used to be a conventional gold standard for monitoring whitening, has significant shortcomings that diminish the credibility of research results. Dental researchers in the past had limited choices in selecting shade guides for monitoring whitening. However, a significant change occurred with the introduction of the new Bleachedguide 3D-Master and particularly after the introduction of the new tab marking system that includes interpolated shade guide units (ranging from 1 to 29 sgu). There is a clear evidence of the inferiority of Classical Value scale and benefits of the "interpolated" Bleachedguide, which is why the Bleachedguide is recommended by the American Dental Association instead of Vitapan Classical in the guidelines for Bleaching Products (dentist-dispensed and over-the-counter).

Oral Presentations

Saturday, September 29
2:55-3:20

Free Hand Anterior Restorations

Didier Dietschi, DMD, PhD

Classical indications of composite resins in the smile frame are well established, as well as a few other cosmetic applications. Less is known from the public and the profession in regard to the potential of modern composite technology and novel clinical protocols. Free-hand bonding has actually evolved from a mere filling material to a versatile esthetic solution for a broad range of moderate to complex clinical situation such as post-orthodontic smile enhancements, the esthetic and functional rehabilitation of tooth wear or even the veneering of eroded, and discolored anterior teeth. For instance, the "old idea" of prefabricated veneers was recently revitalized thanks to a combination of high-pressure and temperature-molding process followed by a laser surface vitrification; this novel system is opening new perspectives for the treatment of deficiencies which were formerly restored with direct composite veneers.

This program will review:

- The most recent clinical progresses of direct composite application
- The prefabricated composite veneers, with multiple case presentation and relevant clinical knowledge.

Didier Dietschi, DMD, PhD

Dr. Didier Dietschi was licensed in 1984 and received his doctoral and Privat Docent degrees in 1988 and 2003, respectively, at the University of Geneva, Switzerland. He also received a PhD degree in 2003 at the University of ACTA, Netherlands. Following a 6-year period of full-time teaching and research activity in Operative Dentistry and Periodontology, he started a part-time activity in a private office in Geneva, dedicated to aesthetic restorative dentistry. He holds now positions of adjunct Professor at CASE Western University (USA) and senior lecturer at the University of Geneva.

Dr. Dietschi has published more than 75 clinical and scientific papers and book chapters on adhesive and aesthetic restorations; he also co-authored the book, "Adhesive Metal-free Restorations, edited in 1987 by Quintessence and translated in 7 languages. Dr. Dietschi is lecturing internationally on adhesive and aesthetic restorations.

Jane D. Brewer, DDS, MS

Dr. Brewer, DDS, received her Certificate in Fixed Prosthodontics and MS Degree from the State University of New York, University at Buffalo, School of Dental Medicine. A career dental educator, she has spent half of her career in academia and half in private practice (prosthodontics). Her research interest is focused primarily in color analysis of ceramics and teeth. Active in a number of prosthodontic organizations, she served the American Academy of Fixed Prosthodontics as its 56th president and served on the Editorial Council of The Journal of Prosthetic Dentistry for 12 years (through the Academy of Prosthodontics). Dr. Brewer is currently Chair of the Department of Restorative Dentistry at the University at Buffalo School of Dental Medicine.

Oral Presentations

Saturday, September 29
3:20-3:45

The Dark Side of All-Ceramic Restorations

Jane D. Brewer, DDS, MS

While the marketplace overflows with all-ceramic options for everything from intracoronal restorations to implant supported fixed complete dental prostheses, the appearance matching of a single or limited restoration in the "esthetic zone" remains frustrating. This presentation will address some of the many challenges in achieving an ideal all ceramic restoration – color, shade, and translucency; limitations of devices; choice of materials; advantages/disadvantages of translucent materials; identifying substrate problems; and materials /substrate coordination.

Objectives:

- Define some of the factors in the "difficult" all ceramic case
- Recognize the limitations of ceramic materials and how to choose the best material
- Understand some of the problems in shade matching and what we need to know to make the best shade and translucency choices
- Identify substrate problems and how to coordinate substrate with the optical properties of ceramic restorative materials.

Oral Presentations

Saturday, September 29
3:45-4:25

CERAMIC WARS: The Return of the Ceramist Creating the Illusion of a Tooth in 3D

Edward A. McLaren, DDS, MDC

The role of the ceramist in the delivery of highly esthetic ceramic restorations has been significantly and forever altered by the increased development and evolution of digitally created restorations. There is a clash or "war" in philosophies how human artistic expression can co-exist with the digital "machine world" as Ceramists struggle with how to adapt to the changing conditions, and themselves evolve their skills and services to survive and thrive in this new reality. Machines can do an adequate esthetic result for posterior teeth but to date cannot duplicate the varied layers of translucencies and colors that are necessary for acceptable esthetics in anterior teeth. The two most important areas for the foreseeable future where Ceramists can apply and excel in using their creative talents is in creating single anterior teeth, and the "Minimalistic ceramic layering" of anterior teeth (which machines can't do).

This presentation will cover:
- How to interpret shade information into a ceramic build-up
- Ceramic layering techniques for creating the illusion of anterior teeth
- Minimalistic veneering of anterior natural teeth (called the "Mini").

Edward A. McLaren, DDS, MDC

Dr. McLaren received his DDS from the University of the Pacific School of Dentistry. He received his specialty certificate in Prosthodontics from UCLA School of Dentistry.

Dr. McLaren is a Professor in the Biomaterials and Advanced Prosthodontic department. Dr. McLaren maintains a private practice limited to prosthodontics and esthetic dentistry in which he does all of his own ceramics. He is the Director of the UCLA Center for Esthetic Dentistry. He is also the founder and director of the UCLA Master Dental Ceramist program.

Dr. McLaren is a board member and project director for Clinicians Report; he is the lab section editor for *Inside Dentistry* magazine, the Techno-Clinical editor for *Spectrum* magazine, on the editorial review board of *Practical Procedures and Aesthetic Dentistry magazine* and on the editorial review board for *Contemporary Esthetics* magazine.

Dr. McLaren is actively involved in many areas of prosthodontic and materials research and has authored over 60 articles. He recently published a book, *The Art of Passion: Ceramics, Teeth, Faces, and Places*.

Mark Baker, CDT

Mr. Mark Baker completed his Dental Technicians Diploma in London England graduating in 1977 with honors. He then moved to southern Germany from 1979-83, where he gained extensive tutoring and hands-on experience in fabricating fixed and removable prosthetic restorations within one of Germany's most prestigious laboratories. In 1985 Mark immigrated to Sydney, Australia and opened his own successful aesthetic crown and bridge laboratory specializing in anterior restorations and implants.

Mark is well versed on the importance of technical clinical communications and their implementations for successful case planning leading to ultimate patient satisfaction. He is a keen and avid supporter and member of many international study groups, including the "International Society For Dental Ceramics" and has tutored various hands-on crown and bridge courses and presentations throughout Europe, Asia, Australia and New Zealand.

Mark is now Product Marketing Manager for the shade communication at Vident, the North American distributor for Vita products.

Lunch & Learn

Friday, September 28
12:00-1:00

Reliable Techniques for Improved Practical Shade Selection

Mark Baker, CDT

Shade selection remains the most critical yet often misunderstood step in successful restorative case planning. Techniques influencing effective shade selection can be subjective and visually challenging for many dental professionals. In this comprehensive table clinic session we will discuss and demonstrate reliable procedures and practical tips for enhanced clinical and laboratory communications.

