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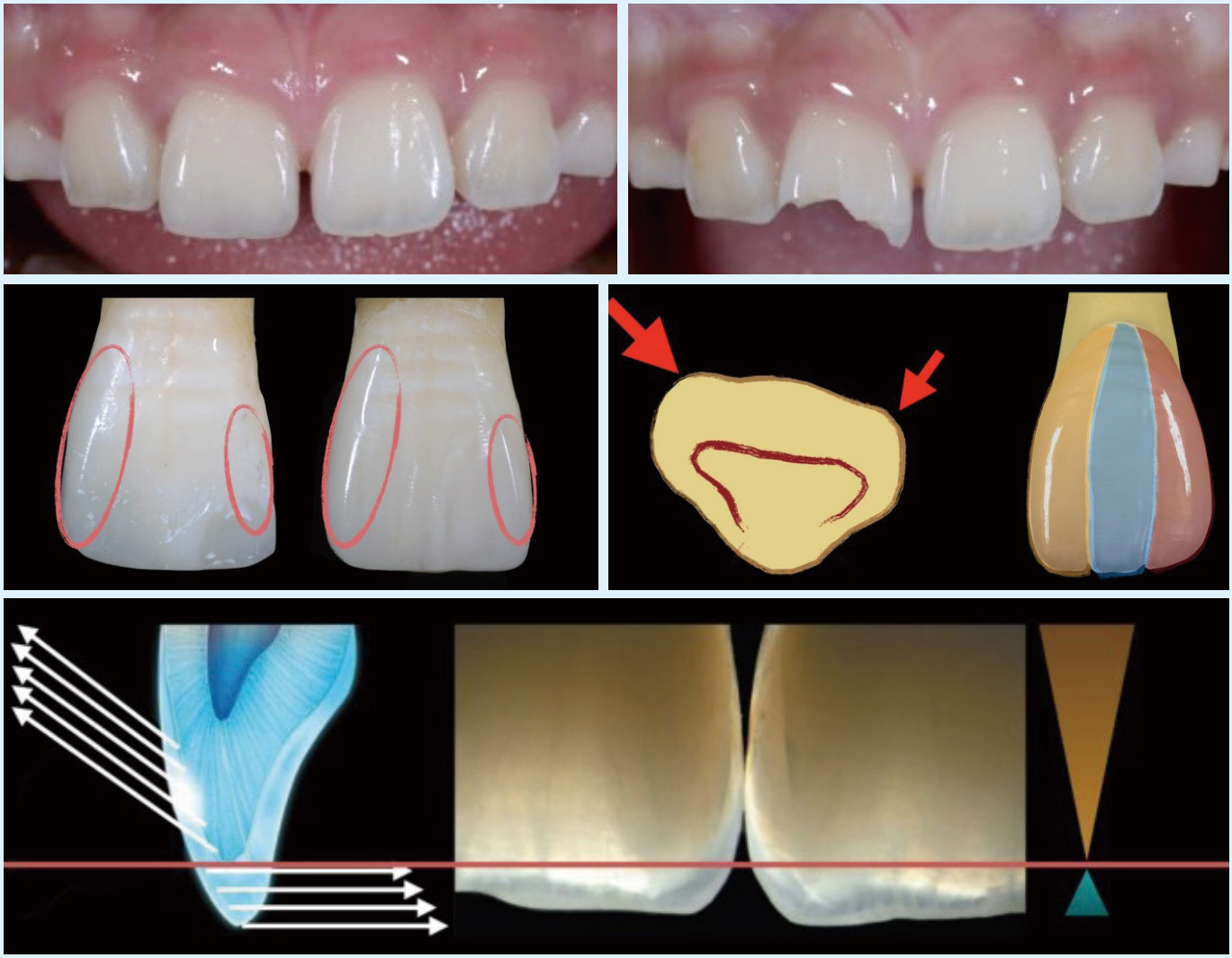
JCDD

Journal of Clinical & Digital Dentistry



Cover Images from Sangho Cho. (J Clin Digit Dent 2023;5(3):17-20)

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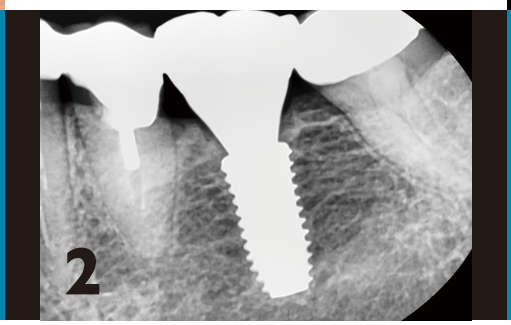

JCDD
Journal of Clinical & Digital Dentistry

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About the Journal

The Journal of Clinical and Digital Dentistry are published four times (March, June, September, and December) annually since May 2019. The abbreviated title is "J Clin Digit Dent". In the journal, articles concerning any kind of clinical dentistry such as prosthodontics, orthodontics, periodontics, implant dentistry and digital dentistry are discussed and presented.

Aims and scope

This journal aims to convey scientific and clinical progress in the field of any kind of clinical and digital dentistry.

This journal publishes

- Original research data and high scientific merit in the field of clinical and digital dentistry.
- Review articles.
- Case reports in implant dentistry including GBR, digital dentistry, 3D printing, and prosthodontics.
- Short communications if they provide or document new technique and clinical tips.

About the Journal

Editorial Board

Editorial

Cherry on top (畵龍點睛).

Humanity is constantly evolving and changing. Although whether modern humans are happier than those in the past remains uncertain, it is a fact that civilization itself has progressed significantly. It makes one wonder if there has ever been a period in the ever-evolving history of humanity where change and progress occurred as rapidly as they do today.

Smartphones, which began to emerge only two decades ago, have become indispensable for people worldwide. Their utility extends beyond mere phone calls, encompassing diverse means of communication, photography, internet access, shopping, and various bookings. Furthermore, the development of autonomous vehicles is steadily advancing, and in the near future, the anticipation of more convenient and safer driving through self-driving cars is growing. Recent advancements like Chat GPT are revolutionizing not just language barriers, but also everyday life and research in all fields, with the pace of progress accelerating.

Similarly, dentistry is also experiencing an accelerating shift towards digitalization. Many materials and treatment methods from the past have already disappeared. However, no matter how much dentistry becomes digitized, dental treatment remains a medical practice. Diagnosis, the modification of tooth anatomy based on a patient's condition, as well as occlusal adjustments by dentists, are areas where digital technology may fall short. As digital technology continues to influence the entire dental field, the role of dentists, much like adding the finishing touches to a dragon painting (畵龍點睛), becomes increasingly crucial, and their value is expected to become more greatly recognized.

Although most dentists are making efforts to learn digital dentistry, it is believed that the efforts of dentists focusing on fundamental aspects of dentistry such as tooth anatomy, functional occlusal harmony, and dental esthetics (which form the basis of standard dentistry rather than digital dentistry) are even more critical.

This issue of JCDD will include articles that shed light on how implant treatments have evolved, both in the past and today, as well as clinical procedures for anterior composite resin treatments. It is hoped that this will provide dentists with an opportunity to reconsider their role, not only in the context of digital transformation, but also in terms of their core responsibilities.

