the literature. These slow growing dense cortical bone deposits usually do not cause patient issues except where removable prosthetics must sit either adjacent to or over these areas. Because the overlaying tissue is thin, it may ulcerate easily due to appliance pressure or abrasion from some foods.

Excision of exostosis in the mandible is a safe predictable procedure with minimal postoperative sequela. As an alternative to a scalpel, the Bident bipolar electrosurgical unit provides an incision without charring of the flap edges as would be seen with monopolar electrosurgical units.[10] The bipolar electronic surgical tip produced a smaller temperature gradient (average difference, 9.2 degrees C) at the 1-mm tissue depth compared with the monopolar electrosurgery tip (average difference, 14.6 degrees C).[11] Additionally, arcing commonly seen with monopolar electrosurgery units when cutting near metallic restorations or dental implants is not observed with the Bident electronic unit making its usage safe.[12] The tip additionally provides coagulation of the capillaries transected during the incision and hemostasis is maintained providing better visability in the surgical field then would be expected with a scalpel incision.

The dense nature of the exostosis allows it to be cleaved in a single piece with a chisel after appropriate scoring of the bone. Use of surgical chisels has decreased over the past twenty (20) years for fear the potential of soft tissue damage should the tip of the chisel slip.[13, 14] Chisels may be used safely when a periosteal elevator is placed below the bone to be sectioned to act as a safety stop. An alternative to the chisel has been use of a diamond to grind away the entire exostosis. In the authors opinion this will led to accumulation of nonvascular osseous debris under

Figure 7

Figure 8

Figure 9

Figure10

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Media Release

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Fig. 1: Products of the IPS 99 line (from left to right): IPS 99 One Dentcisal, IPS 99 Build-Up Liquid, IPS 99 Paste Opaquer, IPS 99 Ceram Transpa Incisal and IPS 99 Ceram Dentin.

Technique for surgical mandibular exostosis removal

Dr. Kurtzman is in private general practice in Silver Spring, Maryland and is a former Assistant Clinical Professor at the University of Maryland, Department of Endodontics, Prosthetics and Operative Dentistry, Maryland, USA. He has lectured both nationally and internationally on the topics of Restorative dentistry, Endodontics and Implant surgery and prosthetics, removable and fixed prosthetics, Periodontics and has over 280 published articles. He is privileged to be on the editorial board of numerous dental publications, a consultant for multiple dental companies, a former Assistant Program Director for a University based implant maxi-course he has earned Fellowship in the AGD, AAIP, ACD, ICOI, Pierre Fauchard, Academy of Dentistry International (ADI), Mastership in the AGD and ICOI and Diplomat status in the ICOI and American Dental Implant Association (ADIA). Dr. Kurtzman has been honored to be included in the "Top Leaders in Continuing Education" by Dentistry Today annually since 2006. He can be contacted at dr_kurtzman@maryland-implants.com.

Gregori M. Kurtzman, DDS, MAGD, FAAIP, FPFA, FACD, FADI, DICOI, DADIA

Introduction:

Exostosis, termed torus mandibularis [1] (commonly called tori) are a common clinical finding. The majority of these are asymptomatic, benign bony outgrowths which are slow growing over the patient's lifetime. These consist of dense cortical bone and are avascular in nature.[2] Mandibular exostosis are commonly located lingual to the premolars and are often bilateral. They also may be located on the buccal portion of the ridge either in a solitary location or extensively spread bilaterially. Incidence has been reported in the range of 9 to 60 percent in various ethnic groups and has been reported in the literature for over 180 years.[3-5] Both genetic and environmental factors have been implicated as the causative factor and the true cause may be multifactorial.[6]

The presence of exostosis may pose a problem in successful construction of dentures. When large enough they may create speech issues due to limitation of the tongue space. The tissue overlaying exostosis histologically is thinner then normal gingiva and may ulcerate easily when masticating hard or sharp foods.

Case presentation:

An 86 year old female patient of the practice presented with the complaint of soft tissue irritation due to abrasion from food in the buccal posterior right quadrant. A buccal exostosis was present at the first molar and had been not increased in size during the sixteen (16) years the patient had been in the practice. (figure 1) After discussion with the patient she requested that the exostosis be removed to help decrease the future food abrasion of the thin overlaying tissue.

Anesthetic was administered to block the inferior alveolar nerve. Additional anesthetic was then applied locally at the papilla to control bleeding at the surgical site.

A bipolar electrotronic surgical unit (Bident, Oaks, PA,USA) is utilized to make an intrasulcular incision distal to the exostosis to be removed and extended mesially to allow soft tissue reflection and exposure of the exostosis. (figure 2) Vertical releasing incisions are not necessary and if additional reflection is needed the sulcular incision should be extended further distal and mesial to the surgical site. The incision may be made with a scalpel blade but the bipolar surgical tip will afford better hemostasis during surgery[7] and therefore provide better visability. The bipolar electrosurgical tip may be used in a wet field[8] and the authors recommend applying a water spray during cutting. This will keep the tissue hydrated and yield a flap margin that is non-charred.[9]

Reflection of the soft tissue is accomplished with a periosteal elevator with care being given to avoid tearing the thin tissue. Tissue should be reflected as a full thickness flap, with the entire exostosis being exposed especially inferiorly. (figure 3)
The periosteal elevator is placed inferior to the exostosis to protect the underlaying soft tissue and a surgical length carbide (Brasseler, Savanah, GA, USA) in a highspeed handpeice with water is used to score a line on the superior aspect of the exostosis. (figure 4) The score line should be placed close to the normal contour of the alveolar ridge. A monoplane chisel is placed in the score line. The chisel will allow the exostosis to be cleaved from the alveolar ridge. It is important that the periosteal elevator be placed inferior to the exostosis to prevent accidental slippage of the chisel tip and subsequent tissue damage. The tip of the periosteal elevator is kept in contact with the bone and a gentle tap is applied to the chisel with a surgical mallet. (figure 5)

The exostosis being dense cortical bone will cleave at the score line and separate from the underlaying bone as a single piece. (figure 6) The osseous bed will present with sharp edges at the point of cleavage. (figure 7) A football diamond (Brasseler, Savanah, GA, USA) is utilized in a highspeed handpeice with water to smooth the alveolar ridge and remove any sharp edges that resulted after cleavage of the hard exostosis. (figure 8) The flap is repositioned and a vertical mattress suture is placed at each papilla with 4-0 polyglycolic acid (PGA) suture. (figure 9) The sutures should be left in place for twenty-one (21) days. Prior to release of the patient, gentle pressure is applied to the site with wet gauze to permit a fibrin clot to help tack the periosteum to the new osseous bed. Pressure should be applied for 5 minutes. This will also prevent fluid accumulation under the flap during the immediate period following surgery.

The patient returned two weeks post surgical to check healing and sutures were still present. Inflammation was absent and the patient indicated that minimal discomfort was present following surgery and the area felt normal 3 days after surgery. A follow-up appointment was scheduled at four weeks post surgical to check the site. Sutures were absent and tissue appeared healed. Slight recession was noted on the mesial buccal of the first molar

Conclusion:

Exostosis are a common occurance as sited in

Figure 1

Figure 2

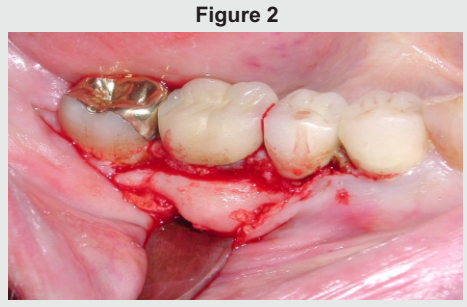
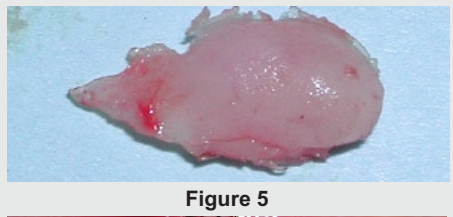


Figure 3

Figure 4



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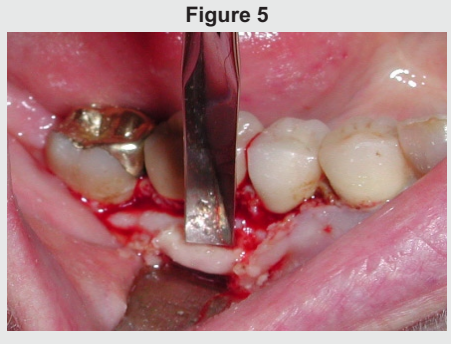

Figure 6

Expodent 2012 - Mumbai

Association of Dental Industry and Trade of India West Zone [ADITI West Zone] organised Expodent 2012 Mumbai at Bombay Exhibition Centre, Western Express Highway, Goregoan, Mumbai from 14th to 16th September 2012.