Topics discussed include:

- Use of VITA Classical shadeguide® compared to VITA System 3D-Master®
- VITA Easyshade® from clinical use to laboratory shade verification and beyond
- Shade communications in tandem with cameras and color analysis for everyday use.

Lunch & Learn

Saturday, September 29
12:00-1:00

Principles of Color Science for Appearance Matching

William M. Johnston, PhD

This review will cover the major color science aspects that affect appearance matching, including calculation of color from spectral reflectance or transmittance, metamerism, translucency, technical differences in measuring equipment, effects of and interactions among mixed ingredients, and layering.

Objectives:

- Attendees will understand the effects on visual appearance of basic optical properties of biomaterials being matched and will discuss the interactions of color science principles that affect an esthetic dental appearance.

William M. Johnston, PhD

Dr. Johnston is a Professor at The Ohio State University College of Dentistry and has research interests in the chemical and physical properties of dental biomaterials with an emphasis on the optical properties of esthetic biomaterials and the theoretical bases for determining optical characteristics.

Joe C. Ontiveros, DDS, MS

Dr. Ontiveros received his DDS 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 book, Esthetic Color Training in Dentistry–Communication of Color and Appearance. Dr. Ontiveros is currently an Associate Professor and Head of Esthetic Dentistry at the University of Texas Health Science Center School of Dentistry at Houston, and Head of the Oral Biomaterials Division for the Houston Center for Biomaterials and Biomimetics.

Lunch & Learn

Saturday, September 29
12:00-1:00

Power Bleaching

Joe C. Ontiveros, DDS, MS

Patients today are increasingly in search of whiter and brighter smiles and their expectations for blinding white teeth continue to grow. The dental professional must be able to balance the request for extremely white teeth with predictable treatment options and a view to the overall oral health of the patient.

Objective:
You will learn:

- to address the 'bleachorexic' patient
- to answer safety concerns and manage tooth sensitivity related to bleaching
- guidelines for interpreting bleaching research
- review a step-by-step process for in-office bleaching.

Lunch & Learn

Saturday, September 29
12:00-1:00

CAD/CAM Ceramics – Selection, Priming and Cementation

John M. Powers, PhD

This program reviews the selection and properties of silica-based and zirconia-based ceramics used in CAD/CAM dentistry. Criteria for priming and cementation are presented.

Objectives:

- Learn about the selection and properties of ceramics used in CAD/CAM dentistry for frameworks, copings and full-contour restorations.
- Learn criteria for the use of primers with silica-based and zirconia-based ceramics.
- Learn criteria for the use of cements with silica-based and zirconia-based ceramics.
- Learn the results of an eight-year clinical study of self-adhesive resin cement.

John M. Powers, PhD

Dr. Powers graduated from the University of Michigan with a B.S. in chemistry in 1967 and a Ph.D. in dental materials and mechanical engineering in 1972. He received an honorary Ph.D. from the Nippon Dental University in 2011. Dr. Powers is Senior Editor of The Dental Advisor and Clinical Professor of Oral Biomaterials, Department of Restorative Dentistry and Prosthdontics, at the University of Texas School of Dentistry at Houston. Dr. Powers has authored more than 1000 scientific articles, abstracts, books, and chapters. He is co-author of the textbook, *Dental Materials - Properties and Manipulation*, and co-editor of *Craig's Restorative Dental Materials and Esthetic Color Training in Dentistry*.

Esam Tashkandi, BDS, MS, PhD

Dr. Esam Tashkandi obtained his Dental Degree with honors form King Saud University Riyadh, Saudi Arabia, in 1989. He then completed his Prosthodontic Specialty training at the University of Michigan, Ann Arbor, Michigan. In 1999 Dr. Tashkandi obtained his PhD Degree in Oral Health Sciences from the University of Michigan where he studied Color Science under the mentorship of Bill O'Brien. He currently is an Associate Professor at King Saud University. In addition, he is an Adjunct Scientist at the Houston Center for Biomaterials and Biomimetics of the University of Texas School of Dentistry at Houston. Also, Dr. Tashkandi is a visiting Professor in the University of Freiburg in Germany.

Lunch & Learn

Saturday, September 29
12:00-1:00

The Psychological Aspects of the Observer and Dental Shade Matching

Esam Tashkandi, BDS, MS, PhD

During the complex process of visual shade matching which is routinely done in virtually all aspects of clinical dentistry, the psychological state in which the observer, in this case the dental clinician, is often overlooked.

This session aims to shed light on the following areas:

- The current state of the literature in regard to the subject
- The implications of fatigue of the dental observer in particular on the ability to select the proper shade
- Methods of improving dental shade matching under various psychological states.

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Abstract #1

The Layering Composite Selection and Evaluation in Class IV Restorations: Instrumental Assessment

S. Brazzoli*, N. Barabanti, A. Rizzi, Z.M. Kovács-Vajna, A. Cerutti
University of Brescia, Brescia, Italy

Objectives: The purpose of this study was to evaluate the ability of dental students, with experience in layering technique to realize a sample-tooth combining an estabilished range of resin composites masses.
Methods: A random selection of three dental students took part in the study. The sample-tooth was a standard upper central incisor in resin composite color-defined A3. Two composites (*Venus Diamond ® - Heraeus Kulzer, IPS Empress Direct - Ivoclar Vivadent*) based on the enamel / dentin layering concept were selected. Each student was asked to create three class IV restorations for each composite that they used for the first time these materials. We observed the learning curve for each material; the colour difference (ΔE_{94}) and the colour distributions (Lightness - ΔL^*, Chroma - ΔC^*,hue - Δh^* from the color space CIELCh) were spectrophotometrically assessed (*SpectroShadeTM*) before/after restoration. This values were referred to the rariables: operators, series, backgrounds and materials used.
Results:
- The time spent reduced along the series of reconstructions for both materials.
- According to the ANOVA test at a fixed level of significance ($p = 0.05$):
- ΔE/Operator was statistically significant $p = 0.036$:
- ΔE/Series was not statistically significant, $p = 0.040$.

Table 1

Operator	μΔE94	σ ΔE94
1	5,277	1,683
2	4,621	1,570
3	4,502	1,443

Table 2

Series	μΔE94	σ ΔE94
1	4,408	1,714
2	4,763	1,250
3	5,229	1,701

- ΔE/Material the correlation was statistically significant, $p = 0.000$.

Material	μΔE94	σ ΔE94
Venus ® Diamond - Heraeus Kulzer	3,875	1,105
IPS Empress Direct - Ivoclar Vivadent	5,725	1,472

Table 3

- ΔL/Operator: the correlation was not statistically significant
- ΔL/Material: the correlation was not statistically significant
- ΔL/Series: the correlation was statistically significant

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• ΔL/Background: the correlation was statistically significant

Table 4

Factors	p (<0,05)
Operator	0,817
Series	0,029
Material	0,246
Background	0,000

Conclusions: the material selection is highly related to the aesthetic, althougt the learning curve is relatively fast (short time and comparable aesthetic). However, there is not great uniformity in the results due to the influence of operator subjectivity in the realization of the restoration. This aspect suggest that we need to explore the confidence and aesthetic approach using composite "recipe" layering technique and dental spectrophotometer dedicated to composite evaluation.