Wongun Chang, DDS MS PhD

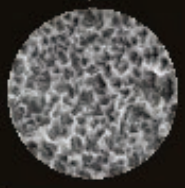
SQ

Submerged Qualified

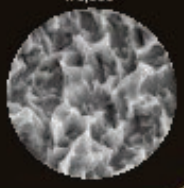
Dual & Open Thread

Prevent bone loss

x 2,000



x 5,000



S.L.A. Surface

Excellent Osseo-Integration with SLA surface

Double Thread

Smooth implant placement and shorten surgery time

Wide Cutting Edge

Improved Self-tapping

Sharp shape of Apex

Superior initial placement

Tapered Body

Improving Initial fixation force

Vacuum cleaning machine

Quality Control

Clean implant with automatic cleaning system

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Implant Design and Implantation protocol: Current concept and Advancement

Dongwoon Lee, DDS, PhD

Implant platform modifications

The machined (turned) surface is designed to attach to soft tissue, and is considered essential in preventing plaque build-up due to the exposure of implants to the oral environment. After the initial transition from external to internal connection, most implants adopted a 0.5–2.0 mm-high machined surface, with a rough surface below the crestal module area. As the machined surface collar cannot directly contact the surrounding bone, the implants are usually placed at the same height as or 0.5 mm below the alveolar bone. However, the elimination of the machined surface and extension of the rough surface to the platform have enabled deeper placement of implants.

Fig. 1. The design of implants with internal connection has shifted toward elimination of the polished surface.

Prof. Dongwoon Lee

Prof. Lee received DDS degree from Wonkwang University in 2002. He completed the post-graduate study in Department of Periodontology from Veterans Health Service (VHS) Medical Center in 2006 and received PhD from Korea University in 2015. He is a board-certified periodontist in Korea. After military service from 2006 to 2009, he has worked at VHS Medical Center as a clinical professor from 2009 to 2022. He was a visiting scholar at USC Herman Ostrow School of Dentisry from 2013 to 2014. Since 2022, he has been an associate professor at Department of Periodontology, Wonkwang University College of Dentistry. He has contributed to more than 30 SCIE articles and numerous magazines, and has given lectures nationally and internationally.

Stable connection

The change from external to internal connection basically involved shape alteration. In contrast, adopting a conical type of internal connection allows for a more secure fastening. Stress, which previously concentrated on the upper part of the screw, can now be dispersed downwards, ensuring mutual stability of the bone and implant when supported by the surrounding bone. Although marginal bone resorption due to an inflammatory response in micro-gaps at the fixture-abutment level was considered essential, the support for this notion seems to have diminished considerably.

Reinforcement of the inner wall thickness

The appropriate thickness of the implant varies based on the tooth. Previously, a thickness of 5.0 mm was recommended for maxillary central incisors, while premolars typically used a 3.7 mm thickness to ensure adequate tooth spacing. For a given size of hex screw, decreasing the width of the implant inevitably results in thinning of the internal wall, reducing the resistance to fracture. Although implant fracture is not a result of a single factor, efforts have been directed towards reinforcing inner wall thickness through measures such as applying a corrosion-resistant coating to the screw, changing the internal angle, or reducing the screw diameter.

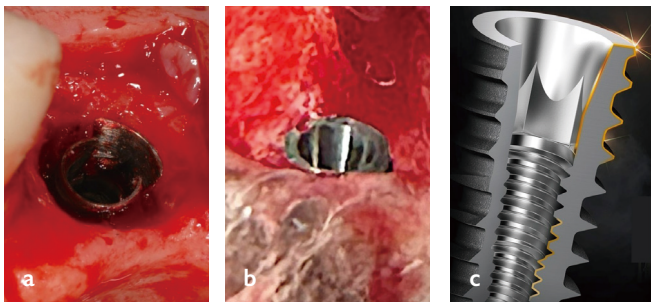


Fig. 2a-c. Changes to the internal wall of implants
a) Clinical photograph of a fractured premolar implant with 3.7 mm diameter.
b) Photograph of an implant with the same diameter and a thicker inner wall in an animal experiment.
c) Diagram depicting improved thickness of the inner wall by reducing the screw diameter (Dentis SQ MINI).

Flexibility of depth control

Recognizing the challenges posed by shallow implantation depth, emphasis has shifted to the thickness of soft tissue around the upper part of the implant. As previously mentioned, the changes to modern implants provide flexible depth of implantation within allowable ranges.

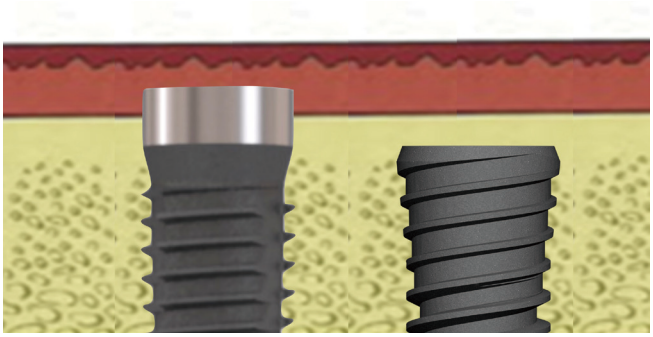


Fig. 3. The stable connecting structure and the absence of a machined surface enable depth flexibility in implantation.

Guided bone regeneration in non-submerged implants

With flexible implantation depth, GBR can be achieved through perforations using a healing abutment, depending on the shape and thickness of the surrounding soft tissue, initial fixation, and the bone-defect shape. Evidently, this was also possible with previous tissue level implants. However, the basic protocol for two-piece implants was to insert a cover screw that would be later replaced with a healing abutment in a second surgery. Currently, the use of a resorbable barrier membrane and bone graft material to connect the healing abutment at the same time as implant placement has become a universal clinical practice.

A case of left mandibular molar implant placement.