While opening ceremony lightening of lamp was done by President of ADITI Head Office Mr. Rajiv Seth, Hon Secretary of ADITI Head Office Mr Praveen Malhotra, Chairman Expodent International India Dr. B S Shetty, Treasurer IDA HO Dr. Deepak Muchala, Treasurer ADITI Head Office Mr. Ashwani Kapoor, Editor Voice of ADITI Mr. Karan Bir Suri, Past President ADITI Head Office Mr. Vinod Baval, Past Hon Secretary ADITI Head office Mr. Firoz Merchant, Chairman Expodent Mumbai Mr. Bharat Thakkar, IPP ADITI West Zone Mr. Nasir Merchant, Organizing Secretary Expodent Mumbai Mr. Dilip Valimbe, Treasurer Expodent Mumbai Mr. Sanjay Shah, ADITI West Zone Hon Secretary Mr. Nitin Somaiya.

Event was well organized with participation of 115 Dental companies displaying their products spread over 280 booths total trade are admeasuring more than 45000 sq.ft. State of art equipments, material and technology were at display.

During 3 days total visitors were more than 7500 which has been landmark in history of Expodent Mumbai. It was highest attended trade events in Western India. Saturday 15th September 2012, dinner was hosted for all exhibitors for fellowship and interactions amongst trade & industry which was attended by many Dental Trade entrepreneurs.

Expodent 2012 Mumbai organizing committee would like to thank M/s Merform for their wonderful service during booth erections, Dr. Ajay Kakar of Bitein for registration, M/s Sodexo hospitality for catering. Expodent 2012 Mumbai organising committee would like to thank M/s NESCO Ltd for kind cooperation.

Expodent 2012 Mumbai Organizing committee extends its gratitude to all the dental faculty members and dental trade members for supporting the event.

ADITI West Zone is happy to announce dates for Expodent Pune 1st to 3rd Feb 2013, Expodent Mumbai 27th to 29th Sept 2013.

Partial Porcelain Veneers: Clinical and Laboratorial Considerations

Dr. Christian Coachman **graduated in Dental Technology in 1995 and in Dentistry at the University of São Paulo-USP/Brazil in 2002.**

He started his work with his father, Dr Robert Gray Coachman in the Keys-Coachman Institute in São Paulo, Brazil that now is the Well Clinic Dentistry – www.wellclinic.com.br

Moreover, Dr. Coachman attended the Ceramic Specialization Program at the Ceramoart Training Centre in Brazil, where he also became an instructor.

In 2004, Dr. Coachman was invited by Dr. Goldstein, Garber, and Dr Salama, of Team Atlanta, to become Head Ceramist of their laboratory, a position he held for over 4 years.

He is a member of the Brazilian Academy of Dentistry and the Brazilian Society of Esthetic Dentistry; and of the American Academy of Esthetic Dentistry (AAED).

Dental companies and offices developing products and implementing concepts and has lectured and published internationally in the fields of esthetic dentistry, dental photography, oral rehabilitation, dental ceramics and implants.

ABSTRACT

Being minimally invasive is for sure more challenging than being more aggressive, but the effort is worth it when considering the long term dental health. Being more aggressive makes everything easier, but becoming a better dentist to be able to produce better treatments should always be our goal. The main reason to do a partial porcelain veneer on anterior teeth is to be more minimally invasive. The main goal of this article is to discuss and compare 3 different types of restoration when using a partial veneer: Feldspathic ceramics on refractory, Platinum foil technique and Pressable Lithium Dissilicate technique.

KEY WORDS - ceramic dental, dental porcelain, veneers preparation, laminate veneers, dental veneers, ceramic veneers.

INTRODUCTION

Partial laminate veneers are the most conservative indirect restorations, designed to restore or reshape parts of the tooth. These small fragments of porcelain strategic allocated are the most conservative tooth restoration and the main reason to do a partial PLV on anterior teeth is to be more minimally invasive [1-4]. It is definitely easier to do a full veneer when comparing to a partial one. Easier to fabricate, easier to try in, to bond, to match the color and most of all to hide the cement line on the long run. So the increased challenge is only worth because of the conservative concept of the treatment [2-10]. Saving tooth structure should be an obsession in modern dentistry. Ceramics are materials of choice for making partial veneers, because they have very high adhesion to tooth structure and maximum aesthetic [2,9,11].

Other topics that will affect how conservative one can be are how to remove old restoration preserving as much as possible the natural tooth structure (burs x laser) [6,8,12,13] and the tooth preparation design to achieve the desired color and shape [3].

Minimally invasive and noninvasive veneers are becoming more popular approach [1,4]. The innovate conservative preparation designs for anterior teeth, such as partial veneers, can conserve significant amounts of sound tooth structure [2,3]. Conservative approaches allow preparations to be supragingival and enamel is kept intact. These factors had a positive effect on the success rate of laminate veneers [5,14].

Usually the partial veneer on anterior teeth will be done on a couple of situations [2,3]: to replace an old restoration, fix a fracture, close a diastema, improve the space distribution usually combined with other veneers and/or crowns, change the shape of the tooth (from triangular to square, to close black triangles), for esthetic reasons (increasing the length or changing the shape) and to cover cervical abrasions or root exposure (type V restoration).

There are a couple of different restorative modalities when dealing with partial defects on anterior teeth. Significant differences in the amount of tooth structure removal were noted between preparation designs. Partial or complete veneers removed approximately 3% to 30%, and approximately 63% to 72% of the coronal tooth structure by weight, was removed when teeth were prepared for all-ceramic and metal-ceramic crowns [3]. Analyzing the options (pros and cons), taking into consideration material properties and different preparation designs:

Full veneer v/s Partial veneer: Partial veneers can be more conservative but they are more critical when it comes to hiding the cement line and any staining that can happen. Also partial veneers are more critical when it comes to handling and bonding on the correct position due to the delicate size of the restoration [3,15,16].

Direct composite v/s Indirect composite or ceramics : Direct composite is cheaper and may be easily modified and repaired. But the indirect composite or ceramic have better physical properties (resistance to staining, wear, fracture) [1]. The dentist needs good skills to do a direct composite, the indirect requires skills from the technician. The big advantage of doing a direct is a better chance of matching the color and no need for color communication with the lab [2,9,15-17]

Indirect Composite v/s Indirect Ceramics: Composite is usually less expensive than ceramics but ceramics has better longevity, better physical and optical properties. The adhesion of ceramics to dental tissues is significantly higher than the composite, allowing its use in more conservative preparations, such as partial PLVs [1,15,17,18].

Mechanical interlocking with enamel is more stable than the bond to dentin. Tooth preparation should preferably not remove healthy tooth structures unnecessarily. This will guarantee a larger quantity of remaining enamel and greater strength of the tooth, as flexion of the tooth may be related to fractures and debonding [3,5-7,11,15,19].

Options on materials and techniques

The main options compared on these articles regarding materials and techniques when it comes to fabricating a partial porcelain veneer are: Feldspathic porcelain on refractory, feldspathic on platinum foil and pressed lithium dissilicate [1,4,8].

Some advantages and disadvantages [4,8] - (Table 1)

Partial Veneers

Technique	layered Refractory	layered Foil	Pressed E.max
layering	full	full	small or non
thickness	0.3mm	0.3mm	0.2mm
handling	sensitive	sensitive	easier
precision	good	average	best
bonding	great		
finishing	easier	easier	sensitive
esthetic	great		

Either the refractory and the foil technique allows a multilayer build-up, that means that we can add more opacious material on areas that we need to block the light and more translucent material where we need more light transmission. The pressed partial veneer is monolithic (one color and one opacity) with some small incisal layering if necessary. It means that if restoring a defect that involves dentin and enamel areas with different colors and opacities the pressed restoration can present some limitations. For example, an extense class IV type of restoration that one needs to reproduce the dentin color with more chroma and opacity to block the light on that area and then also recreate the incisal and interproximal translucency, or on cases with wide diastemas that we also need to combine different

Fig 1. Pre op situation. An old composite class IV restoration on the incisal edge of #9 (tooth 21). Need for replacement due to esthetic reasons.