Abstract #2

Change in the Shade of Ceramic Core Materials when Placed against Colored Backgrounds

N. Chebib[1*], J.M. Meyer[2]
[1] Saint-Joseph University, School of Dental Medicine, Beirut, Lebanon
[2] School of Dental Medicine, University of Geneva, Geneva, Switzerland

Objectives: The color of abutment tooth affects the final color of all-ceramic restoration after cementation. How much translucency / opacity each ceramic system provides? The objective is to establish whether a reliable pattern of interaction exists between ceramics of various thicknesses and backgrounds of different color.
Methods: Specimens were divided into 6 groups according to type of ceramics (Zirconia or lithium disilicate), opacity (medium opacity MO or high opacity HO) and thickness (Zr0.5, Zr0.3 MO0.5, M00.8, HO.5, HO0.8mm). L*, a* and b* were measured using a spectrophotometer (USB2000, Fiber optic Spectrometer, Ocean Optics, Dunedin, FL, USA). 3 specimens from each group were placed on 4 different backgrounds (composite, brown composite, metal, gold) and L*, a* and b* were recorded. Primary outcome was ΔE.
Results: Statistical difference in ΔE existed between Zr0.3 and Zr0.5mm (ΔE =4.01 and 3.01) on neutral background.
Brownbackgrounds affected color of all medium opacity cores (ΔE= 4.7 and 4.6). High opacity material had better masking abilities (ΔE=3.0 and 3.1) on brown background.
Gold background affected significantly Zr0.3mm core (ΔE=5). When increasing thickness (Zr0.5mm) ΔE decreased (ΔE =3.2). High opacity and medium opacity at 0.8 mm are best choice for

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masking gold: ΔE=2 for MO0.8mm and HO0.8mm. Gold background affected zirconia and MO0.5mm cores similarly (ΔE=3.2 and 3).
High opacity materials (HO0.5mm ΔE=1.3; HO0.8mm ΔE=2.7) were able to mask the metal background.
Metal background affected more medium opacity materials (MO0.5mm ΔE =3.1; MO0.8mm ΔE=4.1) than high opacity materials. Zr0.5mm and MO0.5mm were affected similarly.
Conclusion: Zirconia 0.5mm is better masking than 0.3mm, can mask partially brown background and neutral composite background but is not opaque enough to mask metal and gold backgrounds. Medium opacity and high opacity lithium disilicate ceramics with increased thickness (0.8mm) are the best option to mask metal and gold backgrounds.

Abstract #3

Short-, Medium-, and Long-Term Repeatability of Intraoral Spectrophotometer

C. Cao, M.S. Eldiwany*, G.N. Frey, J.M. Powers, R.D. Paravina
University of Texas School of Dentistry at Houston, Houston, TX, USA

Objective: The objective of this study is to evaluate the short-term, medium-term, and long-term repeatability of intraoral spectrophotometer.
Methods: Color of Vita Classical (16 tabs) and Vita 3D Master (29 tabs) shade guides (Vita Zahnfabrik) was measured using Vita Easyshade Compact intra-oral spectrophotometer, made by the same manufacturer. Color measurements were performed three times on the center of each shade tab, using the positioning jig made from silicone bite registration material (Discus Dental), as follows: at 0 hours (short-term), after 4 hours (medium-term), and at 1 week (long-term). The repeatability of short-term, medium-term, and long-term measurements was calculated using the mean color difference from the mean (MCMD, ΔE*). Short-term measurements were also compared to medium-term and long-term measurements by calculating respective ΔE* values. An unpaired t-test was performed. A ΔE* of 1.8 was considered the 50:50% perceptibility threshold (lower values were considered imperceptible, while higher values were considered perceptible).
Results: MCDM (s.d.) for short-term, medium-term, and long-term measurements are listed in the table.

	Short-term	Medium-term	Long-term
Classical	0.17 (0.13)	0.18 (0.14)	0.09 (0.07)
3D Master	0.15 (0.10)	0.13 (0.09)	0.10 (0.07)
Both shade guides	0.16 (0.11)	0.15 (0.11)	0.10 (0.07)

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The difference between short-term and medium-term measurements was not statistically significant, while the difference between the short-term and long-term measurements was significant ($p < 0.0001$, 95% CI: 0.03 to 0.08).
Mean color differences (s.d.) between short-term and medium-term measurements for Classical, 3D Master and both shade guides combined were 0.53 (0.24), 0.54 (0.19) and 0.53 (0.21), respectively. Corresponding values for short-term vs. long-term comparison were 0.48 (0.14), 0.58 (0.16) and 0.55 (0.16), respectively.
Conclusions: The short-term, medium-term, and long-term repeatability of intraoral spectrophotometer were below the perceptibility threshold. The same is true for short-term/medium-term and short-term/long-term comparisons. These findings recommend the evaluated device for intra-oral color measurements in dentistry.
Acknowledgment: The authors thank VITA Zahnfabrik for donating Vita Easyshade Compact intra-oral spectrophotometer.

Abstract#4

Assessment of a Digital Shade-Matching Technique. Comparison with Conventional Method

R. Ghinea[1*], M.M. Perez[1], A.M. Ionescu[1], R.D. Paravina[2]
[1] Department of Optics, Faculty of Science, University of Granada, Campus Fuentenueva s/n 18071 – Granada, Spain
[2] University of Texas School of Dentistry Houston, Houston, TX, USA

Introduction: Shade matching is a challenging task in dentistry. Conventional shade matching, by visual observation, is still inaccurate. The use of new digital techniques can substantially improve this task by making it more flexible, accurate and observer independent.
Objectives: Assessment of a digital imaging shade matching technique through comparison with conventional shade matching by visual observations.
Methods: 10 experienced dental practitioners matched 30 ceramic samples with corresponding shade of the VITA 3D-MASTER Toothguide (VITA-Zahnfabrik, Germany). Digital images were obtained for both samples and shade tabs (Sony-Alpha, Sony-Corp., Japan) inside a viewing cabinet (CAC60, Verivide-Ltd., UK), under CIED65 Standard-Illuminant. L*, a* and b* values were calculated through transformation matrixes from the RGB values of a 101x101px central area (Photoshop-CS5, Adobe-Inc., USA) (Figure1). CIEDE2000 and CIELab color differences were calculated between each sample and all the shades of the toothguide. For each color difference and each sample, a ranking of VITA 3D-Master shades (by increasing value of the color difference) was established. The smallest color difference was considered as best match.

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Results: The results of the best match, according to the visual observations, compared with the position of the selected shade in

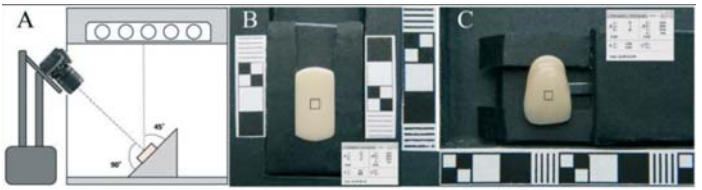

Figure 1. Materials and Methods: a) Illuminating/Measuring configuration used for digital imaging; b) Example of a digital image obtained for one of the ceramic samples; c) Example of a digital image obtained for one of the shades of the VITA 3D MASTER Toothguide. The black square represents the 101x101 pixels area used for color calculations.

the digital matching ranking, are presented in Figure 2. For the CIEDE2000 formula, the shade indicated as best match by the panel of observers was classified by the digital matching technique averagely as second or third best option (Mean position=2.86). For the CIELab formula, the best match indicated by the panel of observers was averagely classified by the digital matching technique as fourth or fifth best option (Mean position=4.56).