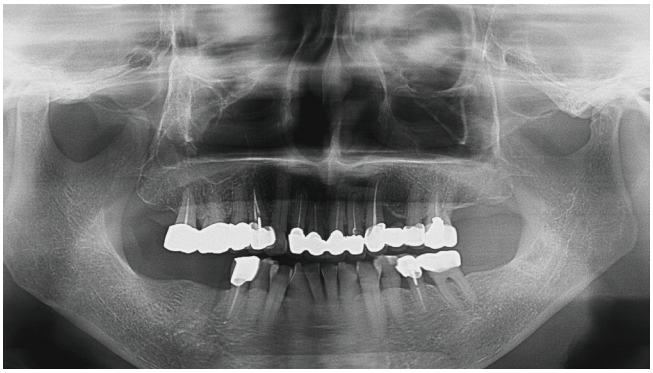


Fig. 4. Panoramic photograph at initial consultation

Fig. 5. Preoperative clinical photograph

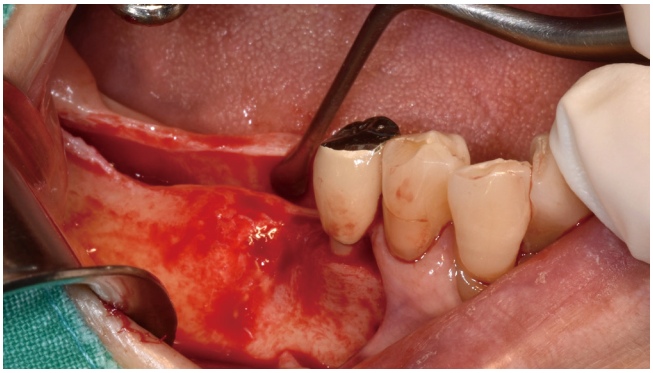


Fig. 6. Flap raising

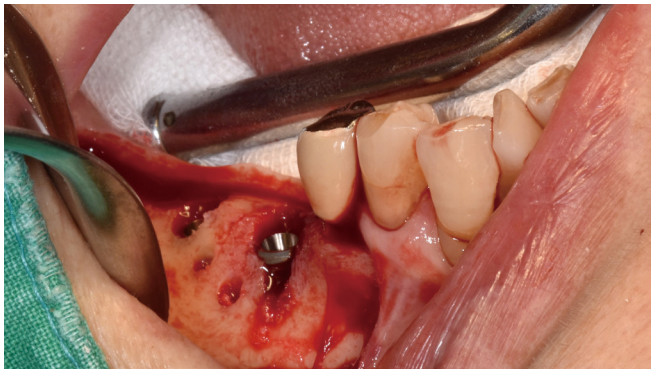


Fig. 7. Photograph after implant placement (4.7D x 10 mm, 5.2D x 8 mm, OneQ, Dentis, Daegu) the mild buccal defect can be minimized by adjusting the implantation depth

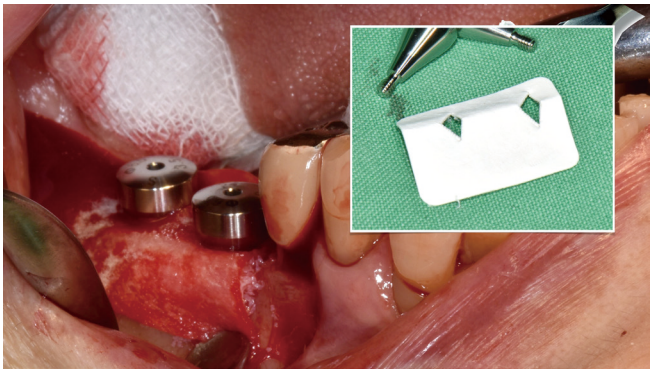


Fig. 8. With suitable initial fixation, a resorbable barrier membrane is cut and the healing abutment is fastened.

Fig. 9. Bone graft material is added below

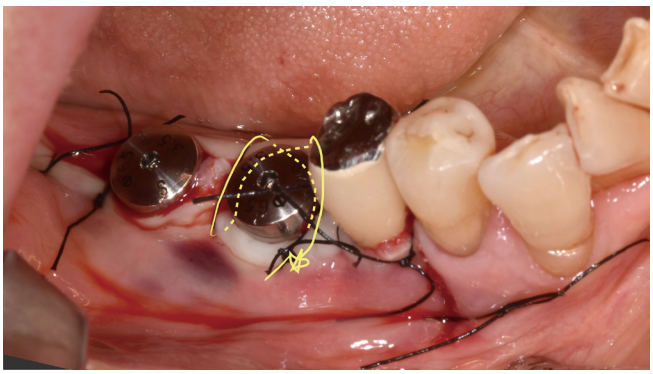


Fig. 10. Suturing

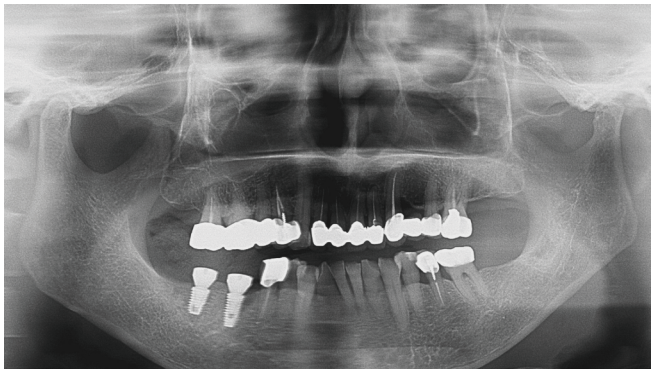


Fig. 11. Postoperative panoramic photograph

Fig. 12. Clinical photograph after four postoperative weeks.

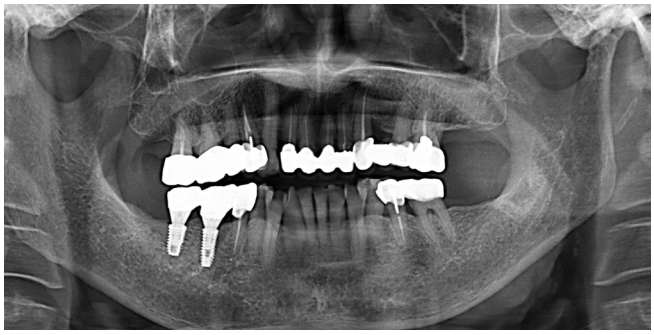
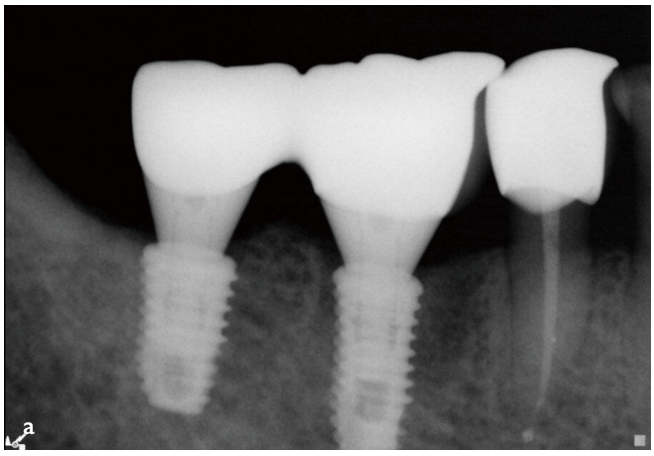


Fig. 13. Panoramic photograph after final placement of the dental prosthesis after five postoperative months;

Fig. 14. Clinical photograph immediately after placing the dental prosthesis



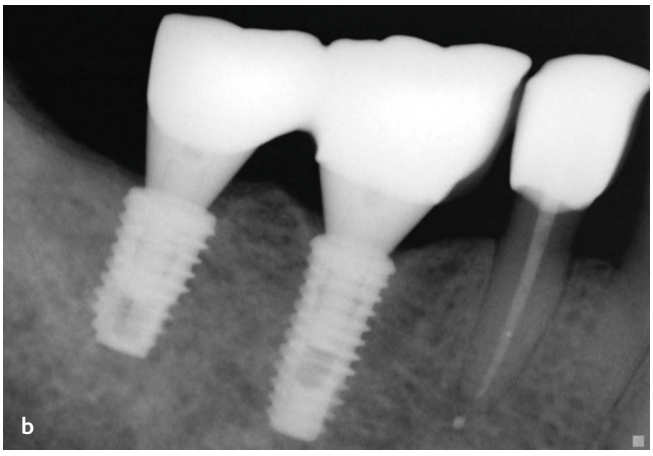


Fig. 15a-b. Clinical photograph immediately after placing the dental prosthesis

Conclusion

Through the historical advancements in implant design and their impact on clinical practice, we are intrigued by the potential future developments in the clinical landscape of implant dentistry.

