Australian researchers transform teeth into early-stage brain cells

New findings could aid in the therapy of stroke victims

Scientists from Melbourne in Australia have recently presented the world’s first dynamic virtual mouth that includes 3-D representations of the anatomical features of teeth, gingivae, tongue, cheeks and palate. Using a technique called smooth-surface particle hydrodynamics, it was developed on real data on the physics of chewing at the Commonwealth Scientific and Industrial Research Organisation, the Australian national science agency.

According to the researchers, the new mastication model will help to predict how a particular food breaks down and how flavour is released into tie saliva to the taste buds. In addition, it will show the distribution and interaction of components such as salt, sugar and fat, they said.

The invention holds important implications for getting a better understanding of food structures and the sensory experience of consumption as well as for other areas like oral health.

First 5-D dynamical virtual mouth

A standard for dental records

The Niigata division of the Japan Dental Association is planning to standardise dental records nationwide to improve the identification of bodies in emergency situations such as large-scale disasters.

In order to increase identification efficiency, the association said it wants to implement an optical mark recognition sheet with 28 check items, including past treatment, that has shown to expedite the matching process of dental remains dramatically.

The initiative, which is part of a larger project by the Japanese Ministry of Health, Labour and Welfare, was successfully tested last year with dental information gathered from over 1,700 patients from the Niigata prefecture.

Sterilisation ineffective

Using disposable rather than non-disposable syringe tips could potentially decrease the risk of cross-infection between dental procedures, even when the latter kind have been thoroughly sterilised several consecutive times, researchers from New Zealand have suggested in the latest issue of the Australian Dental Journal.

NextGen materials

Researchers at the Vienna University of Technology have reported to have developed a new generation of photoactive materials based on the element germanium in partnership with dental manufacturer Ivoclar Vivadent. Initial tests have shown that it considerably reduces the duration of the hardening process for fillings.

Dr. Mahesh Verma (left) recently received the Padma Shri Award, one of the highest civilian awards in India, for his contribution to the field of dentistry. Verma is currently president of the Indian Dental Association.

www.dental-tribune.asia
As a result, numerous studies have shown predictable results using autogenous bone, which also have bone substitute materials. However, within the last decade, the role of autogenous bone as the "golden standard" for sinus grafting procedures has been increasingly discussed, since same results can be obtained using bone substitute materials without additional donor-site morbidity and additional stress for the patient.

In the webinar, different approaches of sinus grafting procedures, the selection of different bone substitute materials, clinical and histological results and a sufficient complication management will be discussed.

Research from Singapore wins implantology award

SINGAPORE/GENEVA, Switzerland: For her research on the clinical efficacy of the sandwich bone augmentation technique, Dr Jia-Hui Fu from the National University of Singapore’s Faculty of Dentistry has just been awarded the André Schröder Research Prize by the International Team for Implantology (ITI) in Geneva in Switzerland.

In her paper, published in the journal Clinical Oral Implants Research, she and a team of researchers were able to show that the technique provides predictable results in the regeneration of buccal bone on dental implants.

Fu was recognised for the first part of her study during which she was collecting clinical and radiographic parameters between 2009 and 2011 as part of an overseas scholarship at the University of Michigan in the United States. Follow-up research, which has recently been submitted for review, according to Fu, will focus on the biological and structural phenotypes of the bone that has been regenerated via the technique.

“We observed that implant design affected bone regeneration at the platform level and will explore the influence of implant macro- and micro-designs on the stability of regenerated bone in subsequent studies,” she said.

First reported about a decade ago, sandwich bone augmentation utilizes the different healing properties of particulate cancellous and cortical bone allografts. These are layered on the implant surface and protected by a bovine pericardium membrane, mimicking native human bone structure. The technique has demonstrated several advantages compared to the method of harvesting block grafts, such as reduced surgical trauma and treatment time.

Internationally-educated Fu, who is currently working as an Associate Professor at the National University of Singapore, is the first dental professional from Singapore and the second from Asia to have won the Prize, which has been awarded since 1992 to researchers who contributed significantly to the area of dental implantology and oral tissue regeneration, according to the ITI. Named after the organisation’s founder, a Swiss professor and pioneer in fixed tooth replacements, it is endowed with the sum of 20,000 Swiss Francs ($US22,500).