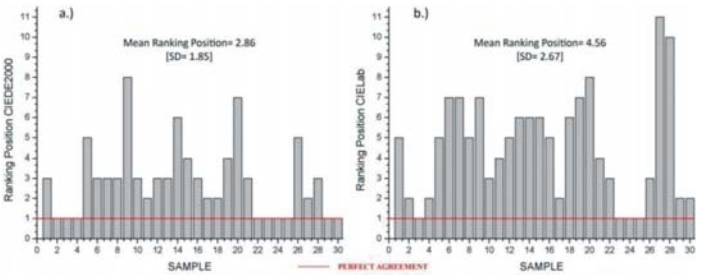

Figure 2. Observer's Best Match ranking positions in the a) CIEDE2000 and b) CIELab Digital Matching classifications.

Conclusions: The proposed digital technique satisfactorily fulfilled the shade matching task in dentistry. The obtained results were similar to conventional shade matching, encouraging the further development of this method. As expected, the CIEDE2000 color difference formula performed better than the CIELab formula.

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Abstract #5

Hydrogen peroxide whitens teeth by oxidation theorganic structure

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[6] Department of Mining and Materials Engineering, McGill University, Montreal, QC, Canada

Objectives: The mechanism of tooth bleaching using peroxide oxidizers is not fully understood. It is still unknown whether peroxide radicals make teeth whiter by deproteinizing, demineralizing, or oxidizing tooth tissues. This study was designed to define the mechanism of tooth bleaching and determine which of tooth chemical components is/are affected by bleaching.
Methods: Sixty sound teeth were collected from adult patients. The teeth were divided into 6 equal groups (n=10). Group 1, 2, 3 and 4 were treated for 4 days with one of the following solutions: deproteinizing (NaOH) that removes organic content, demineralizing (EDTA) that decalcifies the mineral content, oxidizing (H2O2) and distilled water (control). Group 5 and 6 were pre-treated with either deproteinizing or demineralizing solutions before treating them with oxidizing solutions for 4 days. Changes in elemental ratios, crystallinity index and shade parameters of the treated teeth were examined by means of EDS, Raman spectroscopy and shade-spectrophotometry. The data obtained was analyzed with Wilcoxon Signed-Ranks Test, and the statistical significance was set at $p<0.05$.
Results: Tooth deproteinization increased slightly the lightness (4.8±2.7 degrees), tooth demineralization resulted in a strong decrease in the lightness (8.5±5.6 degrees), and tooth oxidization induced the highest increase in the lightness (19.9±6.5 degrees). Oxidization of the deproteinized teeth did not influence shade parameters, but oxidation of the demineralized teeth resulted in a strong increase in the lightness (10.7±5.8degrees).
Conclusions: Hydrogen peroxide does not remove substantial amounts of organic and inorganic tooth constitutes, and it whitens teeth just by oxidizing their organic matrix. These findings are of great relevance in dentistry since it provides better understanding of tooth bleaching mechanism, and explained the reasons behind its main limitations such as lack of predictability and stability after treatment.

Poster Presentations

Abstract #6

Influence of Bracket Color for Different Type Malocclusion (Report 2)

Y. Hosoya[1*], N. Nakao[2], F. Garcia-Godoy[3]
[1] Nagasaki University Graduate School of Biomedical Sciences, Medical and Dental Sciences, Nagasaki, Japan
[2] Nagasaki University Hospital, Division of Orthodontics and Dentofacial Orthopedics, Nagasaki, Japan
[3] Bioscience Research Center College of Dentistry, University of Tennessee, Memphis, TN, USA

Objectives: To examine the influence of bracket color on appearance along with the difference in degree of malocclusion on appearance.
Methods: Subjects were students from a dental hygienist school (31 first and 33 second year) and dental school (32 first, 38 fourth and 37 sixth year), and 82 patients attending for orthodontic treatment (22.5 ± 8.0 years old). Questionnaires were conducted using color photographs of patients wearing three different color brackets (gold, white and silver) in different types of malocclusions: mild malocclusion of anterior teeth without discrepancy (Group A), significant anterior crowding over 4 mm discrepancy (Group B), and significant upper maxillary protraction over 6 mm overjet (Group C). Data were analyzed with a chi-square test at $p<0.05$.
Results: In each of Group A and C, the most preferred bracket colors were white (57.8% in both groups) for the dental hygienist school and gold (56.1%) and silver (57.9%) for the dental school, and gold (54.9%) and silver (65.9%) for the patients with significant differences between the dental hygienist school and other two groups. In Group B, the most preferred bracket color was white (90.6% for the hygienist school, 76.6% for the dental school, and 80.5% for the patients) without significant difference among the hygienist school, dental school and patients. For the dental hygienist school, 89.1% of the students were interested in the bracket color and was significantly higher than that for the dental school (57.9%) and patients (56.1%). The percentage who showed the interest in bracket color and teeth-alignment were 89.1% and 96.9 % for the dental hygienist school, 57.9% and 86% for the dental school, and 56.1% and 90.2% for the patients.
Conclusion: Preferred bracket color for different types of malocclusion and interest in bracket color and teeth-alignment differed among dental hygienist school students, dental school students and patients.

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Abstract #7

Influence of Surface Topography on the Color of a Ceramic CAD/CAM System

C. Igiel*
Department of Prosthodontics Medical Center ofJohannes Gutenberg-University University of Mainz, Mainz, Germany

Objectives: To optimize the clinical outcome of ceramic restorations it is important to determine the effect of different substructures and ceramic characteristic on the final color. However, there is a lack of information on how color is affected by the fabrication procedure. Therefore the purpose of this in vitro study was to evaluate by means of a dental spectrophotometer the effect of the surface glaze on monolithic all ceramic restorations.
Methods: Thirty all ceramic monolithic crowns (IPS e.max CAD, Ivoclar Vivadent) were fabricated using a CAD/CAM- System (Cerec AC acquisition unit and 3 MC XL milling unit, Sirona). The selected color was A2 and the crowns were divided into two groups (n=15) according to different translucencies (LT, HT). Three surface modifications were evaluated (rough, polished and glazed) with a clinical spectrophotometer (Easyshade compact, VITA Zahnfabrik). Each Crown was seated on a resin stump with a colored try-in paste (A3) and measured ten times. The color data was expressed in CIE L*a*b* system coordinates. Color differences (ΔE) among surface modifications were calculated and repeated measures were analyzed using ANOVA and Bonferroni post hoc test (α=.05).
Results: L*a*b* values of the ceramic system were affected by the modification of the ceramic surface. Significant interactions were present in L*a*b* values between rough, polished and glazed crowns (P<.003). The result of the color differences within each group was ΔE: 0,533 rough LT; 0.857 rough HT; 0.618 polished LT; 1.155 polished HT; 0.412 glazed LT; 0.274 glazed HT. Between different groups ΔE: 1.088 rough/polished LT; 0.708 rough/polished HT; 0.817 polished/glazed LT; 0.930 polished/glazed HT; 0.754 rough/glazed LT; 1.378 rough/glazed HT.
Conclusions: The modification of the ceramic surface has a definite effect on the finale color of all ceramic systems tested. However, the mean ΔE values were less than 2.0 ΔE units which is rated as a good color match in the oral environment.

