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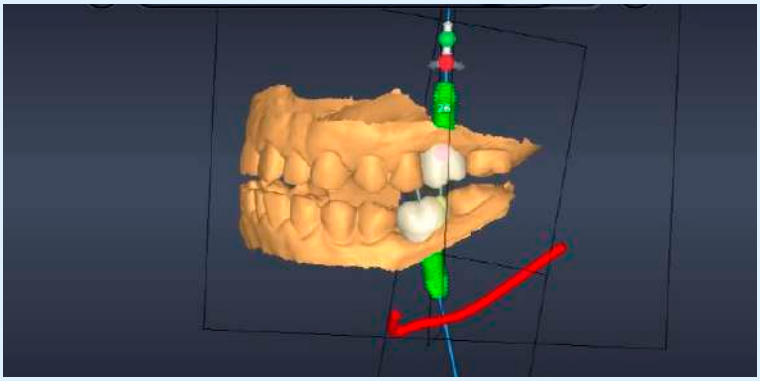
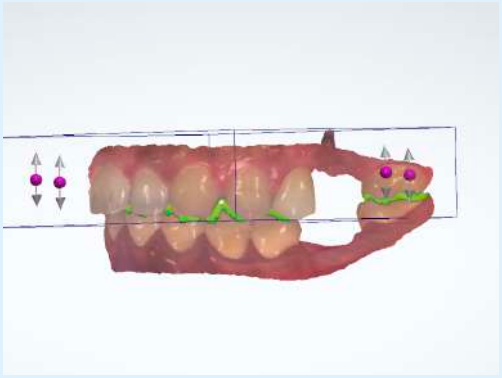
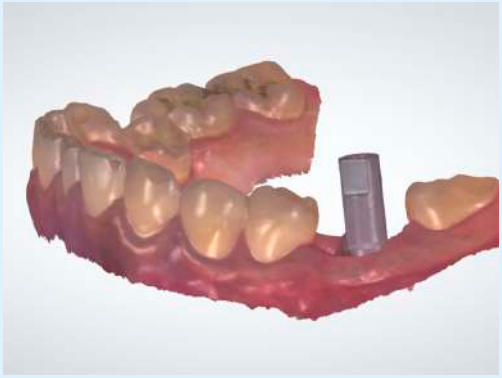
JCDD

Journal of Clinical & Digital Dentistry








Cover Images from Kim HD (J Clin Digit Dent 2020;2(3):17-27)

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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

Human beings are not robots.

The research trend of Dentistry has changed with time.
In the past, most journals published opinion papers. Authors explained their findings for themselves, such as what worked and what did not. Subsequently, researchers conducted studies and presentations on improving patient treatment methods and introducing new methods and treatment techniques. The treatment concept was not subject to long-term clinical results or studies but useful for clinical application and research developments. Next, evidence-based studies became the mainstream, and studies performed using statistical significance dominated after the 1990s.

With the recent development of digital technology, most studies have focused on digital dentistry. Digital dentistry is now starting, and many studies are based on the author's opinions and experiences and the method of digital equipment use, as in the past. Digital dentistry should be a tool for the optimal treatment for each patient. Therefore, studies should be conducted for it because digital dentistry is not a treatment goal.