In addition to its award, the ITI says to provide 2 million Swiss Francs ($US 2.25 million) annually to research in both fields.

International Implant

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DT Asia Pacific

DHAKA, Bangladesh: Students planning to take up an education in dentistry in Bangladesh this year will have to study longer, as the country’s Medical and Dental Council in the capital Dhaka has approved a new curriculum at its general meeting, which was held in early May. Among other things, it will see Bachelor of Dental Surgeon (BDS) programmes extended to five years.

Timelines for the annual examinations will also be changed in order to give students more time to focus on practical learning when the new guidelines will become effective later this year.

The previous dental curriculum, implemented in 2007, required BDS students to study for four years which, according to representatives of the Bangladesh Dental Society, proved insufficient for remaining competitive with students from other countries where students often have to complete longer programmes.

Similar rules were already implemented successfully with new guidelines for academic degrees in medicine and general surgery last year, they told the newspaper Dhaka Tribune last week.

The update for dental programmes will become valid for students who enroll for the next academic year 2014–2015 starting in fall. All graduates who have started under the previous curriculum will not be affected by the changes, the Council said.

Bangladesh has currently 1,700 seats available in 23 dental colleges nationwide, of which over 90 per cent are operating privately, according to figures from the Directorate General of Health Services, an agency working under the country’s Ministry of Health and Family Welfare.

Dental curriculum in Bangladesh revamped

“Should our results continue to be as successful as they have been, we hope to see this work entering clinical trials within the next five years,” she told Dental Tribune Asia Pacific.

The centre, a collaboration of academic and medical institutions at the university, has been working on brain therapies based on dental stem cells since 2005. Among other findings, it has discovered that treatment with stem cells after a stroke can lead to improved cognitive and motor skills in rodents. The recent findings published in the Stem Cell Research and Therapy journal were part of wider research on developing a laboratory-based model for actual treatment in humans.

“Ultimately, we want to be able to use a patient’s own stem cells for tailor-made brain therapy that doesn’t have the host rejection issues commonly associated with cell-based therapies,” Ellis said. “Dental pulp stem cell therapy may also provide a treatment option available months or even years after the stroke has occurred.”

According to research, dental stem cells derived from the pulp of primary or adult teeth hold great potential for future regenerative therapies. For example, they have been successfully transformed into a variety of tissues including blood, bone and nerves, by researchers. In comparison with stem cells extracted from bone marrow and other sources, they are easier to collect and pose fewer ethical problems.

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Dear reader,

These really must be exciting times for anyone doing research on dental stem cells because in addition to its potential for successfully treating dental and craniofacial diseases, these cells have also been found to be useful in the therapy of a number of general conditions such as inflammatory or neural diseases, as recently demonstrated by researchers from Australia.

Cell populations with stem cell characteristics however cannot not only be found in dental pulp. Scientists have identified them in five other dental tissues including the periodontal ligament and the apical papilla.

This knowledge puts the mouth right in the forefront of efforts to fight existing and future diseases. If the therapeutic potential of these cells is finally unleashed, the saying “oral health is important for general health” will have an entirely new meaning.

Yours sincerely,
Daniel Zimmermann
Group Editor
Dental Tribune International

Dental Tribune welcomes comments, suggestions and complaints at newsroom@dental-tribune.com.

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Perfect restorations

Restoring damaged or missing teeth has always been a tough challenge, since ancient Egypt until the present time. Rapid developments in the field of CAD/CAM systems in the last decade are bringing us closer to our goal of achieving the perfect restoration. Computers are, beyond doubt, far superior to humans in determining such critical parameters as evaluating dimensions, angles or spaces. Furthermore, what we see on the screen is often what the milling unit or 3-D printer produces.

It is the obligation of every one of us to join this fast-moving industry. We owe it to our patients, as well as to ourselves, to become acquainted with and put to use all available technology to offer the best possible treatment. I believe that digital and CAD/CAM restorations are taking over in setting the standards for dental restorations.

They are precise, predictable and much easier to produce.

We are certainly coming closer to our goal. The perfect restoration appears to be just around the corner.