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Abstract #8

Effect of Light Activation on Tooth Whitening Efficacy and Hydrogen Peroxide Penetration: An In Vitro Study

S.R. Kwon*, U. Oyoyo, Y. Li
University of Loma Linda, Loma Linda, CA, USA

Objectives: To determine the effect of light activation on tooth whitening efficacy and hydrogen peroxide penetration into the pulp cavity and correlate tooth color change with penetration levels.
Methods: 40 extracted human canines were sectioned, cavity enlarged, and randomized into four groups, Group A: placebo gel, Group B, placebo gel with light activation, Group C: 40% hydrogen peroxide gel, and Group D: 40% hydrogen peroxide gel with light activation. A one-hour treatment was performed three times, at a one-week interval. Hydrogen peroxide penetration (HPP) was spectrophotometrically estimated using leucocrystal violet and horseradish peroxidase. Specimen color was measured using the Vita Easy Shade Compact at baseline, after whitening, 1-hour, 1-day, 1-, 4-, 8-, 12-, 16-, 20-, and 24-weeks post-whitening. Color change was measured per Commission Internationale de l'Eclairage methodology. Rank-based Analysis of Covariance was performed to compare color change and HPP level among the four groups while adjusting for tooth thickness. Friedman's test was used to assess within group differences for color change and HPP. Partial nonparametric correlations between color change and HPP levels, adjusting for tooth thickness, were performed with rank transformations. Tests of hypotheses were two-sided with alpha level of 0.05.
Results: Greater HPP was observed in groups C and D compared to groups A and B ($p<0.001$). The groups showed no difference at baseline with respect to any of L*a*b color measurements ($p>0.05$). Highest delta E values after treatment were observed in group D and remained higher than groups A-C ($p< 0.05$). Delta L values were higher in groups C and D compared to groups A and B from post-whitening until 24 weeks ($p <0.05$). HPP levels did not affect color change ($p>0.05$).
Conclusion: Light activation increased whitening efficacy without affecting hydrogen peroxide penetration levels.
Acknowledgement: Whitening materials used were kindly provided by Ultradent Products Inc.

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Abstract #9

Preliminary Investigation of the Perceptual Threshold of Tooth Whiteness

S. Westland[1], W. Luo[2*], M. Mohammadzadeh[1], A. Joiner[2]
[1] University of Leeds, Leeds, United Kingdom
[2] Unilever Oral Care, Bebington, United Kingdom

Objectives: To investigate the perceptibility threshold of the average observer to changes in the CIE L*a*b* values and the tooth whiteness index (WIO) based on psychophysical studies.
Methods: A psychophysical experiment with a group of observers has been conducted to determine the perceptual thresholds in tooth whiteness. A psychophysical method called staircase was applied to determine thresholds based on visual assessment of digital images of teeth on a calibrated display. Three separate sets of transformed staircases have been carried out to determine the thresholds for ΔL*, Δa* and Δb* in the context of tooth whiteness. A MATLAB GUI was written that enables that a baseline teeth image to be displayed alongside a modified version of the image. Observers were presented with pairs of images and asked to respond which of the images contained the whiter teeth. Based on findings from a pilot study, observers were asked to make 30-40 assessments per trial per CIELAB parameter in the main experiment.
Results: The threshold values determined are ΔL* = 2.10, Δa* = 2.31 and Δb* = 1.43 (based on the overall values without outliers). This corresponds to thresholds in WIO (whiteness) equation space of approximately 5 WIO units ($\Delta W_L = 5.10$, $\Delta W_a = 4.65$, $\Delta W_b = 3.97$). If only the up staircase is considered, the thresholds are ΔL* = 1.14, Δa* = 1.54 and Δb* = 1.09, and ΔWIO is around 3 units ($\Delta W_L = 2.77$, $\Delta W_a = 3.10$, $\Delta W_b = 3.03$). The thresholds of WIO based on the up staircase is believed to be more relevant to the consumers' perception in a real tooth whitening.
Conclusions: The thresholds for tooth whiteness perception in CIELAB space and WIO space were determined. The findings also suggest that the threshold in WIO space is uniform in the three directions in the CIELAB space.

Poster Presentations

Abstract #10

Color Adjustment Potential of Resin Composites in Simulated Class I Restorations

R.D. Paravina, M.S. Eldiwany, J.C. Ontiveros*
University of Texas School of Dentistry Houston, Houston, TX, USA

Objectives: To evaluate the color adjustment potential (CAP) of resin composites in simulated class I restorations using visual and instrumental methods.
Methods: Single ($_S$) shade compositedisc-shaped specimens (D=10 mm, 2-mm thick) were fabricated using 7 shades (A2 shade of Venus Pearl (VP, Heraeus), Venus (VN, Heraeus), Filtek Supreme Ultra (FS, 3M ESPE), Tetric EvoCeram (TE, Ivoclar), Empress Direct (ED, Ivoclar), Esthet X HD (EX, Dentsply), Spectrum TPH3 (SP, Dentsply) and a control shade (B2 shade of Venus Diamond (VD, Heraeus). Dual ($_D$) shade discs were additionally fabricated mimicking class I restorations: outer ring control shade (outer D=10 mm, inner D=4 mm, 2-mm thick); inner ring holes were filled with one of 7 test shades or the control shade; (n=5). Specimens were wet polished to 400-grit followed by rubber polishing (PoGo, Dentsply) for 40 seconds. Instrumental color evaluations were performed by means of non-contact spectroradiometer. All specimens were measured at the 1-mm center area with no backing. Visual color evaluation of specimens were performed by five evaluators with superior shade matching competency using a viewing booth observed in edge contact using 0/45° optical geometry, D65 illuminant and illuminance of 1.000 lx. Color difference between test and control shades was graded from 1 (perfect match) to 5 (total mismatch) for all types of specimens. Means and standard deviations were determined and analyzed by ANOV and Fisher's PLSD at the 0.05 level of significance.
Results: Single ($_S$) and dual ($_D$) specimens: color differences (ΔE*), instrumental color adjustment potential (CAP_I), visual ratings (VR) and visual color adjustment potential (CAP_V), are given in the table: Specimen type (single-dual), composite brand and their interaction were found to be statistically significant (P≤0.001), for both CAP_I and CAP_V. Fisher's PLSD intervals for comparisons of ΔE*

Comp.	ΔE_S	ΔE_D	CAP_I	VR_S	VR_D	CAP_V
ED	6.0 (0.3)	5.2 (0.6)	0.13	4.5 (0.5)	3.9 (0.6)	0.13
EX	4.6 (0.4)	2.6 (0.3)	0.44	4.3 (0.6)	2.5 (0.6)	0.43
FS	3.9 (0.3)	2.8 (0.4)	0.27	3.6 (0.7)	1.9 (0.5)	0.46
SP	7.5 (0.3)	5.5 (0.4)	0.27	4.8 (0.4)	3.0 (0.8)	0.38
TE	7.6 (0.6)	5.2 (0.4)	0.31	4.7 (0.5)	3.8 (0.8)	0.20
VN	3.9 (0.3)	2.8 (0.5)	0.28	3.8 (0.7)	2.0 (0.7)	0.47
VP	5.0 (0.4)	3.1 (0.4)	0.37	4.1 (0.6)	2.1 (0.5)	0.49