Fig 2. Removing an old restoration and conservative tooth preparation. The cord on the mesial was placed to help expose the area where the finishing line will be placed.

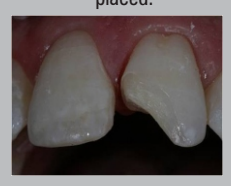

Fig 3. Prep finalized. A mini chamfer on the finishing line was created. The internal surface was completely rounded avoiding stress on the ceramics.

Fig 4. Acrylic temporary generated by a silicone index made over the pre op situation. The temporary margin are over extended to increase the retention and bonded in to place utilizing the spot etch technique. It's also important to take the provisional out of occlusion, in centric and protrusive excursion.

Fig 5. The refractory die. A perfect copy of the stone die, reproducing all the prep details. The lower portion of the refractory die is placed in distilled water. The refractory will absorb the water from the bottom to the top expelling the air once inside it.

Fig 6. Working model with the refractory die and the lingual silicone index in position. The wash bake is done with clear ceramics to improve the blending of the margins by picking up the underlined color. To fit the refractory into the working model a special silicone base was fabricated.

chromas, opacities and translucencies, on these cases we may have more limitations with monolithic restorations.

On the other hand, the monolithic pressable restoration (emax lithium dissilicate, for example), usually allows the fabrication of restorations [9] with better fit and physical properties and easier handling when comparing to a feldspathic partial veneer .

When comparing the refractory with the foil technique we also have some pros and cons. The foil technique has a faster fabrication process. The refractory technique has several extra steps as: duplication of the die with all the setting times involved, the degaseification bake, soaking on water in between each bake, sand blasting the refractory and fitting the ceramic peace on the stone die.

The foil technique is really fast and can be done over any type of model system without having to fabricate an additional die. The other advantage of the foil is that you can apply any type of ceramic (feldspathic, alumina, zirconia, etc) on top of the same type of foil [4]. On the refractory technique we have to match the thermal expansion coefficient of the refractory with the ceramic, so usually you have different types of refractory for each type of ceramics.

Another advantage of the foil when compared with the refractory is that you can create more delicate margins with the foil. You can remove the foil and preserve these thin margins. With the refractory usually you lose some of these thin margins when sandblasting to remove the refractory material.

The biggest advantage of the refractory over the foil is the fit. Clinically we see a better fit with refractory when comparing with the foil. Remembering that the pressable system will overcome both, refractory and foil when it comes to precision.

If using a feldspathic ceramic one can utilize the refractory or the platinum foil technique. When having a very clear chamfer with a thicker margin the refractory technique can work very well. If the idea is to use a feldspathic ceramic but the margins are very thin, the foil technique usually gives a better result because one can preserve the thin margins that usually are lost when sandblasting the refractory off the veneer [4].

How small and how thin can the ceramic fragment be?

Depends on the ceramic material and system utilized. The main options are: Feldspathic on refractory, feldspathic on platinum foil or a pressable system. The feldspathic ceramic is more delicate and the restoration when below 0.5mm can be very fragile and difficult to handle. When utilizing the pressable Lithium Dissilicate material, the restoration can be as thin as 0.3-0.2mm and still have good resistance [8]. Regarding the size, these pieces can be as small as possible, the limiting factor will be the handling, the smaller the more difficult to try-in and to bond. Sometimes it can be very difficult to position the ceramic peace and check the fit when using gloves. Removing the gloves just to try them in and bond can be an option with small pieces.

The main steps and techniques that will be discussed:

1. Removing an old restoration to prepare for the new one (Burs vs Laser)
2. Tooth prep design to allow for ideal esthetics (color and shape) and physical properties being as minimal invasive as possible. That means, reducing not more neither less than the exact amount necessary.
3. Provisionalization. Options on materials and techniques.
4. Lab steps. Which system can allow more predictability and more efficiency achieving ideal esthetic result.
5. Try-in and adjustments. Handling these little pieces intra orally.
6. Bonding. Technique and materials.
7. Finishing after bonding. Removing the cement excess and polishing, probably the key steps to achieve a good interface between ceramics and enamel.
8. Occlusal adjustments.
9. Maintenance and long term success.

1. Removing an old restoration

In many cases when doing a partial veneer one needs to remove an old restoration that was in place (Fig 1). The key is to remove the old restoration grinding as little as possible healthy tooth structure (Fig 2). The conventional way to remove it is to grind down the old restoration utilizing burs, better if utilizing a microscope or a loop. Despite the effort not to touch healthy structure, some kind of reduction is inevitable. So, every time one needs to change the restoration the size of it will get bigger and bigger. A new way to remove bonded restorations is by utilizing laser. To do so the restoration needs to thin enough for the laser to destroy the bonding interface [12,13].

2. Tooth prep design for partial veneers

The prep should be design to enable ideal esthetics and ideal physical properties, in the most conservative way possible [2,5,7,10,14].

After rounding and smoothing out all the internal surface of the preparation the key moment will be the determination of the extension of the restoration by determining the position of the finishing line. It will depend on the reasons one is doing the restoration. For example, if closing a diastema or a black triangle, the prep needs to go more subgingivally to allow for change on the emergence profile. If changing the length, the prep needs to be extended to the lingual surface. Another very important aspect to be analyzed is the path of insertion. Creating undercuts on the cervical area is very common and this will lead to open margins.

Another decision is how should be the finishing line to better blend the interface between ceramic and enamel. Should one create a very clear margin or an irregular finishing line for better blend. Should one create a chamfer (Fig 3), an endless bevel or just slightly bevel the margins.

A clear chamfer can help with the try-in process and help with the positioning but on the other hand it will make more difficult to hide the interface between the enamel and the ceramics, the cement line. That is why we recommend no specific finishing line, but instead to bevel it and allow and irregular and thin ceramic margin. Usually we will over extend the ceramic margin and polish it down after bonding achieving a more invisible interface. In many situations, if the path of insertion allows, the partial veneer will be done prepless and the finishing line will be determine by the technician to allow the ideal design.

Another aspect to be analyzed regarding the prep design is the occlusion. The ideal is that the centric occlusal contact doesn't fall right over the interface between ceramics and enamel. When preparing, one should analysis that and place the finish line either before the contact and leave it in enamel, or after leaving it in ceramics. Also, one has to analyze the protrusive movement. Sometimes there is enough space in centric but when moving the mandible forward the lower teeth may get closer to the preparation showing the one has to prep more or adjust the lowers.

3. Provisionalization

Options: Acrylic or Bis-acrylic with a silicone index done over a wax-up (Fig 4). Over extend the margins to create retention. Direct composite done also with the help of a silicone index (7,8).

4. Laboratory steps

The Feldspathic Partial Veneer with the refractory technique (8)

The technique consists on duplicating the stone die into a refractory die where the ceramic can be build on top of it and baked.

The steps and challenges when building-up a partial feldspathic veneer:

- Precise process of duplication from the stone die to the refractory. High quality precision silicone has to be used to reproduce all the details of the preparation (Fig 5).
- One has to utilize a special die/model system that allows the positioning of the refractory die on the working model (Fig 6). This is a disadvantage of the refractory technique when comparing with the platinum foil or pressable technique that doesn't require any type of special model system.
- Prior to the build-up the refractory needs to go through a degaseification cycle on the ceramic oven, to avoid contamination of the ceramic. After each bake the refractory also needs to be soaked in to water to be completely hydrated before the next ceramic addition (Fig 5). Both process increases the working time and becomes a disadvantage when comparing to the platinum foil technique.
- 1st bake, the “Wash” bake, with clear ceramics to blend in better the interface and hide the cement line (Fig 6).
- 2nd bake, the main bake, where opacius dentin (if needed)(Fig 7), dentin and enamel are added (Fig 8). Masking the shadow of the preparation becomes the main challenge. To improve the blend of the interface one needs to overextend the

Fig 7. Opaque dentin material is used to replace the missing dentin. Blocking the light on this area is important to maintain the correct value and match the adjacent tooth, as well as masking the tooth preparation (IPS d.sign ceramics-Ivoclar Vivadent AG, Schaan, Liechtentein on GC refractory-GC Germany GmbH).

Fig 8. The main bake is followed by the addition of regular dentin, enamel and opalescent materials. The silicone guide will help on the positioning of the incisal edge and its effects.