Dr Munir Sibwadi

Dental Tribune Asia Pacific Edition No. 5/2014

Developing hand skills

In general dental practice, simple to moderate restorative cases dominate the total workload in the practice and the financial gain ratio is comparatively high in simple cases compared with full mouth rehabilitation or other complex treatment. However, it is interesting to note that our young dentists in dental practice are focusing on complex case management and not giving due priority to Class V restorations, in-lays, onlays, mild anterior crowding, maintaining optimal oral hygiene, enhancing tooth colour, etc. Globally, the focus is on implant and full mouth restorations, which requires in-depth clinical knowledge and skills in simple case management first.

Personally, I always advise my trainees to develop hand skills in direct composite resin restorations, as a good dentist must have artistic hands. Once we understand the minute details (texture, colour, anatomy and effects) of natural teeth using direct restorations, it is easy to obtain quality work from the laboratory and achieve high clinical results. In order to treat complex cases, such as cosmetic full mouth rehabilitation, temporomandibular joint dysfunction (TMD) and sleep medicine, one must complete the required continuing education and learn clinical skills at quality training centres.

MiCD and TMIA harmony dentistry are becoming quite popular because of their do no harm approach to clinical practice and simplicity in training approach that focuses on skill acquisition.

As a practising clinician and presenter of various international training programmes, I feel that every good clinician should participate in a clinical teaching programme, if possible, because this will help clinicians to remain updated and promote personal happiness by sharing their knowledge and skills for better patient care around the world.

Dr. Sushil Koirala is Editor-in-Chief of Dental Tribune – Asia Pacific’s sister publication cosmetic dentistry. He can be contacted at skoirala@wlink.com.np.

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We are certainly coming closer to our goal. The perfect restoration appears to be just around the corner.

Dr Munir Sibwadi is specialist in prosthodontics, implantology and CAD/CAM dentistry from Dubai in the United Arab Emirates. He can be contacted at mubs@wlink.com.np.

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International organisation aims to redefine nickel-free label in dental products

**DTI**

GENEVA, Switzerland: The International Organization for Standardization (ISO), one of the world’s largest developers of voluntary international standards for products and services, is currently revising its recommendation for metallic materials for restorations and appliances. The revision will bring about a modification of labels that proclaim a dental product nickel free.

As reported by the American Dental Association at the beginning of April, ISO aims to clarify and redefine the term “nickel free” in its ISO 22674 standard.

The norm classifies metallic materials that are suitable for the fabrication of dental appliances and restorations, and specifies requirements with respect to the packaging and marking of products and to the instructions to be supplied for the use of these materials. It further allows manufacturers to employ the term “nickel free” if a product contains less than 0.1 per cent nickel.

The revision to the standard would oblige manufacturers to account for trace amounts of nickel in metal alloys with a label change, including the statement “nickel free: contains less than 0.1 per cent nickel”, similar to food product labels that indicate traces of substances that are associated with allergic reactions, such as peanuts, ADA stated.

**US adults stay away from dentist**

**DTI**

WASHINGTON, USA: The latest figures released by US research company Gallup indicate that almost one-third of Americans do not visit the dentist once a year, although this is generally recommended. In large-scale public opinion polls conducted in 2008 and 2013, only about 65 per cent stated that they had visited the dentist at least once in the previous year.

The survey also showed that more women than men visited the dentist. In 2013, 67.2 per cent of the female participants but only 62 per cent of their male counterparts reported visiting the dentist annually.

With regard to ethnic variation, the investigators observed that in 2013 about 55 per cent of black and Hispanic participants said that they had visited the dentist in the past year, compared with about 70 per cent of white and Asian participants.

According to Gallup, similar results were observed in 2008. However, there was a slight decline in the black population. In 2008, the percentage of black participants who visited the dentist in the past year was still at 58 per cent.

Participants’ dental care-seeking patterns appeared to differ according to marital status too. The investigators said that in 2013 married participants (70.9 per cent) visited the dentist more often than single individuals did (60.7 per cent). In addition, the survey showed that those who were separated visited the dentist the least often. The rates dropped the most among this group: from 52.4 per cent in 2008 to 46.6 per cent in 2013.