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values among specimen type and brands were 0.09 and 0.16, respectively. Corresponding values for visual ratings were 0.17 and 0.31, respectively. A strong correlation, with r^2=0.90 was recorded between visual and instrumental findings for single specimens, and r^2 was the same for visual and instrumental findings for dual specimens. An r^2=0.35 was recorded between CAP_I and CAP_V.
Conclusions: Color adjustment potential was specimen type (single-dual) and composite brand dependent. CAP_I decreased in the following order: EX, VP, TE, VN, FS=SP, ED. Corresponding order for CAP_V was: VP=FS, VN, EX, SP, TE, ED.
Acknowledgements: Funded in part by Heraeus Kulzer Gmbh, Hanau, Germany

Abstract #11

Colorimetric Comparison between Two Shade GuidesUsed for Tooth Whitening Monitoring

R.D. Paravina*, Y. Korkmaz, J.C. Ontiveros
University of Texas School of Dentistry Houston, Houston, TX, USA

Objectives: To compare color ranges and color distribution of two shade guides used for tooth whitening monitoring.
Methods: Color ranges and color distribution of Vita Bleachedguide 3D-Master (BG, Vita Zahnfabrik, Bad Säckingen, Germany) and value scale of Vitapan Classical (VC, Vita), were analyzed (N = 3). A circular area on the middle of the labial surface of the tab, excluding the cervical portion, was measured with intraoral spectrophotometer (D65, 2°).
Results: The range of color difference (ΔE*) from the lightest to the darkest tab was 36.6 (BG) and 17.8 (VC), $p<0.01$. Mean values of ΔE* among pairs of adjacent tabs were 3.2 ± 1.1 (BG) and 5.2 ± 1.7 (VC). L*C*h° ranges for BG were 23.2, 28.2 and 11.2, respectively. Corresponding values for VC were 13.4, 11.2 and 11.6, respectively. R^2 values between BG lightest to darkest tab order and L*, C* and h° were 0.97, 0.96 and 0.92, respectively, while corresponding values for VC were 0.70, 0.70 and 0.74, respectively.
Conclusions: Bleachedguide 3D-Master exhibited significantly wider color range than Vitapan Classical, wider lightness and chroma ranges, and had more consistent color distribution.

Poster Presentations

Abstract #12

Effect of Staining and Repolishing on Color and Translucency of Resin Composites

Y. Korkmaz, N. Kar, G.N. Frey*, J.M. Powers, R.D. Paravina
University of Texas School of Dentistry Houston, Houston, TX, USA

Objectives: To evaluate the effect of staining and repolishing on color and translucency of resin composites.
Materials and Methods: A2 shade of the following resin composites was used: Empress Direct - ED, Tetric EvoCeram - TE (Ivoclar Vivadent), Estelite Σ Quick - ES, Estelite Ω - EO (Tokuyama) Filtek Supreme XTE - FS (3M ESPE), Renamel Microfil – RM (Cosmedent), Spectrum TPH3 – SP (Dentsply/Caulk), Venus – VN, and Venus Pearl – VP (Heraeus). Disc shaped specimens (D=10mm, 2-mm thick, n=5 per shade, for a total of 100 specimens) were polymerized using a standard halogen light-curing unit (Demetron 501, Kerr/Demetron) for 40s. Each specimen was polished using one-step polishers (PoGo, Dentsply/Caulk) for 40 seconds. Spectrophometer (Color-Eye 7000, GretagMacbeth LLC) was used to measure color and translucency after 24 hour-storage in distilled water at 37°C (baseline), after the exposure to staining in coffee for 7 days, and after repolishing using one-step polishers for 40 seconds. Means and standard deviations were determined. The data were analyzed by analysis of variance. Fisher's PLSD intervals for comparison of means were calculated at the 0.05 level of significance.
Results: Mean (s.d.) changes in color (ΔE*) and translucency parameter (TP) in different experimental conditions are listed.
Differences between color changes after staining and repolishing (both compared to baseline) were found to be statistically significant ($p < 0.001$, power = 1.0). Fisher's PLSD intervals for comparisons between these two conditions and among the composite

Composite	ΔE* Staining-Baseline	ΔE* Repolish-Baseline	TP Baseline	TP Staining	TP Repolish
ED	2.7(0.4)	2.3(1.3)	6.7(0.3)	5.8(0.6)	5.5(1.2)
ES	1.7(0.3)	0.7(0.2)	5.5(0.4)	4.9(0.4)	5.2(0.3)
EX	3.5(0.7)	2.2(0.7)	5.0(0.8)	4.1(0.7)	4.2(0.8)
FS	5.2(1.2)	3.3(0.9)	4.5(0.4)	2.9(0.4)	3.0(0.3)
RM	7.5(1.9)	6.4(2.4)	4.2(1.0)	3.1(0.7)	3.2(0.4)
SP	4.7(0.7)	3.3(1.1)	4.8(0.3)	4.3(0.6)	4.1(0.2)
EC	5.0(0.7)	3.7(0.6)	5.8(0.8)	4.1(0.6)	4.0(0.6)
VN	4.9(1.1)	3.8(1.2)	4.7(0.7)	3.4(0.5)	3.4(0.4)
VP	3.3(0.5)	2.0(0.7)	4.5(0.3)	3.4(0.3)	3.5(0.3)
EO	2.3(0.3)	1.3(0.7)	6.0(0.3)	5.5(0.3)	5.4(0.5)

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brands were 0.41 and 0.91, respectively. No statistically significant difference was recorded between TP after staining and after repolishing and these values were highly correlated (r^2=0.97).
Conclusions: Staining-dependent color stability of evaluated resin composites decreased in the following order: ES (most color stable), EO, ED, VP, EX,SP, VN, EC, FS, RM (least color stable). Compared to baseline, repolishing of resin composite specimens caused significant decrease of color differences recorded after staining. Translucency parameter decreased significantly after staining. Repolishing did not cause significant TP changes compared to the values recorded after staining.

Abstract #13

Comparison of Translucency and Masking Ability of Different All-Ceramic Systems

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Objectives: Various studies have reported varying results for the translucency and masking ability of different all ceramic systems. The aim of this study was to compare the translucency and masking ability of 3 different all-ceramic systems with different core thicknesses.
Methods: Specimens from 3 different all-ceramic systems were prepared (n=15 per group) as the substructure of all-ceramic restorations (10 mm in diameter, shade A_2). Corresponding A_2 colored veneer porcelains were layered and glaze materials were applied on substructures (Total thickness = 1.2±0.05 mm) (Table 1). $L^*a^*b^*$ and Yxy values of the specimens on white and black backgrounds were obtained using a colorimeter (Minolta CR-321, Osaka, Japan). Color measurements were repeated 3 times at the core, core+veneer ceramic, core+veneer ceremic+glaze steps. Contrast ratios (CR) and color difference (ΔE) values were evaluated with *SPSS for Windows 11.5*. Distribution of the normality of the variables was evaluated with Shapiro-Wilk test. Within the groups, CR and ΔE values were evaluated with Bonferroni corrected Wilcoxon test. Differences in CR and ΔE between the groups were evaluated with Bonferroni corrected Kruskal Wallis test (experiment wise α=.05).
Results: Three all-ceramic systems with different core thicknesses had different degrees of translucency and masking ($p<.05$). Increased core thickness and the existence of veneer porcelain reduced the translucency and increased the masking ability for all groups ($p<.05$). Glaze application on the veneered specimens resulted in an increase in translucency with a decrease in masking ability in all groups ($p<.05$).

