Dental composite curing system apparatus and method

By Dr. Mohammad Al-Bal, UAE

This invention will be a revolution in the field of dental composite restorations, as it will change the prevalent principles and the current rules within the procedure of composite application significantly. With the techniques used in this research, any composite material that has inferior properties concerning stress or shrinkage will behave as an ideal composite restorative material. I was able to achieve this outcome by decreasing the shrinkage and stress to a value of approximately up to 70% for the same materials currently used by dentists using the current techniques. This motivated me to publish my invitation.

Basically, the idea deals with the issue of reducing the side effects of shrinkage and stress of a composite.

Research and development departments in manufactory and universities tried to develop the best possible outcome concerning composites’ minimal side effects of the throughout many ways, such as:

1. As resin is the main reason for undesired side effects in composites, companies tried to create a material (a composite) by improving the quality of resin and trying to reduce it in within the composite mix.

2. Working on developing the curing light devise (light source) by increasing the light wave’s power to reach 1,000 mw/cm², increase the range of the light wave length to 300-500 nm, using a soft start technique and change the light beams coming from the tube light source from a straight to an angle beam (conic shape).

5. In addition to above, other techniques were used but with a minimal impact in reducing the undesired side effects of the composite; e.g. using a perforated plate with different shapes. Unfortunately this technique was not successful and was left aside and not commercially produced.

Considering all of these above, I will explain the difference between my invention and others. I would like to clarify a few simple things to be able to reach solid results:

1. The light beams in all light cures devices has a conic form. During the composites polymerization, unfavorable shrinkage and stress appears. Stress is the power produced from the shrinkage of a restoration connected to the edges of a tooth’s walls. The restoration cannot depart from the walls because the power of the adhesive is greater than the shrinkage power (undesired side effect). The stress power is concentrated inside the corners like a tri-angle and rectangle unlike the circle shape.

4. Using the perforated plate, it will divide the curing process within the restoration to cured and uncured areas. The uncured areas will slightly expand and compensate the shrinkage generated by the cured area. We benefit from this division that the stress and shrinkage allocated to many areas in the restoration and is not concentrated in the edges of the restoration, because when the restoration gets cured without a perforated plate, shrinkage and stress will pull the restoration to the center and the tooth’s walls will prevent this action (vide figure 1.1-1.2).

In the beginning of my researches, using a perforated plate was also not effective and I tried to find the reason what could be changed in order to succeed. The main problem using the perforated plate is that a large part of the restoration or the whole restoration is being cured (keeping in mind that the transformation from plastic -soft- form to a solid state takes 3 to 5 seconds). I made the following reasons responsible for this effect:

There seemed to be not enough space between the holes to prevent the light beam from reaching the restoration. Thus, there will not be enough uncured areas between the cured areas. Since the light beams spread in an angle shape from the source, this the cured area will be increased as well and might cure the entire restoration (vide Figure 2).

To solve this issue I came up with the idea of leaving 1 mm space between the holes. The diameter of the holes is 1 mm. In the following, I would like to point out the reason why I decided to use a diameter of exactly 1 mm and not measurements of more or less.

The main concept is trying to
I studied several combinations of both perforation size and separating distance, and examined the following:

I. Perforations of 0.5 mm did not allow a sufficient amount of curing light to pass through the perforated plate and thus was not able to cause the desired curing effect within the composite.

II. Perforations of 1 mm, allowed a sufficient amount of curing light to pass through the perforated plate (I recorded 400 mw/cm² out of a source of 1100 mw/cm²) and was able to cause the desired curing process in the composite.

III. Perforations of more than 1 mm were not desirable, mainly for two reasons:
   1. It will reduce the number of perforations possible which contradicts with the general concept.
   2. In dental practice there are restorations of 1.5-2 mm in size. Which means that a perforation of 1.5 mm or 2 mm in diameter has the potential of covering the whole surface of the restoration and that may cause the curing of the entire restoration, which is what we are essentially trying to avoid.

IV. Perforations of 1 mm diameter and 0.5 mm separating distance: I found that the light beams passing through the perforated plate (the plate must not exceed 0.5 mm in thickness to reduce the diminishing of curing light power) have almost reunited on the restoration surface after passing through the plate (due to the conic pattern of the light beams passing through the plate) and caused the curing effect on almost the whole restoration's surface.