Data for the survey was obtained through telephone interviews with 178,072 US adults conducted during 2013 and with 354,645 adults conducted during 2008 as part of the Gallup–Healthways Well-Being Index, a research project to track and understand the key factors that drive well-being commissioned by Gallup and health services provider Healthways.
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Improving Oral Health Globally
“The trend towards the medium-price range has accelerated”

An interview with Straumann executive board member Frank Hemm about the company’s recent investment in MegaGen

Following previous investments in Brazil, Germany and Spain, Straumann recently announced that it has bought convertible bonds worth US$50 million from MegaGen, one of the largest dental implant solution providers in South Korea. At the recent World Symposium on the International Team for Implantology in Geneva in Switzerland, on behalf of Dental Tribune Asia Pacific, implants magazine Managing Editor Georg Isbaner had the opportunity to talk with Frank Hemm, a member of Straumann’s executive management board, about the investment and how it will affect his company’s position in the Asia Pacific region.

DT Asia Pacific: According to analysts, South Korean manufacturers are expected to dominate the market for dental implants in Asia in the years to come. Is this projected development the main reason for your investment in MegaGen?

Frank Hemm: South Korea is one of the largest markets for implants in terms of volume. More than two million implants are placed every year and local manufacturers are looking to expand into other Asian markets with high potential. China is a good example, where the market is still comparatively small but under-penetrated and growing quickly.

In these markets, the premium implant segment, where Straumann has been and still is very active, is growing less dynamically than the medium- and low-price segments are. We see the same trend in other markets, like Brazil, where companies like Neodent sell higher volumes than premium providers do. Two years ago, we had to ask ourselves whether we could address the non-premium segment with our existing brand or whether we needed a second brand. We decided on the latter and purchased a 49 per cent stake in Neodent. As an established brand in the region, MegaGen gives us a foothold in the Asian “value” (medium-price) segment. The convertible bond approach means that we have the option to gain a majority stake in 2016 with a managed low risk.

Straumann has always provided premium dental implants backed by solid scientific evidence and service excellence. These key differentiators make it necessary to use a separate brand strategy to address customers who are willing to accept lower standards and who want to pay less for implants. The value segment is growing exponentially and developing a new brand from scratch would simply take too much time and too many resources, which is the reason we chose to invest in other established companies.

Both companies have said that they will continue to operate separately. Still, do you expect any synergies to arise from this partnership?

It is important to keep both businesses completely separate to ensure that customers do not think that Straumann is MegaGen and vice versa. The only synergies we see are in supporting the value brand to enter selective markets, and in sharing back-office functions, like infrastructure, information technology or accounting. Everything else is handled by each company independently. Straumann products are certainly produced in Straumann facilities and this will continue to be the case in the future.

What position is your company generally aiming for in the Asia Pacific region?

We aspire to market leadership in the region. We are not there yet, partly because our Roxolid implants with the SLActive surface are not yet available in the larger markets. We recently received approval for SLActive Tissue Level implants in Japan and the sales figures demonstrate the extent of the potential of our innovative technologies.

Achieving a leading position in Asia will certainly have a positive influence on our global position.

What requirements will have to be fulfilled for you to exercise the option to convert and acquire a majority stake in MegaGen in 2016?

We are keeping a close eye on the company’s development. MegaGen is a relatively new enterprise. It is growing dynamically and has many ambitions that still have to be realised. We also want to see how the market develops and the extent to which MegaGen can penetrate certain areas. The company’s valuation is another item on our radar. If our expectations are met, we can convert the bonds into shares in 2016 or require repayment with interest. That is the flexibility that this option allows us.

Should you decide to convert the bonds into stock, another large international implant conglomerate would be created. Is it only possible to survive in the long run as a large market player?

“In unlike in some industries, scale in the dental implant industry does not have inherent returns.”

The implant market is still very fragmented and the market share of larger corporations is actually declining. There are hundreds of smaller providers, often founded by dental clinicians, that come and go because they do not have the capability to expand internationally. Few companies succeed in making this jump and remaining in the market for a longer period.

Unlike in some industries, scale in the dental implant industry does not have inherent returns.

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Georg Isbaner (left) in talks with Frank Hemm. (DTI/Photo Henrik Schröder, Germany)
Sirona unveils new unit for new markets

INTEGO treatment centre meant to offer premium quality at affordable prices

Daniel Zimmermann
DTI

BENSHEIM, Germany: Checking the latest investment figures, Jeffrey T. Slovin looks relaxed and pleased with himself. Minutes ago, the 49-year-old CEO of Sirona was still rocking the stage in front of 600 guests in a specially prepared production room at the company’s site in Bensheim in Germany for what he says is probably one of the most important product launches in his company’s recent past.