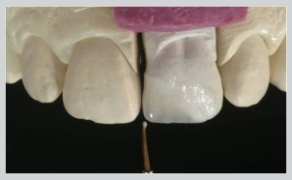

Fig 9. An internal staining was made to mimic the white spots of the adjacent tooth. This staining was stabilized before applying the final thin layer of incisal and opalescent materials.

Fig 10. Final shape and texture, recreating the incisal grooves.

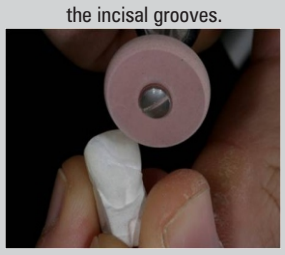

Fig 11. The rubber wheel is used to finish the texture and to thin out the margins without chipping it.

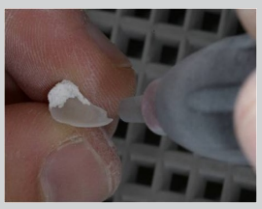

Fig 12. Sandblasting with Aluminum oxide 110um at 1.5 bar (20psi). This procedure is very delicate since the thin margin has to be preserved.

Fig 13. The precision of fit of the restoration depends on the quality of the refractory die. To achieve ideal fit one should used a high quality silicone material to duplicate the stone die. The photo shows clearly the ceramic margin over extended in comparison with the prep finishing line.

Fig 14. Checking the position of the incisal edge with the silicone index to avoid intra oral adjustments.

ceramic build-up over the finishing line, this extension will be polish down after bonding. The whole build-up is guided by the silicone index that was fabricated over the pre op model or diagnostic wax-up (Fig 8).

• A 3rd bake can be done if necessary for final shape corrections with enamel and translucent materials. If some staining is needed, the ideal is to do an internal staining (Fig 9), overlaid with a thin layer of ceramics. This way the staining will not be removed with the superficial polishing procedures neither with the finishing after bonding procedures.

• Shape and texture. Shaping according to the morphological parameters of the adjacent teeth but also according to the remaining part of the restored teeth (Fig 10). The challenge here is to try to reproduce the natural texture of the remaining enamel surface of the restore teeth since any discrepancy will make the restoration visible. One has to be careful to not over grind the marginal areas and harm the fit of the restoration. Remember that one has to leave a thin over extension of the ceramics beyond the finishing line. The ideal is to shape these areas with a soft diamond rubber wheal (Fig 11), under the microscope avoiding diamond burs on these areas.

• External Stain and glaze. The external staining, if necessary has to be minimal and away from the margins since this area will be polished after bonding and any staining will be removed. As mentioned above the texture and quality of light reflection are very important to blend in the ceramic peace to the remaining enamel, the glaze process and the after glaze polishing procedures are very important steps to reproduce the natural dental look. A thin layer of glaze paste is used and the glaze bake is done with a final temperature that will not remove the texture details.

• Divesting after glazing. The key is to preserve the very thin margins through the process of sand blasting to remove the refractory from the ceramic peace. To do so a thin Aluminum Oxide is used (110microns) under low pressure (below 2 bars). (Fig 12)

• Adjusting the fit with microscope. After removing the refractory the ceramic peace has to be adjusted to the stone die. The fit needs to be checked under the microscope and some small internal adjustments can be made to improve the fit. The utilization of a marker spray can be useful to detect the exact areas that need to be ground. After fitting on the single die, the next step is to fit on the solid model (Fig 13), to check the inter-proximal contacts and the occlusion. Also, on the solid model, the shape of the restoration will be checked in relation to the other teeth. The silicone indexes is used to help on this analysis (Fig 14), and the final color is checked (Fig 15).

• Checking the occlusion. The restoration has to be adjusted in centric and in protrusion. The protrusive adjustment (Fig 16) is very important, and a premature contact on the restoration can improve the risks of debonding or fracture.

• Preparing the restoration for bonding [8,9]. The outside of the restoration is protected with wax and the inner part is etched with Hydro fluoridric acid 10% for 20-60 seconds depending on the manufacturer instructions. The ideal etching procedure should create a choky appearance (Fig 17). The acid is rinsed out and the restoration is placed in the ultra sonic for 3-10min, then cleaned with the steamer and dried out completely. The next step is the silanization. Two thin layers are applied and dried with a hair drier for 60 seconds. The ideal is to do the silanization before trying the restoration, to protect the etched surface from contamination.

5. Try-in and adjustments.

As mentioned before, the trying should be done after the silanization. This will protect the etched inner part of the restoration from the contamination that can happen during the try-in process. The recommendation is to silanate the restoration in the lab. This will allow the dentist to speed up the try-in process without having to worry about doing it chair side and having to wait the ideal time for the silane to act.

The first step of the try-in process is to check the inter-proximal contact with a thin occlusal paper. If necessary, the adjustments are made with a smooth diamond rubber wheal. The ideal is to do it without gloves due to the very small size of the restoration. Then the amount of pressure is checked by holding the restoration in position and flossing the inter-proximal area. The fit can only be checked after adjusting the inter-proximal contact.

The second step is to check the fit all around the margins. If necessary some small adjustments can be made by utilizing a colored spray to mark the interference and remove it with a small round diamond bur.

The third step is to check the esthetics, color and shape. Small changes in shape can be done with the rubber wheal. Remember that big changes on shape will harm the internal ceramic build up, remove the staining and the glazed surface. When working with feldspathic ceramics on refractory or platinum foil, the room for changes after removing the restoration from the refractory or foil is small because of the limitation of re-baking these pieces without harming the fit. That is a big advantage of utilizing a pressable systems that can allow re-bakes in a more predictable way giving more freedom for changes and adjustments after the try-in.

To analyze color and shape, the try-in has to be done by placing some material inside the restoration to keep it in position and to analyze the color [20]. With thin restorations, the final color will be the combination of the color of the restoration plus the color of the cement, plus the color of the remaining tooth structure (stump shade). The simplest way is to add some drops of water in between the restoration and the tooth, another option is to add glycerine. The ideal is to try-in the restoration with try-in paste so one can analyze the color aspects when combined with the cement color. The thinner the restoration is the more the stump shade and the cement shade will interfere with the final color. So having a composite cement kit that has different colors can make a difference. The color analyzes should also be done before the tooth gets dehydrated, so the adjusting procedures that needs to be done before checking the color shouldn't take too long and also the mouth should be kept closed as much as possible. The ideal color analyzes is done when the restoration is perfectly fitted into position, that`s why some adjusting procedures are done before checking the color to make sure the restoration is completely fitting and the try-in paste thickness is the same as the final cement will be, that means that the try-in paste will mimic perfectly the final situation. (Fig 18)

6. Bonding Technique and materials.

Although research shows that the background color of the tooth is even more important than the color of cement, it is known that the interaction between natural dentin, shade of resin cement, and their interaction on the final color of ceramic after cementation of the restorations is very important for the success of the partial PLV [20]. An inappropriate color of the resin cement may devalue the end result or lead to failure. Bonding sequence [7,9,11]: Figs 19-24

7. Finishing after bonding [8]

The ideal is to avoid burs. The excess should be removed with blades, as much as possible, and utilize burs as minimum as possible (Fig 25). Then refining the margins by polishing it with rubber tips (Fig 26-30), from more course (blue tip, Fig 26) to less (grey tip, Fig 28).

The ideal is to use the rubber tips instead of using the wheels (Fig 31) due to 2 factors: First, the tips will create horizontal micro grooves and the discs will create vertical grooves. The horizontal grooves will look more natural. Secondly because the tips will give more stability when grinding. The base of the tip will be supported by the ceramics giving a better stability during the polishing procedure. The key is to avoid grinding too much, increasing the gap or creating a ledge between the ceramics and the enamel. One has to understand that the ceramics has different resistance from the enamel, the enamel is softer. If the rubber tip is not supported mostly by the restoration, the chance of grinding more the enamel than the ceramics is big, creating a ledge that will be visible.

After using the rubber tips, the utilization of sand discs (soflex. Fig 29) and a silicone tip with pomes (Fig 30) will give the final luster.

Analyzing the light reflection is very important to check if the match between ceramics and enamel is good. The light reflection line should have continuity when moving from the ceramics to the enamel. A ledge will break this continuity showing the restoration. The other aspect is the quality of light reflection that needs to be controlled by polishing correctly the ceramics to achieve similar optical property of the enamel.

As one can see the finishing and polishing are both very delicate procedures and have major importance to blend in the restoration.