How to cite this article: Lee DW. Implant Design and Implantation protocol: Current concept and Advancement. *J Clin Digit Dent.* 2023;5(3):6-9. www.jcdd.org

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BONE PROFILER KIT

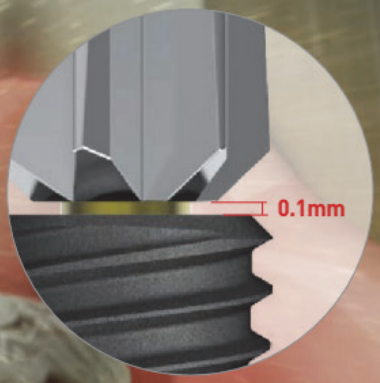
Bone removal without damage to the fixture!

Involvement of surrounding areas? NO!

Prevents fixation error due to residual bone around the fixture joint.

Safety Gap (0.1mm)

With a 0.1-mm safety gap, safe drilling is possible without damaging the fixture.



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Subcrestal Implantation and BONE PROFILER KIT

Pil Lim, DDS, MSD

Introduction

As one of the several criteria for implant success, Albrektsson et al.[1] earlier proposed that marginal bone loss should be less than 1.5 mm in the first year and less than 0.2 mm annually thereafter. Bone resorption does not result from a single cause, but is known to be influenced by a combination of various factors, including insufficient width of the alveolar crest, implant crest module, implant-abutment connection, microgaps, emergency profile of the abutment, overloading, peri-implantitis, and biologic width.[2] While the biologic width of natural teeth is approximately 2mm on average, the biologic width of implants is known to be wider, at approximately 3–4mm. **(Fig. 1)**

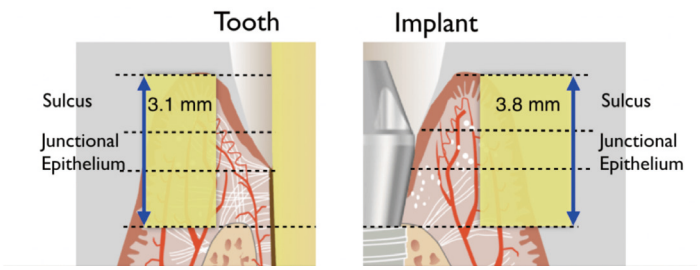


Fig. 1

Pil Lim

He graduated from the College of Dentistry at Wonkwang University. He worked as an adjunct professor for a while in the Department of Implantology at the Catholic University of Korea. He completed the NYC Continuing Dental Education and holds a diploma from the International Congress of Oral Implantologists (ICOI). He has been recognized as an expert by the Korean Academy of Esthetic Dentistry and served as Chairperson of the Society of Korean Clinical Dentistry (SKCD). He is currently the chief of NY Pil Dental Clinic.

In an animal study on the dimensions of peri-implant mucosa, Berglundh & Lindhe[3] reported an approximately 2mm of junctional epithelium and 1.3–1.8mm of connective tissue. Among the three types of implant commonly used in modern clinical practice—external typr, internal submerged (bone level) type, and internal non-submerged (tissue level) type—bone level implants, which are used by many clinicians, are known to form a slightly wider biologic width than tissue level implants. It has been proposed recently that terms describing the external appearance should be favored over biologic width, which includes histological concepts. Previous studies have highlighted the importance of the phenotype of the soft tissue that forms over the top of the implant; specifically, a supracrestal tissue height of 3mm has been reported to be appropriate.[4] **(Fig. 2)**

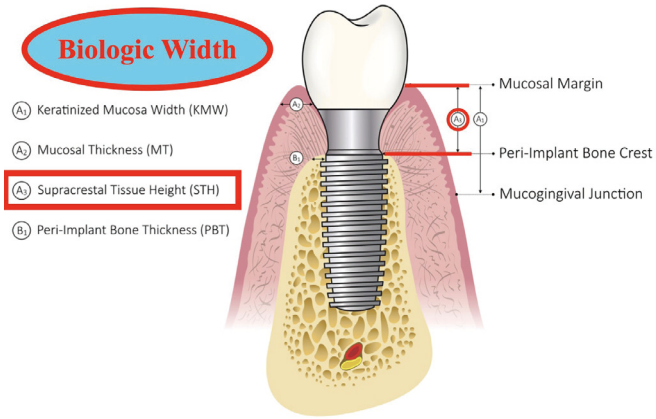


Fig. 2

However, it is not practical to perform soft tissue grafts to ensure sufficient soft tissue height in all patients with thin biotype. In the anterior region, soft tissue augmentation is often performed using techniques, such as connective tissue graft, to maximize aesthetics. However, in the posterior region, it is rare to actually perform soft tissue graft to increase mucosal thickness. Free gingival graft is commonly used in the posterior region, but for a different purpose, which is primarily to increase the width of keratinized gingiva rather than increase the thickness of the soft tissue. As such, in implant patients with thin gingiva in the posterior region, a more practical approach to ensure a certain height of mucosal thickness is to place a bone level implant a little deeper, below the alveolar crest, to induce the thickening of the soft tissue to some extent above the implant.

For bone level implants, we have typically described the vertical depth as approximately 1mm inferior to the alveolar crest. If the thickness of the soft tissue covering the bone is approximately 2mm, this means that the biologic width is approximately 3mm in total (subcrestal 1mm + soft tissue 2mm); hence, the corresponding protocol can be followed. However, if the soft tissue is thinner, the implant needs to be placed a little deeper to achieve a distance of 3–4 mm, based on the concept of biologic width. For this type of subcrestal implementation, it is essential to clean up the surrounding alveolar crestal bone to prevent interference with the fastening of the upper part of the implant. The instrument required for such cases is a bone profiler drill.

Case Reprot

The patient visited the clinic to remove an old bridge in the left posterior mandible and restore the site of defect with an implant. **(Fig. 3)**

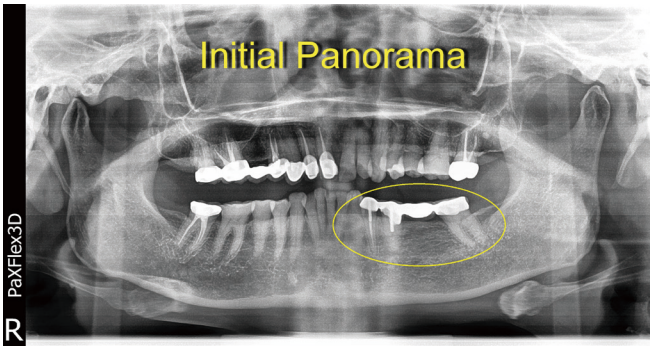


Fig. 3

Since the bone volume and quality were both good, the implant could be placed very easily without additional bone graft. **(Fig. 4)**