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Table 1. Groups in different thicknesses with composition and manufacturer information (n=15).

Groups	All-ceramic system	Substructure thickness	[Veneer porcelain + Glaze] thickness
Group 1	Turkom-cera (Aluminum oxide, Turcom-Ceramic SDN-BHD, Kuala Lumpur, Malaysia)	0.3 mm	0.9 ± 0.05 mm [Vita VM 7 (Vita Zahnfabrik, Säckingen, Germany) + Vita Akzent Glaze (Vita Zahnfabrik)]
Group 2	Turkom-cera (Aluminum oxide, Turcom-Ceramic SDN-BHD, Kuala Lumpur, Malaysia)	0.5 mm	0.7 ± 0.05 mm [Vita VM 7 (Vita Zahnfabrik, Säckingen, Germany) + Vita Akzent Glaze (Vita Zahnfabrik)]
Group 3	IPS e.max Press (Lithium disilicate, Ivoclar, Vivadent AG, Schaan, Liechtenstein)	0.6 mm	0.6 ± 0.05 mm [IPS e.max Ceram (Ivoclar, Vivadent AG)+ IPS e.max Ceram Glaze (Ivoclar, Vivadent AG)]
Group 4	3M Lava (Y-TZP, 3M ESPE AG, Seefeld, Germany)	0.3 mm	0.9 ± 0.05 mm [3M Lava Ceram (3M ESPE AG) + 3M Lava Ceram Glaze (3M ESPE AG)]
Group 5	3M Lava (Y-TZP, 3M ESPE AG, Seefeld, Germany)	0.5 mm	0.7 ± 0.05 mm [3M Lava Ceram (3M ESPE AG) + 3M Lava Ceram Glaze (3M ESPE AG)]

Conclusions: Results suggest that when a translucent restoration is aimed with no masking necessary, use of alumina ceramics with a thin core or lithium disilicate glass ceramics may be advantageous. When an opaque restoration is needed with a high masking ability, zirconia ceramics or alumina ceramics with a thick core may be more suitable. Material structure and core thickness have to be taken into consideration on a patient-by-patient basis.

Acknowledgement: This study has been supported by Ankara University Research Support Fund, Project:4

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Abstract #14

Post Glazing Value Changes of Pressable Lithium Disilicate Restorations

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Objectives: The objective of this study was to evaluate pressable lithium disilicate (IPS e.max Press, Ivoclar, Schaan, Liechtenstein) after glazing to determine if a change in color value occurred.
Methods: Thirty lithium disilicate discs were pressed and a baseline shade obtained with a handheld spectrophotometer (Easyshade Compact, VITA, Brea, California, USA) using the CIE format. The samples were glazed (IPS e.max Ceram Glaze Paste, Ivoclar, Schaan, Liechtenstein) and the shade was recorded again in the same format. The ΔE was calculated to determine the difference between the pre and post glaze specimens. Additionally, the ΔL, Δa, and Δb were calculated and assessed. One-sample and student's t-tests were used to calculate results.
Results: The average ΔE between the pre and post glaze samples was 1.8 (SD 0.5). The average ΔL between pre and post glaze samples is -1.6 (SD 0.8), meaning the value of the post glaze specimen decreased.
Conclusions: When assessing tooth shade for a restoration fabricated from pressable lithium disilicate close attention must be paid to shade matching. While the shade change between pre and post glaze specimens may not be perceptible, the error is additive. Thus, if the initial shade is not accurate, the post glaze decrease in value could change the shade enough to make the difference perceptible ($\Delta E > 2.6$) or perhaps clinically unacceptable ($\Delta E > 5.5$).

Abstract #15

Human Variables Affecting Shade Selection and Reproduction

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Objectives: The purpose of this study was to investigate the effect of individual variations on the accuracy of visual shade-selection and to assess shade-selection visually and instrumentally in-vivo, also to evaluate the effect of ceramic-thickness, inter- and intra-technician variability on shade-duplication of metal-ceramic specimens.
Methods: Fifty dentists participated as observers and were divided into five groups, according to their color-vision, gender and

clinical-experience. Each group was examined on shade-selection before and after training by software program (tooth-guide-trainer) and their scores were recorded. Shade-selection in-vivo was assessed visually (Vitapan3D-Master) and instrumentally (Vita-Easyshade-spectrophotometer). Fifty-four metal-ceramic specimens were prepared and classified into three groups (n=18/gp) according to three different technicians who built up the ceramic. Each group was subdivided into three subgroups (n=6) according to the ceramic-thickness (1,1.5,2mm on 0.5mmthickness metallic-substructures). Each technician manipulated the ceramic according to his own protocol. Duplicated shades of the specimens were evaluated instrumentally (Vita-Easyshade-spectrophotometer). The score of the dentists' exams were statistically analyzed using student's t-test and Paired t-test. Contingency-coefficient measured the relationship between the visual and instrumental techniques. Two-way ANOVAwas used to test the difference between ceramic-thicknesses, inter-technician variability and their interaction. Successive-subtraction was used to calculate the intra-technician variability.

Results: Color-vision and training had significant effect on visual shade-selection. For untrained normal color vision observers, the combined effect of gender and clinical experience influenced shade selection. There was moderate degree of correlation between visual and instrumental techniques in-vivo. The effect of ceramic-thickness on the duplicated shade was dependent on the inter-technician variability. High inter-technician variability was noticed in contrast to low intra-technician variability.

Conclusions: Color-vision-test and training-courses on shade-selection should be adopted. Instrumental shade-selection represents a valuable tool for deficient color-vision dentists and for verifying the shade accuracy of the restoration. Standardized protocol for ceramic built-up is required for proper shade-duplication of metal-ceramic restoration.

Abstract #16

Interdevice-Repeatability of Eight Equivalent Dental Measurement Devices

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Objectives: The aim of this study was to evaluate the interdevice repeatability of eight equivalent color measurement devices (Vita_Easyshade_Advance)

Methods: Ceramic discs (Vita_VM9,VITA_Zahnfabrik,Germany) of each of the 29 colors of the VITA-3D-Master system were manufac-

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tured using a mould. Color coordinates (L*a*b*) of each of these discs were measured fivefold spectrophotometrically (Vita_Easyshade_Advance,VITA_Zahnfabrik,Germany) and the interdevice repeatability between the devices tested was evaluated by calculating the mean and standard deviations of the color coordinates. **Results:** The interclass-correlation-coefficients were: L=0.9959, a=0.9934, b=0.9993