8. Occlusal adjustment [7,17].

Adjusting the bite :- Centric and protrusion. The importance of adjusting the bite, in protrusive movement, for longevity of the restoration when the veneer involves the incisal edge of anterior teeth. (Fig 32)

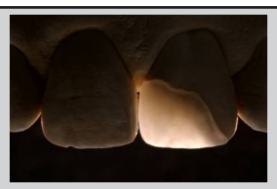

Fig. 15. The photo shows a nice light transmition of the ceramic with the opalescent effect. It is also important to notice the presence of the opaque dentin blocking the light towards the preparation edge.

Fig 16. Very important to check the protrusive excursion and make sure the 2 centrals are touching at the same time and with similar intensity to avoid extra load on the partial veneer.

Fig 17. After the etching procedure, the inside of the restoration should present a choky appearance. The restoration is than placed in to the ultrasonic for 10min followed by the silanization.

Fig 18. The try in is made after silanating the partial veneer with Try-in paste (Try-in paste/Liquid Strip- Ivoclar Vivadent AG, Schaan, Liechtentein).

Fig. 19

Fig. 20

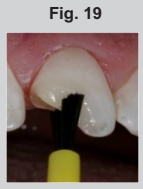

Fig. 21

Fig. 22

Fig 19-22. Etching the tooth, starting with the enamel and following with the dentin (thoroughly wash and dry gently). A thin layer of primer, followed by adhesive, and soft air.

Fig 23. Bringing the restoration into position with the help of a stick with a sticky point. Due to the small size, it is difficult to position it with the fingers.

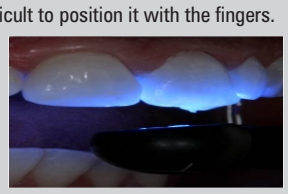

Fig 24. A prior polymerization of 3-5 seconds facilitates the removal of the cement. After that, the final polymerization should proceed for about 40 seconds per side.

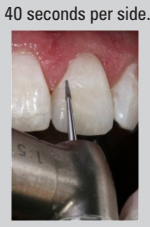

Fig 25. Removing the excess with burs should be avoided. The ideal is to utilize the blades.

9. Maintenance and long term success-final considerations

There are many aspects that need to be analyzed before deciding on the type of materials and techniques when doing a partial veneer.

Durability- Due to the fact that these restorations are usually bonded to enamel, the long term stability is usually very good (3,6,7,11).

Occlusal adjustment- If the partial veneer is utilized to increase the length of the teeth, the occlusal adjustment becomes very important, nor only in centric but mostly in protrusive movement. A poor adjustment in protrusive movement can increase the chance of chipping or debonding.

Esthetic- If the teeth were bleached before bonding the restoration, there is a bigger chance of seen a difference on color between restoration and enamel. The solution can be to re bleach the tooth after a while to improve the match. Usually when bleaching the tooth, the ideal is to wait 2 weeks before taking the final shade and producing the final restoration to allow the tooth color to stabilize. If staining is seen after a while, re-polishing the interface can be the solution.

When the restoration requires extreme difference of color and opacity, the best option will be a layered restoration.

Refining polishing procedures, under the microscope, and doing final photos after a week of bonding (Fig 33 - 34), when normal hydration of the tooth is back. By than a real color analyzes can be done, as well as an analyzes of the interface restoration/tooth and texture blend.

Resistance- When resistance and handling are the main issue, the pressable system with a reinforced ceramics as Lithium Dissilicate is the best option. The press technique with a reinforced ceramics will also allow for thinner restorations, and that is major when working with partial veneers. The Lithium Dissilicate veneer can be reduced to 0.2mm in a very consistent way. One disadvantage when working with a reinforced ceramics is the difference of strength when compared with the enamel. This creates a more difficult match when it comes to texture and contour. When polishing and finishing these restorations, the chance of creating a ledge between the ceramics and the enamel is bigger due to this difference on strength. Finishing a feldspathic ceramics and making it to look like enamel is definitely easier.

Fitting- Regarding the precision, all the systems can provide an acceptable fit, but the press system is definitely do one that gives the best fit in a more consistent way. Another big advantage of the press veneer is to be able to do additional modifications regarding color and shape due to fact that one can bake the veneer after the try-in in a very easy way maintaining the fit and physical properties intact.

Hiding the cement line- Usually the common problem of these restorations is the interface between ceramics and enamel. Staining the cement line is usually a problem long term. Also the change on color since the tooth has a bigger chance of changing color when compared with the ceramics. The success to hide the interface between ceramics and enamel will depend on many factors. Apparently the best results will be achieved when:

-Not producing a clear chamfer but instead, preparing an endless bevel or a prepless situation.

-Keeping the margins 100% on enamel.

-Smoothing out and rounding the internal surface of the preparation.

-Precise impression, stone models, dies and duplication procedures. Lab procedures always under the microscope.

-Smoothing out the ceramic margins as thin as possible and over extend these margins over the enamel for further polishing it out after bonding.

-Utilizing clear light cure composite cement.

-Removing the cement excess with care, under the microscope, mainly with blades, avoiding burs.

-Polishing with rubber tips, focusing on not creating a ledge, blending the line angles, the light reflection and the texture between the ceramics and the enamel.

CONCLUSION

Partial PLVs are suitable alternatives to the direct restorations of resin composite and conventional ceramic veneers, since that combine high aesthetics, strength and adhesion in a minimally invasive approach.

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Fig. 26

Fig. 27

Fig. 28

Fig. 29

Fig. 30

Fig 26-30. Finishing with rubber tips (Brassler), from more corse (blue) to less (grey). Sof-lex disc (3M- ESPE Dental Products, USA). Silicone cone with pomes.

Fig 31. Finishing with rubber discs is not ideal. The chances of creating a ledge between ceramics and enamel are bigger when comparing with the rubber tips.

Fig 32. Anterior guidance equilibration: notice the even contacts in the anterior region with occlusal paper.

Fig 33. Final esthetic outcome.

Fig 34. Intra-oral final outcome showing adequate color, shape and texture.

Cone-beam Computed Tomography: A Powerful New Tool In Our Imaging Armamentarium

Rami Gamil **received his Diplome Universitaire DU in 3D Imaging from the University of Toulouse III Paul Sabatier in France. His main area of interest in research is computer aided implantology, Image Guided and Computer Guided Surgery & currently working on several papers and contributing to the first interactive oral radiology iBook to be published. His main focus is the use of CBCT, 3D imaging,computer aided implant sSurgery, CAD/CAM and rapid Prototyping in dentistry.**
He developed a novel method for preoperative sinus graft volume calculation in 2010.
Dr. Gamil is also the Executive Director of iScan 3D Maxillofacial Imaging center, a cutting edge center in Egypt specialized in CBCT 3D Imaging, Diagnostics, Treatment Planning and Computer Aided Implantology and also maintains a private practice focusing on dental implants & computer aided implantology.

Imaging has always been an important diagnostic adjunct to the clinical examination of the dental patient. However both intraoral and extraoral procedures, suffer from the same limitations of all planar two-dimensional projections. Many efforts have been made to develop three-dimensional (3D) radiographic imaging and while computed tomography is available, its application in dentistry has been limited because of cost, access and dose considerations. The introduction of cone-beam computed tomography (CBCT) specifically dedicated to imaging the maxillofacial region heralds a true paradigm shift. The increasing interest in CBCT from all fields of dentistry is because it has created a revolution in maxillofacial imaging - facilitating the transition of dental imaging from 2D to 3D images and expanding the role of imaging from diagnosis to image guidance of operative and surgical procedures via third party applications software.

So we will take an overview of the advantages, limitations and specific clinical applications of CBCT technology and its capabilities in diagnosis, planning and guidance of surgical procedures.

Advantages:

1. Lower dose: CBCT provides an equivalent patient radiation dose which is 1.3% to 22.7% of a comparable conventional CT.
2. Image accuracy: CBCT imaging produces images with sub-millimeter isotropic voxel resolution ranging from 0.4 mm to as low as 0.09 mm
3. Beam limitation: by collimation limits the area to be radiated.
4. Rapid scan time: leading to less radiation and less artifacts caused by patient movement.
5. Lower cost: CBCT equipment has a greatly reduced physical footprint and is approximately 20-25% of the cost of conventional CT.

Limitations:

1. Poor soft tissue contrast.

Clinical Applications:

Application1
Inferior alveolar nerve (IAN) tracing in relationship to an impacted third molars

Figure 1.1 Preoperative OPG indicating IAN involvement with the lower right third molar without a clear 3D positioning.