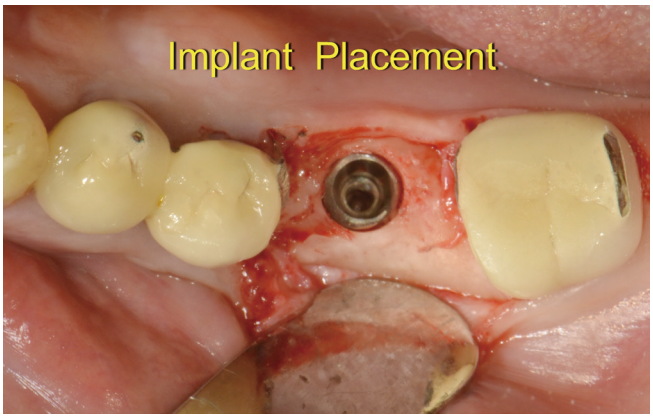


Fig. 4

However, this patient had a thin biotype, with a mucosal thickness of precisely 1mm. **(Fig. 5)**

Fig. 5

Hence, the implant depth was designed to be 3mm inferior to the alveolar crest. **(Fig. 6)**

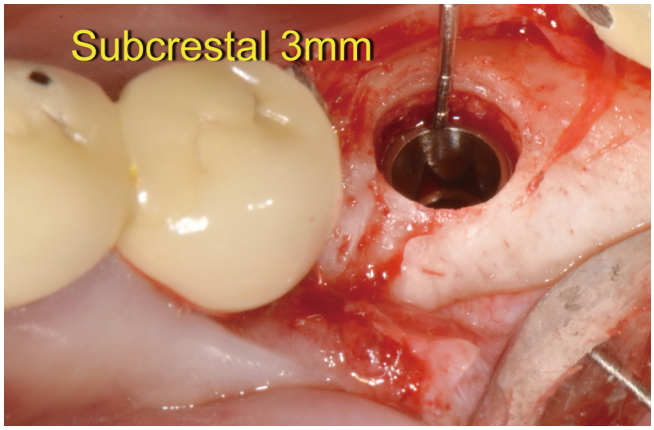


Fig. 6

In other words, the procedure was planned to form a supracrestal tissue height, corresponding to the mucosal thickness above the top of the implant, of 4mm, which is also the biologic width. Needless to say, when deciding the depth of implant placement, in addition to the biologic width, I also considered other factors simultaneously, such as the design of the superior structures (i.e., abutment profiler and/or abutment angle).
When placing the implant inferior to the alveolar crest, a bone profiler was used to trim the bone tissue superior to the implant. A BONE PROFILER KIT (Dentis) consists of the profiler drill itself and a tool called a base, which guides the profiler drill and prevents damage to the implant platform. **(Fig. 7-9)**

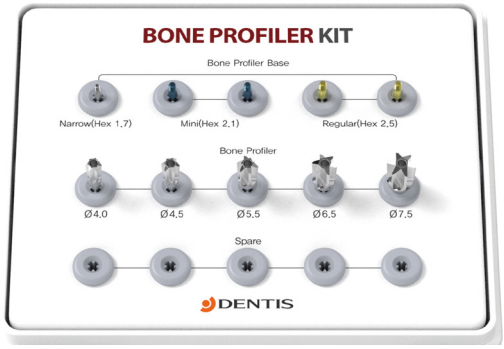


Fig. 7

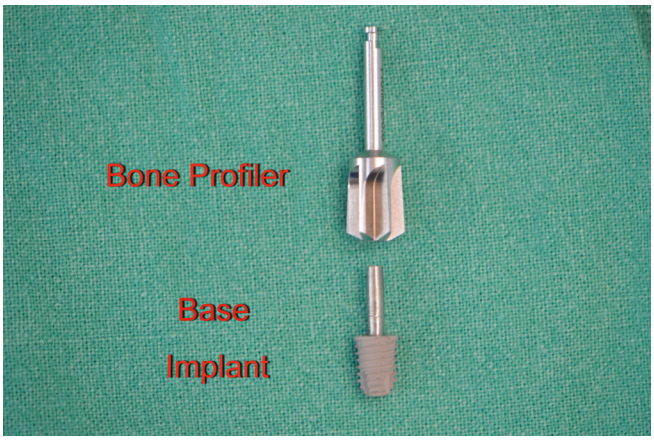


Fig. 8

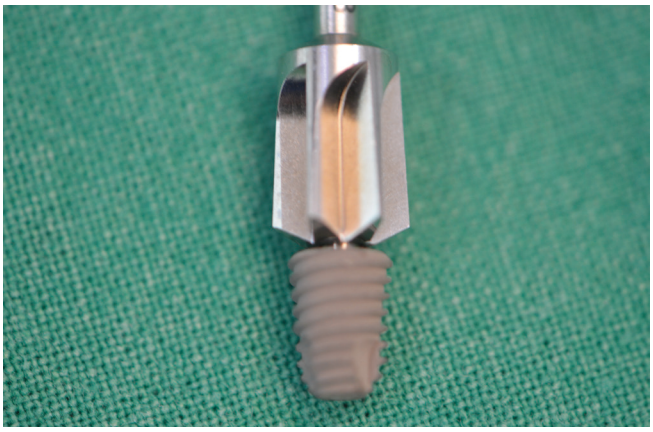


Fig. 9

Bone profilers are recently being produced by numerous implant manufacturers. Compared to the method of inserting the profiler drill directly into the inner hex of the bone level implant, fastening a base before using the profiler drill, as shown here, provides a safety device to protect the implant platform. The profiler drill is also available in different diameters, from 4.0 to 7.5, allowing for the fastening of various sizes of healing abutment. Thus, the surgeon can select the appropriate tool based on the circumstances.
This photograph shows the results of the use of a profiler drill to clean up the bone around the implant platform **(Fig. 10)**

Fig. 10

This periapical radiograph shows the difference in appearance before and after the use of the profiler drill. **(Fig. 11)**