Developed to fill a gap between its C8+ and SINIUS dental chairs, the new INTEGO treatment unit was developed to be a door opener to new markets in which the Germany company took significant investments—markets such as Asia where Sirona opened a new regional headquarters at the end of last year. Excluding the German-speaking countries, however, it will also be supplied in established markets like Scandinavia and Southern Europe, according to Executive Vice President of Sales Walter Petersohn.

Balancing this stretch, however, made it necessary to offer two versions of the unit, named BASIC and PRO, that can serve practitioners with normal treatment requirements as well as specialists who want to perform advanced procedures like implantology or endodontics. For the latter group, the PRO version will offer enhanced features such as an automatic disinfection device or the possibility to add an apex locator. Moreover, it will be equipped with a touch screen panel and a four-way footswitch for more intuitive control. Both versions of the INTEGO will be available with hanging hoses or whip arms in a variety colours to fit different practice environments. Emphasis was also on improved ergonomics with the unit featuring a thinner backrest, more comfortable upholstery, and flexible height adjustment.

The units are going to sell between €35,000 and €25,000, depending on the specific configuration—significantly less when compared to some of the company’s current flagships which sell for up to €50,000. However, Peterson made an assurance that the lower price tag does not mean a compromise in the quality the company is known for around the globe.

“We are proud to still be able to offer a product which is a hundred per cent made in Germany but for which we were able to significantly reduce production costs,” he said.

While the BASIC version of the INTEGO is scheduled to launch in July, the PRO version is anticipated to follow later this year. However, it will take at least until the next IDS in Cologne before registration is received in all target regions and for it to be available in all markets, Petersohn added. Asked about the company’s existing dental chair portfolio comprising four major brands, of which the latest was launched only four years ago, he assured that all will continue to stay for the time being.

“We will let the market decide what the future of each unit will look like,” he said.
Using the same material for different cases

Anterior ceramic restorations placed with the adhesive luting technique

In many clinical situations, a combination of full and partial restorations is indicated. In order to fulfill (bio-)mechanical, functional and aesthetic requirements, it is of utmost importance for clinicians to select the most suitable ceramic materials for each individual case. A thorough knowledge of the latest ceramic systems and adhesive luting techniques is all it takes to fabricate partial restorations according to biomimetic principles.

In our case, a 28-year-old female patient consulted our practice with her request to improve her smile. She was particularly concerned about the appearance of her four maxillary anterior teeth. Orthodontic treatment would have been an elegant solution to realigning both the maxillary and the mandibular arches, but the patient declined this option. Another approach therefore had to be taken to meet her needs.

Teeth 11 and 21 had previously been restored with porcelain-fused-to-metal (PFM) crowns. Besides them appearing very bulky, teeth 12 and 22 (the two lateral incisors) appeared to have been pushed back (Figs. 1 & 2). The patient also had very bright teeth, which would have to be correctly imitated by applying internal highlights (Fig. 3). On the basis of the aesthetic treatment plan, a mock-up of the outcome with the patient was used to discuss the desired outcome with the patient.

The pushed-back position of the lateral incisors was to be restored with veneers, followed by minimal preparation and new crowns for the central incisors. The lateral incisors were minimally prepared according to the anterior matri (Figs. 4 & 5). The space available for the new restorations was shown to be ideal after the PFM crowns were removed from teeth 11 and 21. The remaining amount of tooth structure was adequate to provide biomechanical reinforcement for the two central incisors (Fig. 6), which is also known as the ferrule effect. Therefore, we decided to place the new ceramic restorations according to an adhesive luting protocol.

Based on the information that was available about this case (the colour of the enamel and the tooth core etc.), the laboratory technician selected a suitable press ingot (IPS e.max Press, Ivoclar Vivadent; Fig. 7). The challenge was to select an ingot that would accommodate both the crowns for the highly chromatic and luminous central incisors and the thin veneers for the light lateral incisors (Fig. 8).