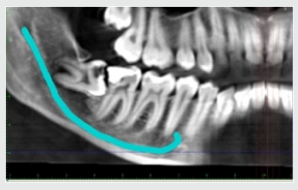

Figure 1.2 IAN tracing using CBCT software in reformatted panoramic

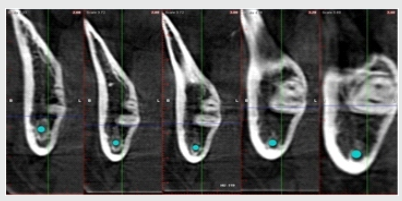

Figure 1.3 IAN tracing in cross-sectional view.

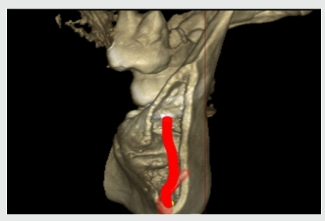

Figure 1.4 Buccal position of IAN in cross sectional 3D view.

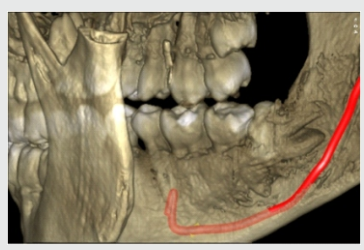

Figure 1.5 Exact position of the IAN in this 3D reconstruction.

Application 2:
Visualization of related innervations and arterial supply to the mandible

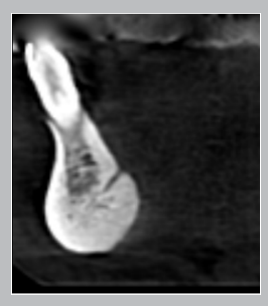

Figure 2.1 Point of entry of the sublingual artery viewed by CBCT.

Figure 2.2 the point of entry of the sublingual artery on an edentulous mandible.

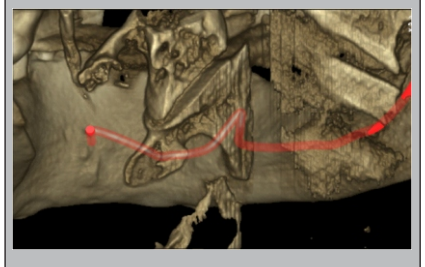

Figure 2.3 3D tracing the point of entry of the sublingual artery to the mandible using CBCT.

Applications 3
3D visualization of a bone defect related to a traumatized tooth

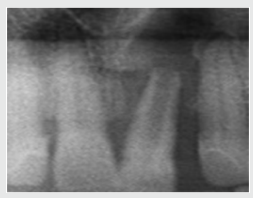

Figure 3.1 Preoperative 2D image in which bone osseous defect details are not completely defined while CBCT shows its exact shape (see below).

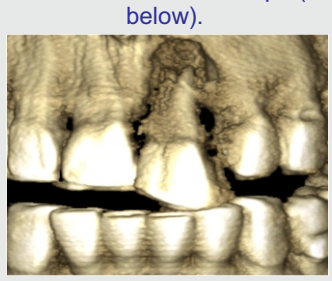

Figure 3.2 Labial 3D view of the defect.

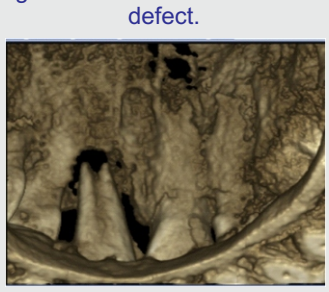

Figure 3.3 Palatal 3D view of the defect showing open root apex.

Application 4
3D planning of a maxillary full arch implant case

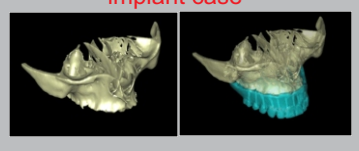

Figure 4.1 Reconstruction of the edentulous maxilla with a scanning prosthesis.

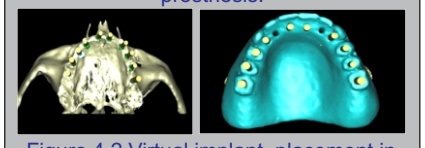

Figure 4.2 Virtual implant placement in the bone and planning the abutments coinciding with the axis of the teeth in the scanning prosthesis.

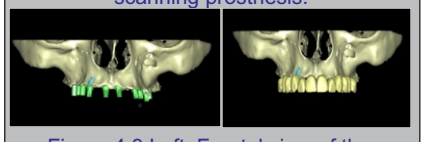

Figure 4.3 Left: Frontal view of the abutments in place, both angled and customized. Right: Virtual teeth placed on the abutments in the position of the final prosthesis.

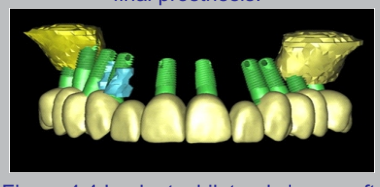

Figure 4.4 Implants, bilateral sinus graft and virtual teeth subtracting the bone and related soft tissue.

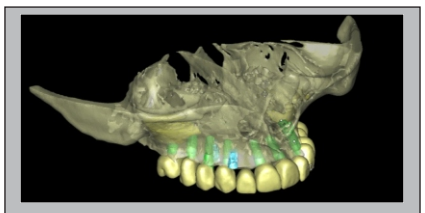

Figure 4.5 Final 3D case design ready for preparing the surgical guide.

Discussion

The development and increased availability of CBCT technology will increase practitioner access to this imaging modality which is capable of providing accurate images in formats enabling 3D visualization of the maxillofacial region in lower cost, better resolution and less radiation doses than conventional CT. Also to be noted that the current CBCT technology has limitations related to image “noise” that reduces clarity such that current systems are unable to record good soft tissue contrast and the image quality is also impaired by artifacts related to metallic restorations. Nevertheless this is the most exciting imaging technology to come to our profession in the past decade that has extended maxillofacial imaging from diagnosis to planning and image guidance of operative and surgical procedures.

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Basic Considerations For Designing A Dental Clinic.

Suma Menon, **Proprietor of Shrishti Interior Designers & Consultants, is a practicing interior designing for the past 10 years, with experience in working with commercial offices, residential spaces, retail stores, training centers, clinics. She can be contacted on shrishti.in@gmail.com for any further details and consultation.**

Clinics need new packaging, brand new dress with the new age perspective. What is being done to create for the patient, surroundings that make him want to live, that restore to him the old fight to regain his health?

Hence, once you have given the basic needs for a space in place, it becomes very simple to proceed for designers like ourselves. Giving the desired outcome on the basis of the requirement then becomes our ultimate goal.

The right choice of material emits its energy and brings about a change in the outlook of a space. The material chosen therefore radiates its character through the intention of the designer. Let's look at each aspect required to complete an area in a clinic and work on them individually. Let's start with the following:

- **Flooring:** For a dental clinic, the flooring speaks a lot for the hygiene of the space as well as to its brightness or openness. Use light colour flooring. Larger tile sizes help in bringing about a joint free feel and also give a feeling of spaciousness to a room. However use of dark coloured tiles is also recommended since it is easier to maintain and any stains on them are less visible.
- **Walls:** Experimenting with wall finishes and surfaces can add spice to the space as well to be used with caution.
  The power of colour speaks volumes about a space. Research has ample evidence to support that colour symbolizes life, health of body as well as mind and nature.

  Use of two different patterns and textures in combination with each other also helps to create a difference to the space.

  Use of mix and match options in paint finishes such as a glossy finish on a wall and a matt on the other can be interesting. Or even use of a light and dark combination can add mood to a space
- **Windows:** Natural ventilation and circulation of air keeps the moisture and bad odours away. Tall and wide windows help in bringing maximum air circulation. Hence it is imperative to maintain a window within the space to facilitate the same.
- **Lighting:** The proper lighting enables you to perform tasks easily, makes you feel safer and more comfortable, and allows you to enjoy your work space to its full potential. Each area, however, has specific and unique General and Accent lighting needs. The functionality of the space should be kept in mind while planning the artificial lighting.
- **Furnishings:** As opposed to a home, a clinic requires a maintenance free space. Use of fabric should be avoided. Leather or leather products, rexine are some of the type of fabric finishes which will help to maintain a hygienic space.
- **Furniture:** Furniture that offers a glass top or even laminated top is a great choice because no matter what you spill on them, you can easily clean it up. Aesthetics too can be achieved with the right style selection of furniture. Shapes and sizes of furniture selected needs to be proportionate to the space available.