Color	Mean_L	SD_L	Mean_a	SD_a	Mean_b	SD_b
0M1	78.7	0.6	-0.5	0.3	6.3	0.4
0M2	74.0	0.5	-0.5	0.2	9.7	0.3
0M3	75.5	0.3	-0.5	0.1	9.6	0.2
1M1	71.6	0.2	0.3	0.1	10.8	0.3
1M2	72.2	0.4	-0.3	0.2	16.2	0.5
2L1.5	70.6	0.3	0.2	0.1	17.0	0.3
2L2.5	71.3	0.3	0.1	0.2	20.1	0.6
2M1	70.5	0.3	0.7	0.1	12.5	0.3
2M2	71.1	0.3	1.0	0.2	18.0	0.5
2M3	70.7	0.3	1.0	0.2	22.5	0.5
2R1.5	71.7	0.3	1.0	0.2	15.6	0.4
2R2.5	70.3	0.4	1.2	0.3	19.8	0.6
3L1.5	65.6	0.3	1.2	0.2	18.4	0.4
3L2.5	66.9	0.4	0.9	0.2	21.0	0.5
3M1	67.5	0.3	1.2	0.2	15.6	0.4
3M2	68.6	0.3	2.6	0.2	20.5	0.5
3M3	68.2	0.3	1.8	0.2	23.9	0.7
3R1.5	66.8	0.3	2.4	0.2	15.7	0.4
3R2.5	68.7	0.3	2.1	0.2	22.6	0.6
4L1.5	62.2	0.4	1.9	0.2	19.3	0.6
4L2.5	63.9	0.3	2.1	0.2	21.8	0.7
4M1	62.9	0.3	1.8	0.2	15.2	0.5
4M2	62.4	0.4	3.4	0.2	21.2	0.6
4M3	61.4	0.5	4.9	0.3	24.8	0.9
4R1.5	61.9	0.4	3.1	0.2	18.9	0.7
4R2.5	63.6	0.4	3.5	0.2	21.8	0.6
5M1	60.5	0.3	2.7	0.4	17.4	1.3
5M2	60.2	0.6	3.4	0.4	19.6	1.1
5M3	57.6	0.6	5.7	0.3	23.2	0.5

Conclusion: Within the limitations of this study the interdevice-repeatability was excellent for the devices tested

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Abstract #17

Evaluating the Color Match between Different Veneering Ceramics

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Objectives: Numerous veneering ceramics are available for producing esthetically favorable dental prostheses. However, the first prerequisite regarding the existing color categories is that these veneering ceramics should be consistent with each other. Therefore, this *in vitro* study determined the color matches of different veneering ceramics under constant test conditions.
Methods: Six ceramic discs of each of the 16 colors of the VITA classical system were manufactured from different veneering ceramics (VM9, Vita Zahnfabrik H. Rauter GmbH & Co. KG, Bad Säckingen, Germany; HeraCeram Zirkonia, Heraeus Kulzer GmbH, Hanau, Germany; IPS e.max Ceram, IvoclarVivadent AG, Schaan, Lichtenstein; Vintage ZR, Shofu INC; Kyoto, Japan, Kiss, DeduDent GmbH, Hanau-Wolfgang, Germany); using a mould. The color coordinates (L*a*b*) of each of these discs were measured five times spectrophotometrically. The means and standard deviations of the L*a*b* color coordinates of the discs of the different color categories were calculated.
Results: Within each color category, there was little correspondence of the L*a*b* color coordinates among the veneering ceramics tested. (The color coordinates and color differences will be add, because the characters will exceed the maximum of characters).
Conclusions: Within the limitations of this *in vitro* study, we concluded that the use of different veneering ceramics could result in color differences that are partially detectable by human perception.

Abstract #18

Efficacy of Visual and Electronic Color Determination

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Objectives: This study evaluated the efficacy of visual and electronic color determination.
Methods: Fifty participants were recruited for the study. Shade matching was performed with a color-corrected light source. Two VITAPAN classical shade guides, with 16 tabs originally arranged

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into four groups based on hue and within the groups according to increasing chroma (also known as A-to-D arrangement) were used. The first shade guide represented the target shade guide. The participants could not read the color information on the target tabs. First, the colors of the 16 target shade tabs were matched by each participant using the second shade guide. Next, the colors of the target shade tabs were matched using an electronic color-measuring device (VITA Easyshade Advance). Shade matching was rated as successful when the color of the target tab matched the tab of the second shade guide (visual color identification) or the color data recorded from the touch screen display (electronic color identification). The efficacies of visual color determination and the electronic color-measuring device Vita Easyshade Advance were scored as rate of exact color matches.
Results: The rates of exact color matches were as follows, according to the method used:
Visual color determination: 70.13%
Electronic color determination: 98.75%

The results depending on gender were as follows:
Women
Visual color determination: 73.38%
Electronic color determination: 98.84%

Men
Visual color determination: 66.30%
Electronic color determination: 98.64%

Conclusions: Within the limitations of this study the following conclusions were drawn when pairs of VITAPAN classical shade guides were matched visually and electronically:
(1) Electronic color matching resulted in a higher rate of exact color matches (98.75%) compared with visual color matching (70.13%).
(2) Women had a higher rate of exact color matches than men using visual color determination. The rates of exact color matches between women and men were comparable within the electronic color determination.

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Abstract #19

New Monomodal Submicrometric Inorganic Matrix for Resin Composites Development

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Objectives: The aim of this study was to prepare and evaluate a submicrometric dental resin composite (SC) containing a new monomodal inorganic matrix based in Ba-Al-Si glass fillers (Nano-Fine NF180, Schott). A micrometric composite (MC) (containing UltraFine UF1.0 (Schott) fillers) with similar composition was used as a control material.
Methods: The study was executed in two phases: (1) the inorganic fillers characterization by X-ray spectroscopy and granulometric analysis; and (2) the experimental composites formulation and their evaluation by radiopacity (R), degree of conversion (DC), hardness (H), flexural strength (FS) and modulus (FM), work of fracture (WF), surface brightness (SB) and roughness (SR) before and after wear abrasion, and creep tests. The composites were formulated with Bis-GMA, Bis-EMA 8, UDMA and TEGDMA monomers and photo-initiators. The submicrometric fillers were added in 78 wt% and the micrometric ones in 75 wt%. The data were analyzed by t-tests, Two Way Repeated Measures ANOVA and SNK test (5%).
Results: Both inorganic systems showed a narrow grain size (SC: 175±30 nm; MC: 1000±200 nm) and a homogenously dispersion in the resin matrix, although the submicrometric fillers occupied a higher surface area than the micrometric ones. The SC were similar to the MC in R, FS, WF and creep properties. On the other hand, the SC was harder than the MC ($p<0.001$), but it presented lower FM and DC than the MC. Moreover, the SC was as rough as the MC before the wear abrasion and it showed higher SB. After the abrasion process, the SB of both composites decreased and the SR increased. Even so, the SC brightness remained significantly higher than the MC.
Conclusions: The monomodal submicrometric system demonstrated a potential use in the development of dental restoratives, mainly related to the aesthetics properties when compared to a micrometric system.

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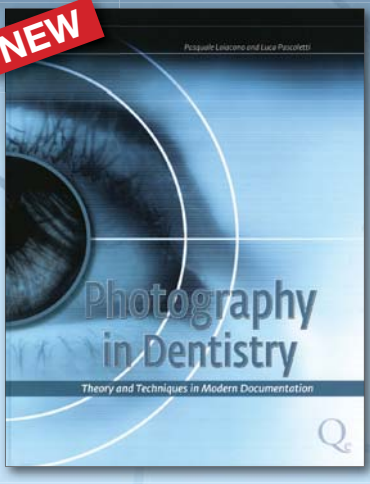

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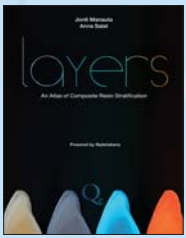

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