V. Perforations of 1 mm and 1 mm separating distance: this combination allowed enough light power to pass through suitable separations, and achieved the desired result of both cured and non-cured areas of the composite's restoration.

VI. Perforations of 1 mm and 1.5 - 2 mm separating distance were not suitable for reasons very similar to the reasons that lead to the rejection of 1.5-2 mm perforations above.

VII. In conclusion I found out that a plate of 1 mm perforations and 1 mm separating distance are the best combination that allows enough curing light power to pass through the perforated plate and achieve the desired focal curing process.

My suggested shape of circular holes of 1 millimeter in diameter and separated from each other by a distance of 1 millimeter is unique and completely different from the shapes suggested in the existent proposals.

Why using circles as a perforation shape?

My experiments indicate that this formation will result in minimal shrinkage effects in comparison to other suggested formations. Furthermore, my suggested formation does not contain any angles (in contrast to the other suggested shapes of parallel lines or grid). It is well known that stress points are usually formed in the tips of angles and thus will result in minimal stress points in the restoration after polymerization.

Based on the research and after my experiments, I considered that the shapes of the cured areas have a cylinder or conic shape, when using a perforated plate with holes in circle shape. Instead, I ended up a different result:

When I investigated the cured areas within the restoration, I found out that the areas are bigger than the hole-diameter from the perforated plate and that its shape is random (not conic or cylinder shaped). Furthermore, these cured areas are fused with the cured areas next to it. It seems as if there are no effects or benefits from using the perforated plate. The reason why we received cured areas of a random shape and
YOUR GENERATION OF BONE REGENERATION.

TODAY’S DENTAL PROFESSIONALS RELY ON NUOSS ANORGANIC BOVINE BONE.

- NuOss® is physically and chemically comparable to the mineral matrix of human bone
- NuOss® is one of the most reliable bone substitutes used by dental professionals
- Natural anorganic bovine bone matrix; available in 6 different forms to best suit your surgical needs

Contact Your Local ACE Surgical Dealer.

NuOss® is a registered trademark of ACE Surgical Supply Company, Inc. Copyright © 2015. NuOss® is manufactured for ACE Surgical Supply.
New world record: Third molar erupts in 92-year-old

By Dental Tribune International

SAARBURG, Germany: Usually third molars erupt during early adulthood, typically between the ages of 17 and 25. In very rare instances, these teeth erupt at a later point in life. At the beginning of the year, a woman already in her 90s set a new record for an erupting wisdom tooth at an advanced age.

The incidence was confirmed on 25 February in Saarburg, Ingelbarg Wolf-Wimmer, who was born in 1922, was 92 years and 258 days old when she was entered into the Guinness World Records.

As reported online by the Luxemburger Wort newspaper, Wolf-Wimmer, who is originally from Austria and now lives in a nursing home in Luxembourg, complained about her denture and her dentist identified an erupting wisdom tooth as the cause of the problem. Wolf-Wimmer is now officially the oldest person in whom a wisdom tooth has erupted. The previous record was held by an 80-year-old person in South Africa.

According to the Luxemburger Wort, radiographs showed that Wolf-Wimmer has three more unerupted third molars in the palate.

By EMS

NŸON, Switzerland - E.M.S. Electro Medical Systems who is the innovator of Piezon and AIR-FLOW technologies and the leader in Prophylaxis and GUIDED BIO-FILM THERAPI announces that it signed a contract with the company Al-Hayat Pharmaceuticals based in Sharjah as the exclusive agent for all E.M.S. dental products in U.A.E.

Since its foundation in 1981, the Swiss company E.M.S. with its headquarters in Nyon has evolved into one of the most successful dental companies worldwide. Due to the concentrated power of the medium-sized company, consisting of innovative technology, perfection, precision and Swiss quality the dental prophylaxis has achieved an entirely new and virtually pain-free standard.

The new cooperation with Al-Hayat will strengthen the presence of E.M.S. additionally and will point the high quality of E.M.S. devices and products. “We are very glad about the new collaboration with Al-Hayat. The visions and strengths of this company reflect the mission of E.M.S. This ensures the highest customer service level for all clients in U.A.E. and provides the best quality to the patients”, says Hans Obermeier, Area Sales Manager of E.M.S. in Middle East.