When maximum brightness is desired in restorations on intensively coloured bases like the two incisors in this case, a medium opacity ingot is the first choice, as it provides a medium level of opacity, as well as good masking properties and...
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¹ Bodini M.
² Vasiliki et al. Efficacy of high C-factor posterior dental crowns on adhesion to cavity-bottom dentin. Biomedicines 2017, 5, 297

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a high degree of fluorescence. The minimally prepared teeth did not provide a binding colour for the partial restorations. Therefore, a more translucent type of ingot would impart a greyish appearance to the relatively thick lithium disilicate veneers. Owing to this, we usually prefer a fluorescent (medium opacity) ingot to ensure the appropriate brightness of the restored teeth.

The restorations were finally fabricated using the well-known press technique. Since the patient had very intensively coloured gingival tissue and dark red lips, the tooth necks had to be saturated with IPS e.max Ceram Oclusal Dentin brown and Deep Dentin A1, in addition to the selected A1 shade (Figs. 9 & 10), for a smooth transition between the tooth necks and the restorations. A large amount of information, which was extremely helpful in the finishing, was provided for the laboratory by means of close-up photographs of the teeth and gingival tissue, as well as the patient’s face showing various natural facial expressions. The surface texture and the shape of the teeth (Figs. 11 & 12) were carefully recreated. Finally, the restorations were prepared for placement.

Conclusion

Upon seating the restorations, it was evident that our treatment approach had been successful and the teeth blended in smoothly with the dentition. The overall impression was harmonious (Fig. 13). The ingot that had been selected was shown to be ideal for this case. There was no difference in shade between the two crowns on the central incisors and the adjacent veneers (Figs. 14 & 15). A highly aesthetic solution was achieved with minimally invasive tooth preparation (Figs. 16 & 17).
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Seven ways to increase dentin bond strengths

Dr Dan Fischer
USA

If you battle with debonding restorations, post-op sensitivity, or microleakage, weak adhesion to dentin could be your problem. There are multiple factors that can impact the quality of dentin bonding, many of which are overlooked or unknown. It can be difficult to see the impact of these factors in a clinical setting. The Research and Development team at Ultradent has performed tens of thousands of lab tests, introducing different variables to find the most fool-proof process for effective dentin bonding. Before approaching these steps, however, it is critical to ensure that some fundamentals are in place.

Bonding can only be predictably performed on hard mineral dentin. All soft, affected tooth structure must be removed to achieve adequate and maximum bond values. Adhesive or minimally invasive dentistry is not dictated by cavity prep design, but rather by simply excising the lesion. Quality adhesive reconstruction will last for many years of durable service if attention to detail is followed.

Tissue management is paramount. The clinician must be in control of all oral fluids before bonding begins. A rubber dam can be a great help but sometimes it simply isn’t practical. Control of bleeding, saliva and pulpal fluid are paramount to predictable bond. I can’t imagine performing adhesive dentistry near or under soft tissues without Visiostat or Astringent X and the Dento Infusor.

A clean and dry air source is required for quality bonding to occur. It is recommended that clinicians use a dedicated air syringe in each operatory to avoid water leakage, which is common in air/water combination syringes.

The most important element to assure quality adhesion, assuming a quality bonding agent is used, example Peak Universal by Ultradent or Cleargel SE by Kuraray, is to prevent contamination. My definition of adhesion is that “any substance which comes between mineral mother dentin and your adhesive is a contaminant”.

Laser-prepared surfaces on both dentin and enamel do not create the ideal surface for bonding. In fact, laser preparation can contribute to a 20 per cent reduction in bond values, on average, due to microscopic fracturing of the surface. To regain the highest bond value, it is imperative to freshen every laser-prepared surface with a diamond bur prior to etching.1,2,3,4,5

With these bonding “best practices” in place, clinicians can increase bond strengths even further by incorporating insights from Ultradent’s lab testing. These lab tests resulted in eight simple, controllable steps for ensuring the highest quality bond strengths.

Step 1: Etch for the appropriate length of time be it with “self-etch” or phosphoric acid etch.
Most phosphoric acid etch preparations can etch too deep if left too long on the surface. A fumed silicate type phosphoric like Ultradent is more forgiving in this regard.