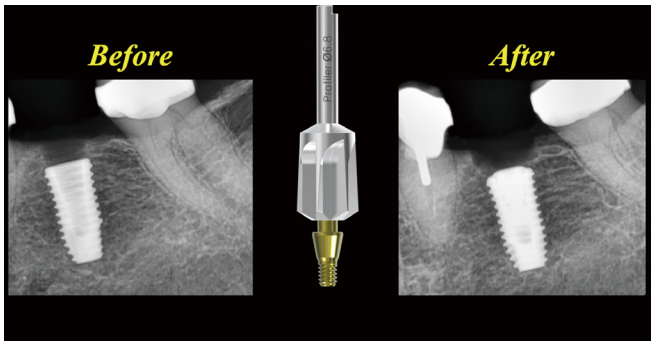
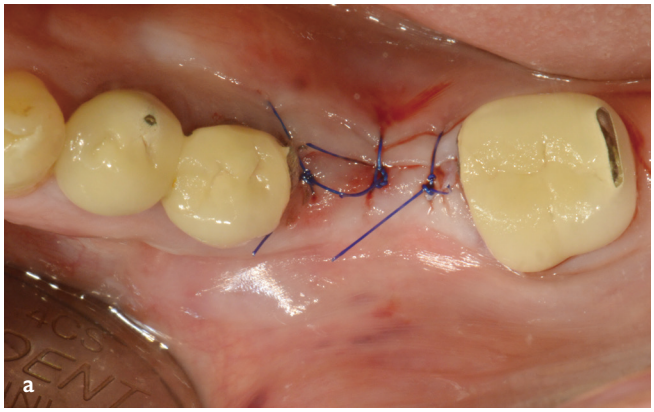
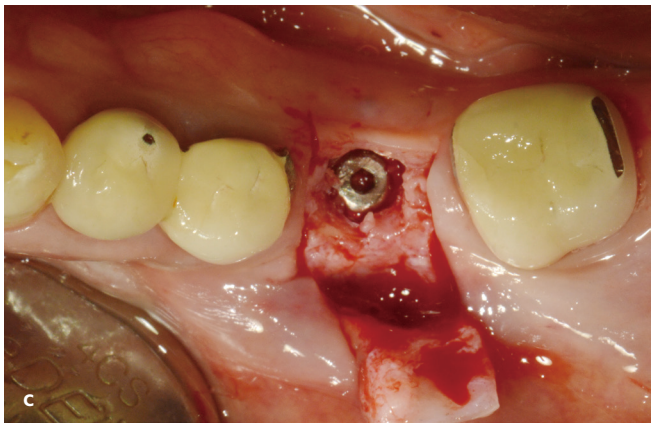
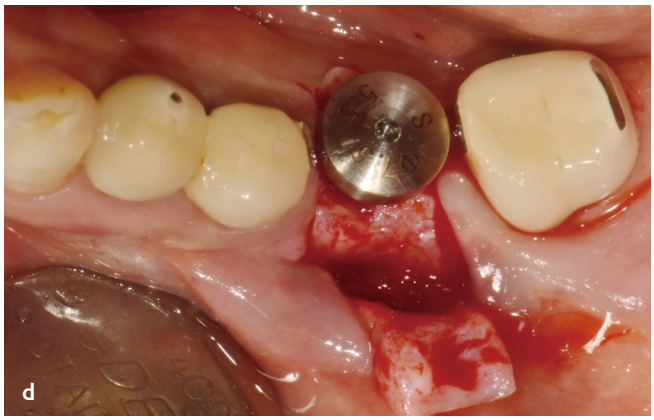


Fig. 11

If performing a single-stage procedure, in which the healing abutment is fastened immediately after placing the bone level implant, the profiler drill must be used immediately. If performing a two-stage procedure with submersion, the profiler drill could be used during the second surgery. However, it is still recommended to use the profiler drill during the first surgery immediately after placement, even when performing a two-stage procedure. This is because this simple procedure can be omitted during the second surgery.
These photographs show the appearance after placing sutures in the soft tissue and ending the first surgery and of performing APF in the second surgery. **(Fig. 12a-e)**







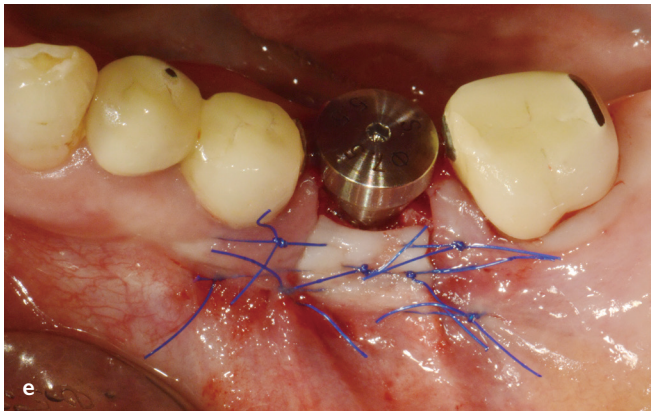


Fig. 12 a-e

This photograph shows the appearance after the complete healing and immediately before fastening the upper part of the dental prosthesis; sufficient mucosal thickness can be observed. **(Fig. 13)**

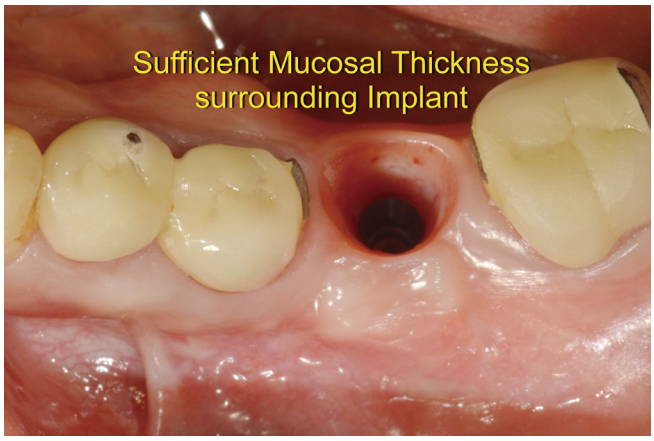


Fig. 13

Histologically, the supracrestal tissue height can be divided into, starting from the most superficial, the sulcular epithelium, junctional epithelium, and connective tissue layers**. (Fig. 14)**

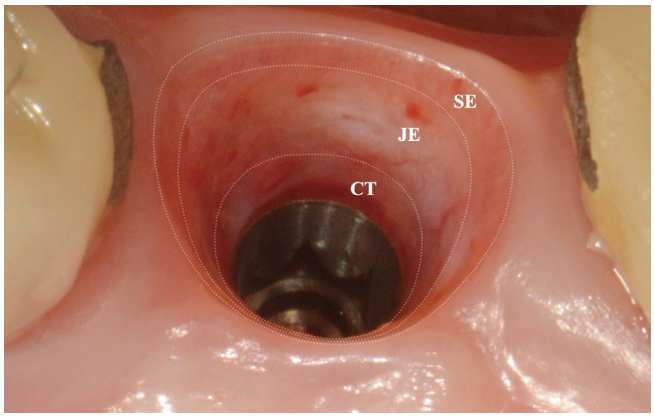


Fig. 14

An appropriate implant depth and emergence profile can be verified through photographs and periapical radiographs of the final restoration. **(Fig. 15, 16)**

Fig. 15

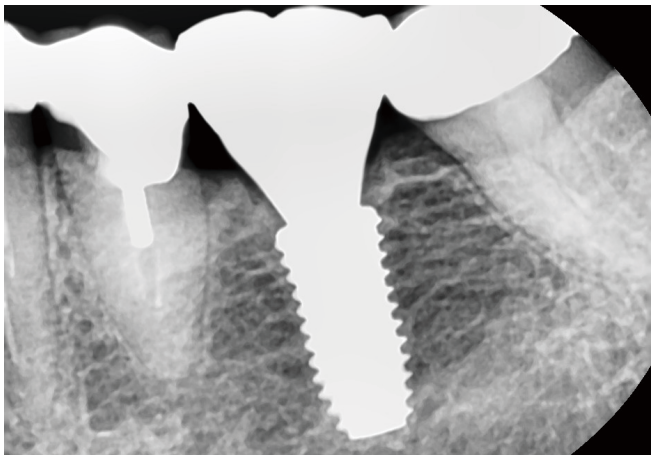


Fig. 16

Conclusion

Thus, when placing a bone level implant in the posterior region, subcrestal placement is often required, necessitating the appropriate trimming of the alveolar crestal bone.