Al-Hayat currently operates 3 offices in U.A.E. with a sales team of highly educated people. Established in 1982, it is one of the leading medical companies in the U.A.E. and has an emphatic across the U.A.E. & Middle East. Furthermore to deliver continuous education to dentists and dental hygienists the company will offer the Swiss Dental Academy courses starting from the beginning of 2016.
Dental Tribune MEA Opening Ceremony at Pavillon Royale-Biel

Presidents of Dental Association from Tunis, Turkey, KSA, Italy, Marwan, Qatar, Kuwait, Oman, in addition to FDI president

GSK booth

Crest & Oral-B booth

Colgate booth

Dr. Nabi Nader (Chairperson of BIDM 2015)

“Design is not just about aesthetics”
Dental Tribune Middle East & Africa Edition | November-December 2015

Showcase of Eye Special C-II @ FDI 2015
A Smart Digital Dental Camera for the entire dental team

By SHOFU

Since its global launch a year ago, Shofu’s EyeSpecial C-II has been hailed as a game changer for every day dental photography. FDI 2015 in Bangkok, Thailand provided the platform for Dr. Przemyslaw Grodecki to share his perspectives on the EyeSpecial C-II dental camera at the DTI Media lounge.

A successful practitioner from Poland with a stellar academic career, Dr. Grodecki is no amateur when it comes to dental photography and has worked with various DSLR cameras in his dental clinic.

An advocate of minimally invasive and holistic dentistry, Dr. Grodecki discussed how EyeSpecial C-II designed exclusively for dentistry, offers a whole new approach to dental photography. He added, “considered essentially as macro-photography in low light conditions, capturing the full dental arches or a single tooth is now much easier than ever before with the EyeSpecial C-II dental camera” EyeSpecial C-II outperforms commercial cameras of similar size to effortlessly fulfill everyday dental photography needs.

Compact and ultralight, Shofu EyeSpecial C-II is easy to use, straight out of the box, eliminating the need for complex settings, expensive training or a dedicated camera specialist, thus enabling him to seamlessly integrate dental photography in his routine treatment protocol.

This one of a kind dental camera comes with 8 automated pre-set dental shooting modes, a large, intuitive LCD touchscreen with onscreen guides and in-built distance finder to simplify usage and eliminate the need for extensive training on dental photography. Proprietary Flashmatic system in EyeSpecial C-II optimizes flash intensity, shutter speed, ISO-stop with built-in auto-focus and auto-zoom features with remarkable anti-shake capabilities to capture accurate intra-oral shades and textures while neutralizing the influence of ambient light and capturing the desired depth of field. Images can also be directly viewed on the computer, tablet or smart phone with a Class 10 Wi-Fi SD card and easily archived with the freely downloadable SureFile image management software, without the fear of patient images being misplaced. Moreover, a chemical and water resistant camera body complies with the infection control protocol in the dental operator.

Designed to meet a range of critical applications ranging from routine intraoral photography for treatment planning, orthodontic evaluation, informed consent, lab communication, training, legal / malpractice defence to practice marketing, the EyeSpecial C-II in short enables the dental team to easily capture precise dental images every time.

Contact Information

SHOFU Dental Asia-Pacific PTE LTD
T: (65)-6377 2722
F: (65)-6377 1121
E: mailbox@shofu.com.sg
W: www.shofu.com.sg

Tooth enamel first evolved in the skin

By Dental Tribune International

UPPSALA, Sweden: Tooth enamel is the hardest substance produced by the human body. Since enamel is one of the four major tissues that make up the teeth and gives them their distinctive shiny white appearance, it comes as a surprise that a study has found that enamel most likely originated from an entirely different part of the body: the skin.

Unlike humans, who only have teeth in the mouth, certain fish species have little tooth-like scales on the outer surface of the body. In the study, researchers from Uppsala University in Sweden and the Institute of Vertebrate Paleontology and Palaeoanthropology in Beijing in China analysed Lepisosteus, an ancient gar fish from North America whose scales are covered with an enamel-like tissue called ganoine.