Step 2: Ensure ideal dentin moisture conditions.
Manufacturers use solvents (acetone, ethanol, water) in adhesives to thin resin chemistries, allowing the adhesive resins to flow into the depths of the etched zone. Since the solvents used are hydrophilic (water-loving), they will actively carry the primer or adhesive into moist dentin better than dry dentin. Each solvent type works differently with moisture levels, with ideal conditions for each described below.

Acetone-Containing Adhesive Systems
Ensure the dentin surface is glistening with moisture. This can be easily achieved by using a cotton pledget and dabbing off the excess moisture. Adhesives that contain acetone are particularly sensitive to over drying. If the tooth surface is not moist prior to adhesive application, a substantial loss in bond strength will result.

Ethanol-Containing Adhesive Systems
Adhesives that contain ethanol do not require as much moisture. Leave the dentin surface damp by using the air syringe for no more than one second, blowing off visible surface moisture. Do not direct any substantial sustained air at the surface. A chalky white or over-dried surface will decrease bond values.

Self-Etching Adhesive Systems
Systems that contain water can be placed on slightly drier surfaces. The water in the self-etch adhesive is the carrier for its acid. Thin for one to three seconds prior to adhesive application.

Step 5: Pay attention to application time & technique.
It is quite important to leave adhesives on site as long as suggested by the manufacturer. In a busy dental office, it is easy to count too fast; watch the clock instead. It is crucial to give the adhesives time to penetrate or wet the deepest etched zones created.

With self-etch adhesives being less acidic than phosphoric acid, it is important to leave the adhesive in place long enough to properly etch and penetrate the dentin and enamel.

Also, be sure to scrub in the adhesive if the manufacturer recommends it. Usually, scrubbing adhesives into dentin will increase bond strengths by a few per cent and allow for a much more consistent and reliable bond. On the other hand, scrubbing enamel will slightly decrease bond strengths. When possible in the same preparation, treat enamel more delicately and dentin more aggressively.

Step 4: Thin and dry the adhesive properly.
All adhesives should be dried before they can polymerize properly. This means that all adhesives need to be aired so they’re paper thin (in the case of Peak) and then air dried. The best way to accomplish this is with a gentle air stream, using half air at 1 to 2 inches from the surface.

A properly thinned adhesive will look uniformly glossy without pools; pooled product contributes to a substantial decrease in bond strength due to trapped solvents. Leave the air on long enough in a gentle stream so that there’s no movement in the resin, just drying, to finish volatilizing the solvents. This allows monomers to polymerize properly for the highest strengths possible.

Step 5: Light cure close to the surface with a compatible light.
Place the curing light as close to the restored surface as possible.
as reasonably possible. This ensures that the materials are exposed to sufficient energy for a proper cure. At a distance of one inch, many lights will only produce ten per cent or less of the energy that they do at one millimetre.

Only a few of the newest generation of LED lights produce a “broadband” wavelength, meaning they actually emit more than one colour of blue. This is important due to the fact that many dental materials contain initiators (light sensitive chemicals) that react to deeper blue and violet colours of light. Manufacturers use multiple formulations for their product lines, with in- cisal enamel shades often containing different amounts or even different initiators than the dentin/body shades. “Broadband” LED curing lights inspire more confidence in those situations, since they emit several wavelengths, similar to how quartz halogen lights function. An unsurpassed quality broadband LED is Ultradent’s VALO.

Step 6: Place the first increment of composite in a super thin layer.

In order to achieve a “monoblock” restoration (tooth, adhesive and composite acting as one), it is important to place the first layer of composite at a depth no greater than 0.2 millimetres in thickness. Another way to improve adaptation to the adhesive layer is to use a flowable composite for the first layer. However, avoid “bulk filling” due to stress build-up issues.

Step 7: Never use expired product.

Products that contain solvent are subject to problems with evaporation. Securely tighten all lids to reduce the risk of solvent loss, which could lead to poor product performance.

Conclusion

Many clinicians will have the opportunity to increase dentin bond values in their practice by incorporating a few simple practices into their bonding procedures. It is important to start with a solid understanding of bonding fundamentals. After this base is established, eight controllable factors contribute to the final bond value achieved; in combination, this increase or decrease can be dramatic.

References

Experience truly unbeatable value for money: Synea Fusion. Uncompromising user comfort with optimal LED illumination, 4x spray and quiet, vibration-free operation included.