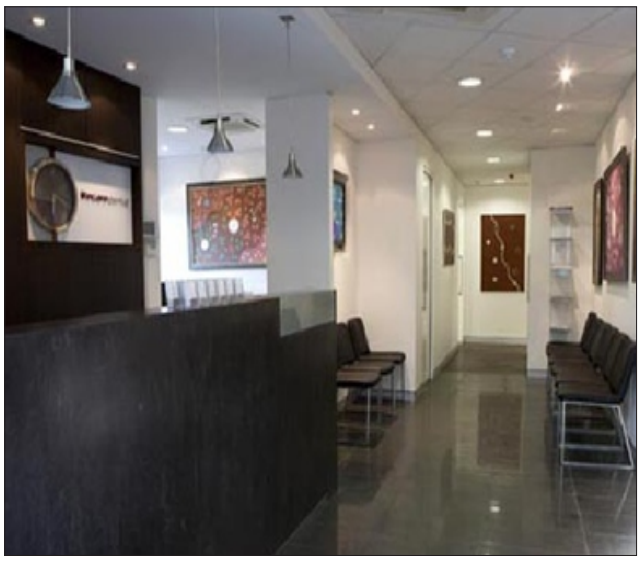
Now that we have our pointers, let us look at the areas which need to be designed in a clinic keeping in mind their basic function and purpose. As listed in our earlier article, here are a few common areas that we find in a regular dental clinic:

1. **Entrance:** The Entrance to a clinic is the window to a brand new perspective to dental health. Choosing the right detail and design is hence important. A wide entry door made of glass or a combination of glass and wood will help give it the desired effect. Increasing the height of the door could also make it impressive entrance to the clinic. A good and impressive signage provides an insight into the type of clinic one is entering.
2. **Reception/Waiting area:** The reception area after the entrance becomes the next area which creates impressions on the minds of patients. A functional, proportionate but aesthetically tasteful reception table would be an appropriate choice. Depending on the type of clinic, reception furniture can look stylish, luxurious, understated, or modern and minimalist.

   Although patients spent the least amount of time here, creating a comforting zone helps to calm the minds of the patients in dental distress.
3. **Consulting room:** The final steps in getting the potential new patient to actually become a new patient are the decor of your consultation room and you, the doctor. In other words, the proper consultation room atmosphere makes your new patient interview significantly easier and far more successful. As opposed to the western countries, in India, the consulting room and the examining room/area are part of the same space.

   The dental tools and instruments need to be close to the dental chair for ease of working. It is also mandatory to have water supply provided to the chair. A wash area is needed for the hygiene along with a large mirror paneling. An X-Ray, viewing machine also needs to be placed in the room. Sterilizer/automan as one calls it, is a necessity and hence allotting a convenient space is a must along with the necessary electrical supply for its operation.
4. **Cloak room/ Rest room:** Like all cloak rooms, this one too needs designed to be maintenance free, clean, hygienic, well lit with anti skid tiles laid on the floor surface.
5. **Store room or space:** A store or supply room, this space may be a dedicated room or just storage provided in the office area. A well organized storage space could consist of drawers, shelves for storing of equipments and instruments. A tall storage unit with sufficient drawers and closed unit shutters would also suffice. '

New age dentists require that utmost interest and care be taken while renovating or designing their work place. As interior designers, it is important for us, to help enhance the clinic's public image and thus making it an important marketing tool as well. However; designing of a clinic is also based on the type of dentistry practiced. Each form of practice has varying requirements and hence it is ideal to design in accordance to the same.



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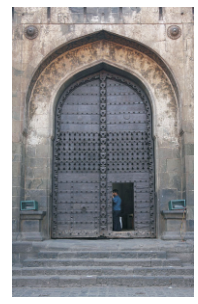

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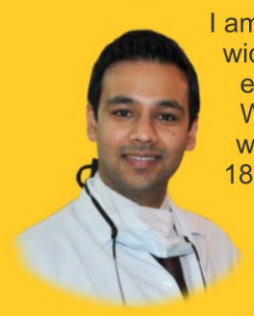

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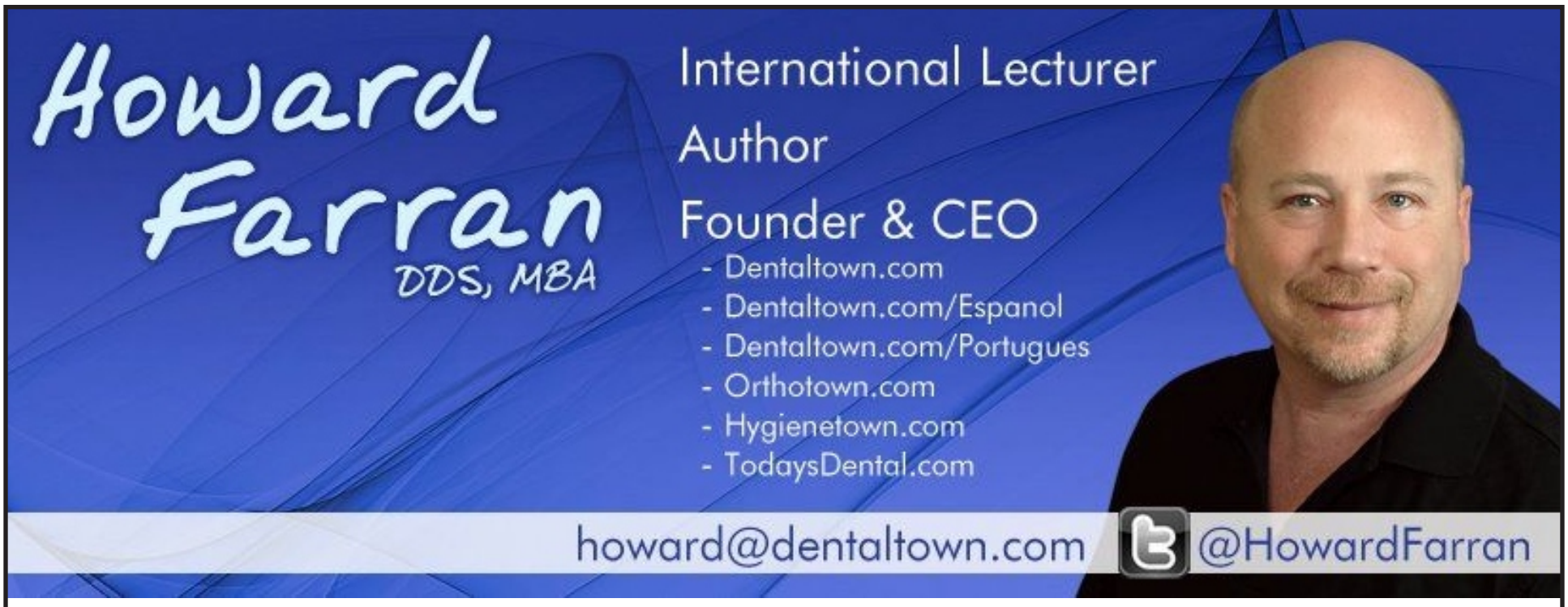

Practice with Purpose

In the July 2012 issue of *Dentaltown Magazine,* I wrote about the importance of a purpose-driven life and the difference between people who have a passion for what they do vs. the poor souls who trade time for money. I wrote a little about giving your team a purpose as well, but I saved the bigger idea for this column, which is giving your entire practice purpose. Not just your staff, not just you, not just the chairs and the bricks and the mortar, but the driving philosophy of your *entire practice.*

Your practice's purpose gives you clear-cut direction. If you take a team of people who place a high value on profitability, every decision they make will go toward maximizing profits. On the other hand, you might have a group of people who highly value customer care and will do and spend almost anything to make sure their customers are well taken care of. Put those two groups together and you're going to see some battles. One team might want to hold back on spending money in order to lower overhead, while the other team really wants to implement something new to offer customers at the expense of the bottom line.

That's why it is so important for companies – large and small – to make their values and their purpose crystal clear. That's where a mission statement comes in. Yes, even though you might consider yourself "just a dental practice," you need a mission statement. A mission statement explains to your customers and your team what your goal is and why your business exists.