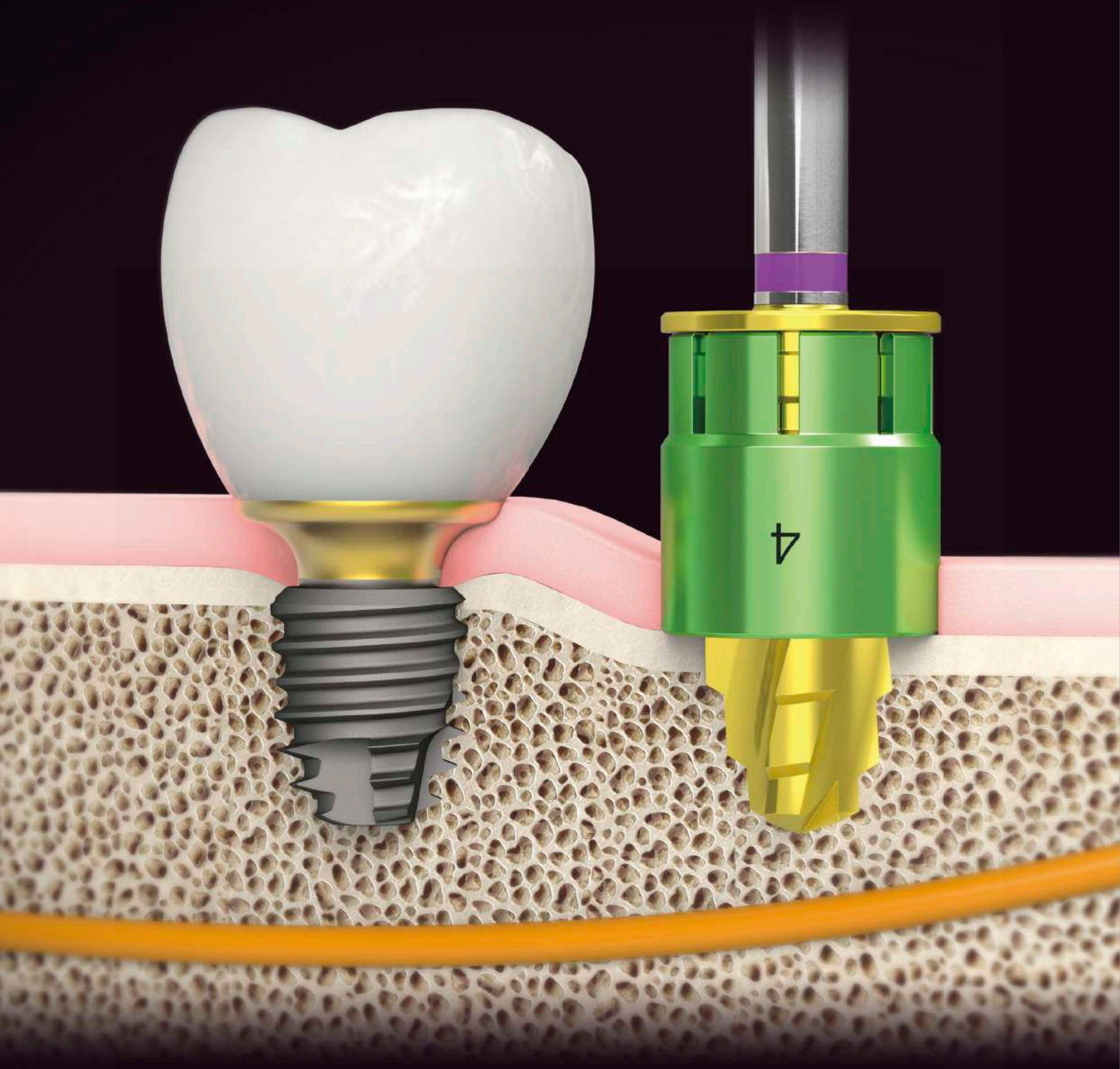
Human beings are not robots.
In the digital age, we must not forget that the dentist's prime mission is to provide the most appropriate treatment for all patients.

"It is the responsibility of the practitioner to be confident, knowledgeable, and competent with all available techniques and to select the most appropriate one for each patient." (Dr. Gerald Barrack, Prosthodontist. Former Clinical professor of Dept of Prosthodontics, NYUCD, USA)

Wongun Chang, DDS MS PhD

DENTIS SQ IMPLANT | SHORT

Safe and strong fixation



DENTIS

고객센터 1899-2804

Maxillary Tuberosity as Soft Tissue Donor Site

Keunyong Lee, DMD, MSD · Jiyoung Park, DMD, MSD

Introduction

First and foremost, two cases are presented here.