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3 keys for successive direct esthetic restoration

Sangho Cho, DDS, MSD

Abstract

There is a difficulty for many practioner in anterior direct restroation with composit resin. Because its result is various according to patient, a practioner have a fear about that unpromisable result. Moreover in esthetic region, there is difference in satisfaction by patient character. That is one of difficulty in this practice. But if we make a manual for parctice it will be easier. So I will summarize the process and things to note in direct anterior composite resin restoration.

Introduction

Anterior direct esthetic restoration with composite resin is a challenging technique for many practitioners. The outcomes vary from patient to patient, meaning that the practitioner is often unsure of the outcome following restoration. Furthermore, differences in patient satisfaction with the resulting esthetics play a role in this challenge. Documenting the elements and processes that should be followed in restoration would make this approach easier. Therefore, this study aimed to summarize the factors that should be considered when performing direct restoration with composite resin, and describe the modification process using a practical model.

Sangho cho

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He further served as the head of both the Department of Periodontics (2004–2005) and the Department of Implantology and Prosthetics (2012–2017) at Mir Dental Hospital.
He is an active member of the Korean Academy of Periodontology, having completed the accreditation process, and has served as the Academic Director of the Korean Academy of Esthetic Dentistry (2012–2014). He is a thesis reviewer for the Korean Academy of Esthetic Dentistry,
And is a clinical editorial board member for the Korean Journal of Clinical Dentistry.

Methods

To practice composite resin filling in the maxillary anterior region, two maxillary central incisors (Nos. 11 and 21) were prepared, and a total of four class IV cavities were formed mesially and distally, followed by practicing the filling, discussing the problems, and modifying the filling.

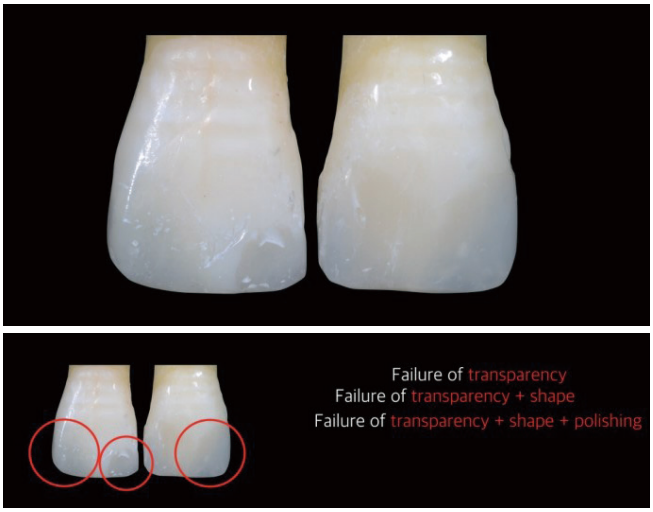

Fig. 2

Results and Discussion

In the following two cases, each with a class IV filling, the filling site was not easily recognizable in the first case, whereas the filling site was clearly distinguishable from the surrounding tooth material in the second case. This difference was intended to facilitate discussion regarding what factors might have influenced the results between these two charges to cause such a difference. **(Fig. 1)**

Fig. 1

The two maxillary central incisors shown below are used as practice models for mesial and distal class IV fillings, respectively. However, these four fillings are all failures, with #11 distal failing to control transparency, #21 distal failing to reproduce transparency and shape, and #11 mesial failing to achieve transparency, shape, and polishing. **(Fig. 2)**

Transparency assesses how much light passes through the tooth when exposed to light. Teeth show differences in transparency from the edge to the cervical margin, depending on the thickness of the dentin and whether or not it contains pulp. In other words, edges with no dentin at all have very high transparency. As you approach the cervical margin, the dentin becomes thicker with more pulp, making it more opaque. **(Fig. 3)**

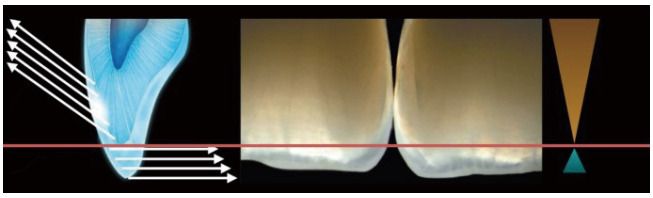

Fig. 3

This difference in transparency causes the color of the tooth to vary, with the so-called cervical margin being a color termed A3.5 or A4, getting closer to A1 or A2 toward the edge. **(Fig. 4)**

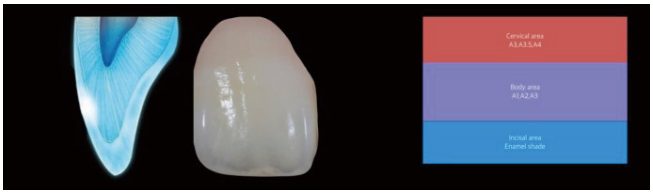

Fig. 4

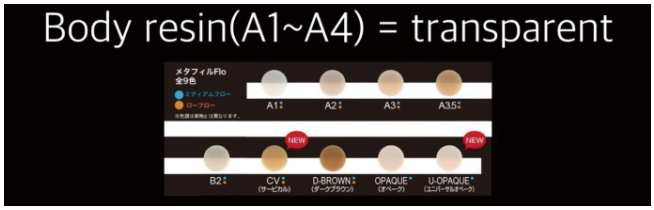

Fig. 5

Therefore, filling according to these standards is guaranteed to In the image shown above, the transparent resin allows the white line in the background to show through, while the opaque resin blocks it. As dentin is opaque, opaque resin should be used when filling dentin, to meet the level of transparency required. Otherwise, the filling may appear darker than the surrounding tooth material after filling. This is because the inside of the filling, or, in other words, the cavity, is always a black cave. Therefore, filling it with transparent resin lets the black cave inside show through, making it look dark. In this case, the fillings appear dark in the model because they were only filled with clear resin. This can be modified as follows. **(Fig. 5)**

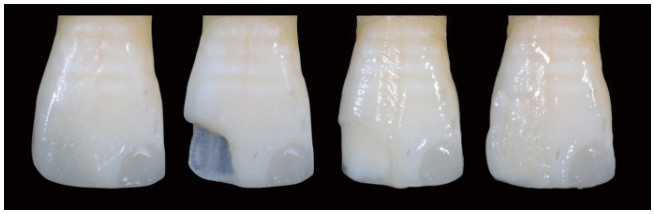

Fig. 6

All of the filled resin from the distal area in #11 is removed, leaving only the palatal side. The opaque resin is then used to adjust the opacity close to that of the original dentin, followed by an A3 resin filling, and finally an enamel filling. **(Fig. 6)**

The results of polishing were as follows.

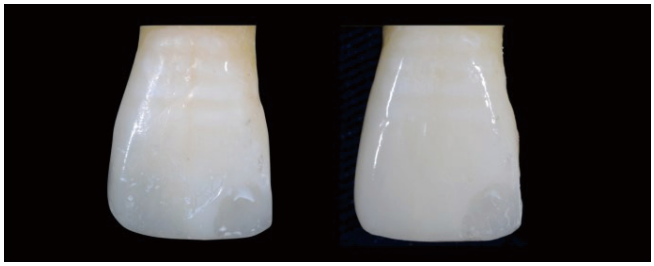

Fig. 7

Comparing the distal area of tooth #11, the failed filling on the left appears somewhat dark, while the distal area on the right has blended well in with the surrounding tooth material. This is because the opacity of the filled resin blends naturally with the surrounding tooth material. Every company that sells resin on the market provides such opaque resins. Therefore, practitioners looking to esthetically fill anterior teeth should always have opaque resin on hand. **(Fig. 7)**

Next, the shape required some modification.