They found genes for two of the three unique matrix proteins of enamel expressed in the genes of Lepisosteus’s skin, and this strongly suggests that ganoine is a form of enamel. In order to determine where the enamel first originated—the mouth or the skin—the researchers then investigated the dermal denticles on two fossil fishes: Psarolepis from China and Andreolepis from Sweden. In Psarolepis, the scales and the denticles of the face are covered with enamel, but there is no enamel on the teeth; in Andreolepis, only the scales bear enamel.

Their findings suggest that enamel in fact first evolved in the skin. Dr. Per Ahlberg, Professor of Evolutionary Organismal Biology at Uppsala University, explained: “Psarolepis and Andreolepis are among the earliest known toothless fish, and there is no evidence that their lack of tooth enamel is primitive and not a specialisation. It seems that enamel originated in the skin, where we call it ganoine, and only colonised the teeth at a later point.”

The study is the first to combine palaeontological and genomic data in a single analysis to explore tissue evolution. The results have been published online on 25 September in the Nature journal in an article titled “New genomic and fossil data illuminate the origin of enamel.”
The University of Copenhagen and University of Ceyl and Munich conduct ed a joint study comparing the reliability of three teeth shade color assessment methods used in dentistry. The study evaluated TRIO® shade measurement tool versus the MHT SpectroShade™ spectrophotometric computer-based system and the human eye.

The university study found that the two objective methods, TRIO® digital impression solution’s shade measurement tool and the MHT SpectroShade™ spectrophotometric computer-based system, to be more reliable than the conventional visual system – the human eye. This is in accordance with a number of other studies cited by the study’s authors. [1, 6, 16]

Published in the International Journal of Oral and Dental Health, the 2015 in vivo study compared the three tooth shade color assessment methods. Concluding that “The reliability of the objective, computer-based systems was higher compared with the subjective, visual method for color determination.”

Shade matching in the restorative workflow

The study noted that patients consider shade match to be the most important factor when judging the quality of a restoration, especially in the anterior region.

However, reliable visual shade selection by the human eye and in nature can be inconsistent due to the complexity of tooth color and outside factors like room lighting, patient clothing and even makeup.

To compensate for these variables, the study performed the color determination in natural daylight, but away of all windows with no direct light. Patients were sat in the same unit chair and with the dental lamp turned off. The angle of the view for MHT Spectroshade, “Shape TRIO® Color and subjective VITA 3D-master Vitapan was the same. Lipstick or other effects that may affect color assessment were removed and patients with strong colored clothing were covered with a white-grayish cloth.

The study found TRIO® shade measurement to be more reliable than the human eye. An important result because less practices have the time or resources to meet the ideal conditions used in the study for evaluating patient teeth shades. When you factor in possible doctor or assistant eye fatigue as well, then the proven reliability of TRIO® shade measurement becomes even more significant. To be able to rely confidently on TRIO® to identify teeth shades saves a tremendous amount of time and steps in the workflow and adds consistency and accuracy to the procedure.

TRIO® is the only intraoral scanner on the market with an automatic shade measurement tool included. The digital impression solution embeds the teeth shade information into the intraoral scan which is then used to design the restoration. This makes communication of the unique teeth shades much simpler and eliminates several steps in the workflow for both the lab and dentist.

The teeth shades are embedded in the scan. And in TRIO® case, the digitally-shared scan can be augmented with HD intraoral images and video – as TRIO® also includes an intraoral camera featuring high speed video and image capture integrated within the IO scanner.

Study methodology

The study pitted the three shade measurement methods against each other: the subjective (scanner) method and the objective TRIO® and MHT SpectroShade™. Eighty-seven teeth from twenty-nine patients were used in the testing.

Visual pairwise comparison was used in the study for benchmarking because the human eye and perception is believed to be the most important factor in color evaluation.

The study concluded by supporting the use of scanning and color measuring computer-based systems for dentistry.

Saying, “the TRIO® Color Shade system as well as the MHT SpectroShade™ colorimetric system were able to measure all the various shades appearing all over the tooth surface, thus give a very detailed shade determination at the tested tooth.”

The study also determined that “the further development of such systems for clinical use would be warranted and could serve as a valuable tool for material selection and restoration design, particularly in the area of aesthetic, restorative dentistry.”

References

*Effectiveness of Shade Measurements Using a Scanning and Computer Software System: a Pilot Study