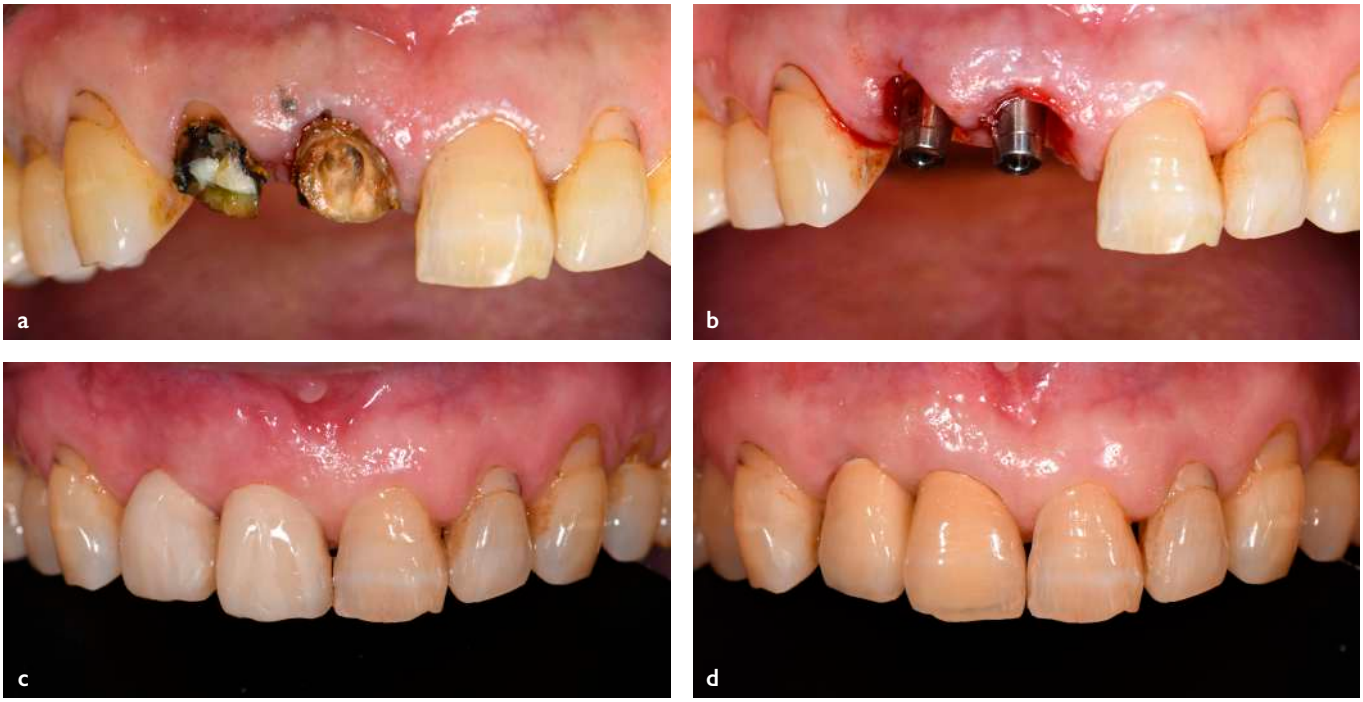


Fig. 1a-d. Connective tissue grafting was not performed because of the relatively thick gingiva and alveolar bone at regions #11 and #12; therefore, only bone grafting was performed for the recovery of the bone defect. After 4 months, at the final restoration, a considerable amount of gingival recession was found
(a) secondary caries of the previous prosthesis at regions #11 and 12 led to tooth extraction
(b) The extraction was followed by immediate implant placement; the gap was filled with xenograft
(c) Immediate non-functional loading and temporary restoration
(d) The final prosthesis after 5 months. A considerable amount of gingival recession can be seen

Keunyong Lee

Director of Ulsan Cham Dental Clinic & Director of Hanmaek Clinical Dentistry Association.
Director Lee graduated from Pusan National University, School of Dentistry, and his specialty is dental implants and dentures, while he enjoys music on rainy days.

Jiyoung Park

Director of Ulsan Cham Dental Clinic.
Director Park graduated from Chosun University, School of Dentistry, and her main focus of research and care is aesthetic dentistry, as she wishes to design the brightest smiles for her patients.