Southwest Airlines' mission statement says, "Southwest Airlines is a company that is for anyone and everyone that wants to get from point A to point B by flying. Our service and philosophy is to fly safe, with high frequency, low-cost flights that can get passengers to their destinations on time and often closer to their destination. We fly in 58 cities and 30 states and are the world's largest short-haul carrier andwe make sure that it is run efficiently and in a economical way." In a rather succinct 80 words Southwest Airlines lays out exactly what it does, and if you've ever flown Southwest, it's apparent that its employees take this mission statement to heart. Other mission statements use broad strokes. Take Sears' for instance: "To grow our business by providing quality products and services at great value when and where our customers want them, and by building positive, lasting relationships with our customers." Pretty broad (actually, a little too broad… and maybe a bit vague), but that's OK, because when you delve into your company's list of core values, you can further define your mission. And in case you were wondering, Dentaltown's mission statement is: "To better dentistry by connecting dental professionals through traditional and innovative media."

Now that you've explained who you are and what you do, it's time to explain the "how" through developing your core values. Core values are extremely important. Without them, your team members will make all of their decisions based on what *they* think is best – which may not actually jibe with the practice's philosophy. You can't afford contradiction and infighting; everyone needs to be on the same page and adhering to the same values, otherwise you're not going to move forward. Your company needs to make clear to the entire team what it values and how it will conduct business.

Some companies have five core values, some have 25. We spent months developing the core values for Dentaltown and my dental practice, Today's Dental, and whittled our list to what we thought are the 12 most important values we, as a company and a dental practice, needed to adhere to. If someone doesn't "get" my corporate culture, I can get them right out the door permanently.

First off, we all decided it was important to create a fun, positive and professional environment. People don't want to come to work and deal with all the catty, tacky garbage people tend to bring into an office, which eventually makes people feel bad. These are your teammates and they're your allies.

We require our teams to be passionate, enthusiastic and determined to make a difference.Try as hard as you can but you can't train people to be these three things. You must make sure you're hiring people who carry these traits and be prepared to jettison those who do not.

Be humble. This is something a lot of people have trouble with – myself included. When you've gone to school for eight years and you come out ready to champion the oral health of your town, it comes with a little bluster. But just because you're a doctor and you make the big bucks, and you're talking to the mother of a caries-ridden two-year-old and she's pouring Mountain Dew into his mouth, doesn't mean you get to be a high-falootin' jerk. You have to be a leader. You can't chastise her or make her feel bad. I have had patients who have come in and said, "If I don't give her Mountain Dew she'll cry." You've got to be calm, take the high road and say, "OK, but what is your baby doing right now? She's crying because she has a toothache, and it could be caused by the Mountain Dew. You're not a bad person. You just did what you thought was right, but it's my job to empower you to make higher quality decisions so that your daughter keeps her teeth for the rest of her life." Remember, you exist to teach, not criticize.

You have to embrace and drive innovation. You have to adopt all technology that makes you do dentistry faster, easier, of a higher quality and at a lower cost. Macroeconomics is made up of three things – people, technology and capital. You have to embrace all new technology.

You've got to follow the golden rule ("Treat others like you would want to be treated"); the common thread found at the heart of every major religion. Simple enough, right? Not really… Let's say your child was injured or sick and you needed to take her to the emergency room. Your child might be scared and might start asking the nurse questions. Would you really want to hear the nurse say, "I'm sorry, I can't talk about this with you. The controlfreak doctor says I can't talk to you like a human." Nobody wants to hear that, and certainly nobody wants to say that, but when someone calls up your practice and your front desk can't explain what they think because you've got them gagged, there's something wrong.

Mistakes will be made. Be accepting and accountable,and move forward. You're not perfect, doc. Nobody is. There's a reason why we call it a "dental practice" –nobody's perfected it, and nobody ever will. We are our own worst critics; if someone screws up, help them realize their mistake, redirect if it's needed and then move forward. You don't laugh at them or chastise them or belittle them. Mistakes are an opportunity to learn.

Speaking of which…

Never stop learning. This is a favorite of mine because if your practice chooses to adopt this particular core value, I can help you and your team along by shamelessly promoting Dentaltown.com's awesome line-up of online continuing education courses. You don't have to take notes. You don't have to get a hotel. You don't have to buy an airline ticket. And all of our courses will not just benefit you but your whole team. Why don't you do something educational and morale boosting for your team like Terrific Tuesdays, when every Tuesday you spring for pizza and the whole staff stays in and watches a one hour-long online CE course given by the best instructors around the world? It's important to continue improving your knowledge base and your skills. Keep learning new techniques that

will start making your practice money, like sleep dentistry or implants.

If you're on my team, you need to be honest and respectful. Integrity is everything. You have to report your cash because if you don't your staff thinks it's OK to steal from the IRS, therefore it's OK to steal from you. You have to warranty all your work. You have to be honest. If you screw up, you tell a patient, hey I'm a human and I just broke the bur off into your nerve and this is what I did. Don't cover it up. Don't lie. It just makes things worse. Be honest, get it all out front.

You have to balance life and work and be fully present in both. To take this a little further, I've got my four Bs: my body, my babies, my business and my babe. If you don't take care of your body, then babies, business and babe don't matter because you'll be dead. You stay healthy in order to be there for your family and your business. So many of us are workaholics. We ignore our families until they want nothing to do with us and we get upset when they eventually only love us because we give them money (because that's the only part of you you really ever gave them). It disappoints me when dentists take personal calls from their spouses all day long but won't let their staff take personal calls from their spouse or their children. When your kid is having a crisis, you reschedule all of your appointments, but when your hygienist's child is facing a crisis, you raise hell and start making threats. It's an awful double standard. Remember, treat other people how you want to be treated.

Strive to make everyone feel safe, valued and important. I've witnessed dysfunctional staff meetings where the doctor barks orders or makes a decision before talking to the staff, and the whole team just looks at him, their eyes as wide as saucers, and before anyone can ask a question the team is dismissed and everyone runs away. That is so dysfunctional. I remember the last time I ever held a staff meeting like this. I told my staff we were buying a CEREC milling unit and my assistant Jan spoke up and said, "That's the stupidest thing I've ever heard in my life." It wasn't because she thought buying a CEREC was a bad idea, it was because our office needed to be updated. After that meeting, we argued about this for about a month. Eventually, and with some long-term financial planning, we all got what we wanted. The point of this story is, in that month while Jan and I butted heads, not once was she afraid that she was going to lose her job because she stood up to me. My team knows I'm not going to fire them or abuse them for standing up to me. We can disagree and have heated debates, but they must be done in a respectful way so nobody fears losing their job just because they disagree with me. You need this in a practice because it allows your team ownership of all of the decisions that are made.

Be remarkably helpful. Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime. Empower your staff. Be helpful. Coach them. Invest in training your team and when they are finished training, get them some more! I can't say enough about online CE. Your hygienists and assistants should know exactly what is going on with a root canal. If you want your receptionist telling people how much a root canal costs, she should at least know what a root canal is. Have her take a CE course on Dentaltown.com. In one hour, she can learn what a root canal is, know how to make one better and faster and then when she's done with the root canal course, she can explain what she learned to patients (and tell them how good you are at it). Empower everyone with knowledge – it's the best help you can give.

Our final core value prompts our team to create

opportunities to make our customers feel special. In these turbulent economic times, why are you taking off your gloves and mask and slinking back to your office while the local anesthetic sets in? You need to take these golden opportunities to bond with your patients, share things with them and listen to them. At the very least, review their social network. Why not?! They're just going to be sitting there soaking up the Novocain anyhow. Say to them, "By the way, how's the rest of the family? I haven't seen your husband in a while. When's the next time he's going to come see me?" Review the treatment plan – not just of your patient in the chair, but of their family as well. Say, "OK, your kids are nine and 10. We talked about sending them for an orthodontic consult when your daughter is 12 and your little boy is 13…" Engage them. Bring up their pano, their digital X-rays. Stay in that operatory to teach. Ensure everyone in your office is a teacher. Give everybody a purpose to teach, you want a measurable impact on the improvement on everyone's oral health from when you graduated from school to when you retire. Being clear about your purpose is one thing, but actually following your own core values is another.

You might spend a year coming up with your company's mission and core values, but without consistent follow through, they won't mean a damn thing. When you review your employees, you must hold them accountable to all of your practice's values. The staff should also have the freedom to police each other. If someone's behavior isn't in line with any of your core values, that person needs to be called out and be held accountable for their actions. Everyone should have the opportunity to change their ways, but if someone on the team is consistently not adhering to any of your company's values, perhaps it's time that person find another practice whose values are more in line with his or her own. ■

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