Every tooth has three lobes that meet to form the labial surface, as shown below. **(Fig. 8)**

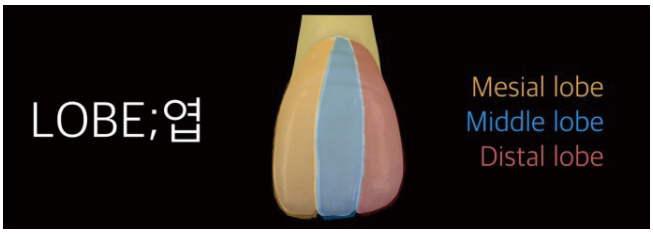

Fig. 8

These lobes cause the following line angles to be formed when viewed from the edge. **(Fig. 9)**

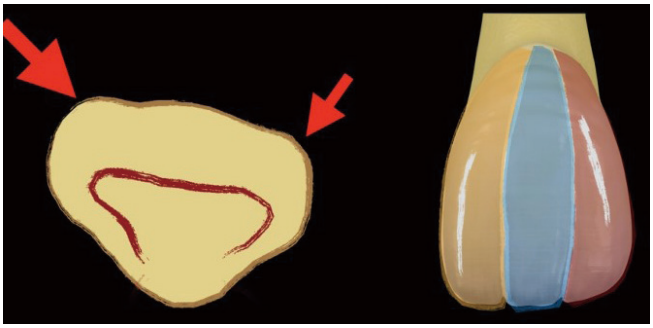

Fig. 9

A failure to reproduce these lobes will result in there being no line angle. The failure of the teeth in the model can be attributed to the failure to reproduce the lobes by filling with no line angle. **(Fig. 10)**

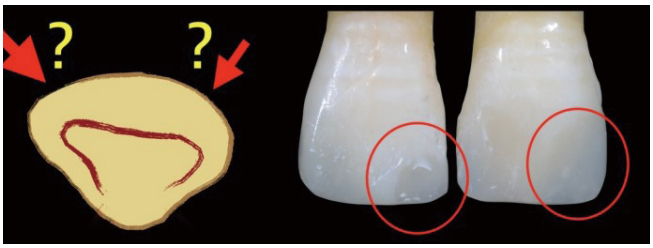

Fig. 10

The medial area of failed #11 is filled again, and the missing line angles have reappeared. **(Fig. 11)**

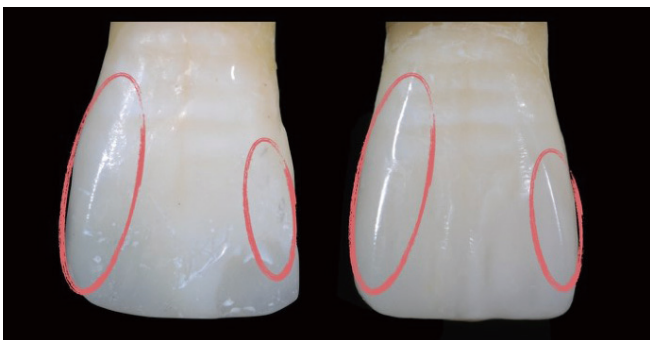

Fig. 11

Subsequently, we will discuss polishing.

Teeth have two main surface characteristics: a characteristic surface, which has many surface features, and a smooth surface, which is a very smooth surface with few surface features. **(Fig. 12)**

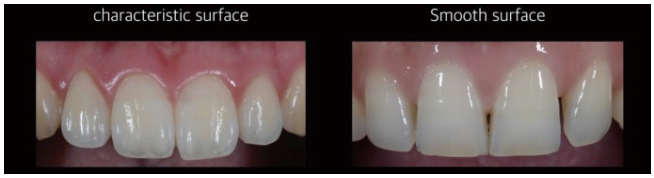

Fig. 12

Differences in surface characteristics are primarily attributable to the effects of age-related wear, with older teeth showing a smoother surface and younger teeth showing more characteristic surface features. The key to polishing is matching the surface characteristics.

Below are the polishing tools the author uses, which can be largely divided into three types: pointed tips, discs, and wheels. Pointed tips are often used to impart surface characteristics, while discs have the opposite effect. The wheels are used for the final polishing. **(Fig. 13)**

Fig. 13

The most important factor to consider when polishing is to look for and remove any unbonded resin or air bubbles that may be present. Leaving these imperfections will lead to food deposits in the future, causing coloration. **(Fig. 14)**

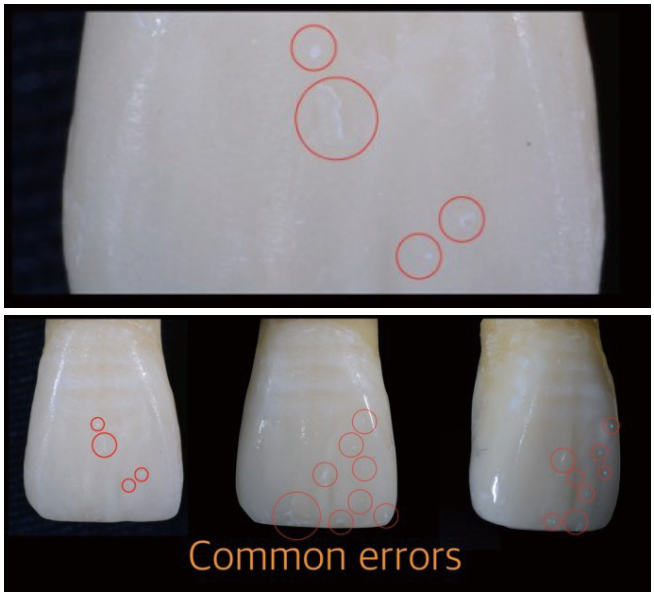

Fig. 14

When polishing, the line angles should be formed in the correct places in consideration of the shape of the lobes. This is equally important for teeth with and without surface characteristics.

The two polished surfaces are compared as follows. **(Fig. 15)**

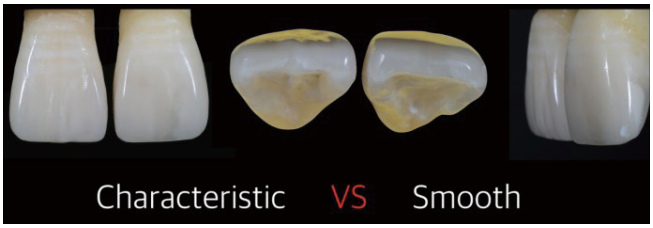

Fig. 15

Conclusion

When performing anterior direct esthetic restoration with composite resin, the following three factors are key considerations: transparency, shape, and polishing. The important factor when assessing transparency is to determine the correct amount of opaque resin; shape requires the reproduction of lobes and line angles; and polishing involves the characterization of the surface to reproduce the original surface shape.

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