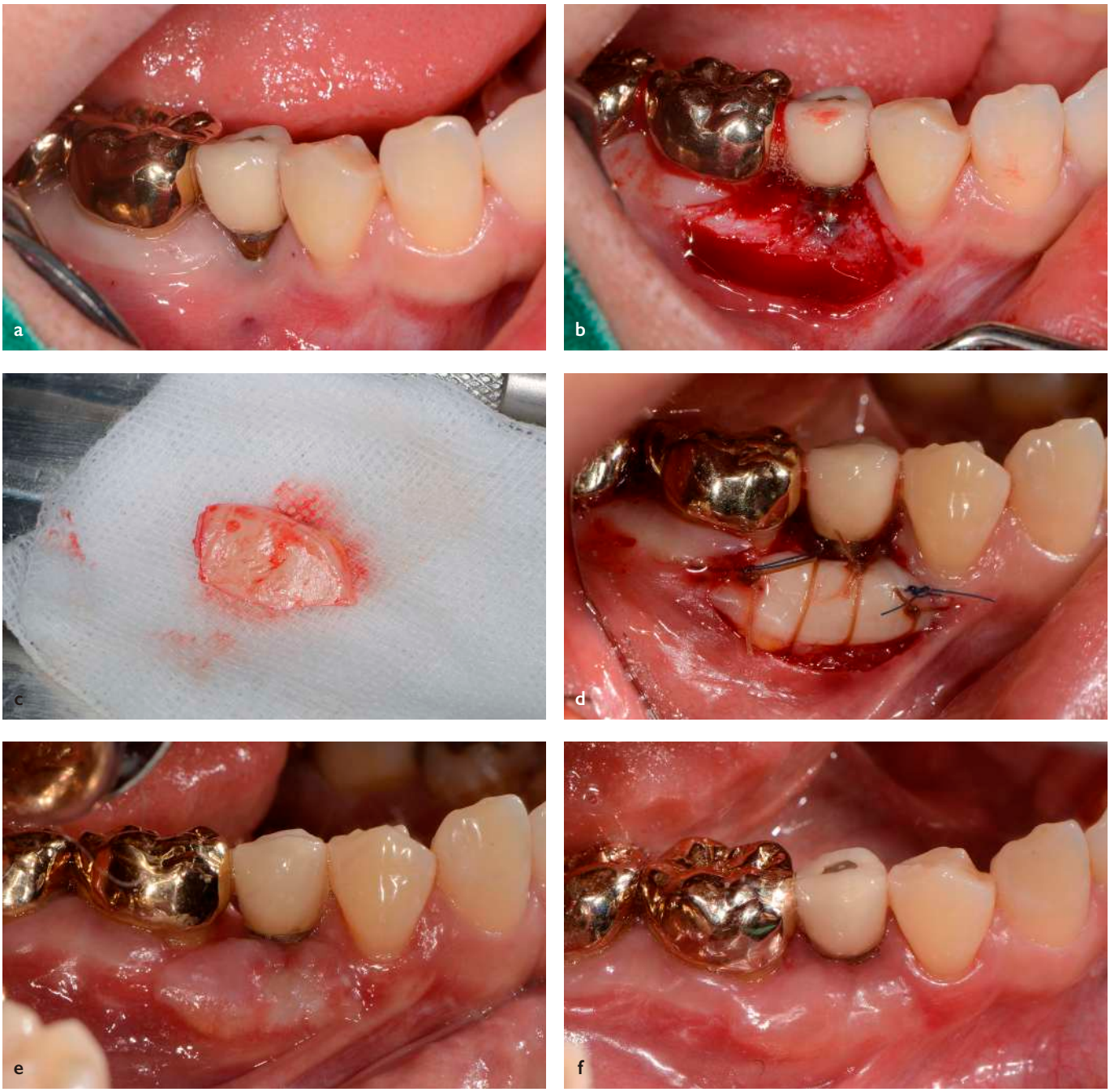


Fig. 2a-f. The patient visited the clinic for continuous gingival recession around the #45 implant restoration site, with pain upon brushing. The attached gingiva of adequate width and thickness was secured using the FGG ; thus, a stable height of the marginal gingiva could be maintained and the patient received plaque control at ease

(a) Advanced gingival recession can be seen at the implant restoration site of the mandibular second premolar. The free gingival graft was used to prevent further recession, and a treatment plan was made such that the patient could administer easy self-care

(b) Formation of the recipient site

(c) The free gingival graft harvested from the palate

(d) The FGG was fixated at the recipient site

(e) Two weeks after the surgery

(f) Two months after the surgery. Stable healing is observed

As the abovementioned two cases show, it is advantageous to secure the attached gingiva of adequate width and thickness for long-term aesthetic and functional success of the natural tooth or implant restoration.

To increase the width or expand the volume of the attached gingiva in the vicinity of the natural tooth or implant restoration, the autogenous soft tissue graft is viewed as the gold-standard graft for a predictable outcome.

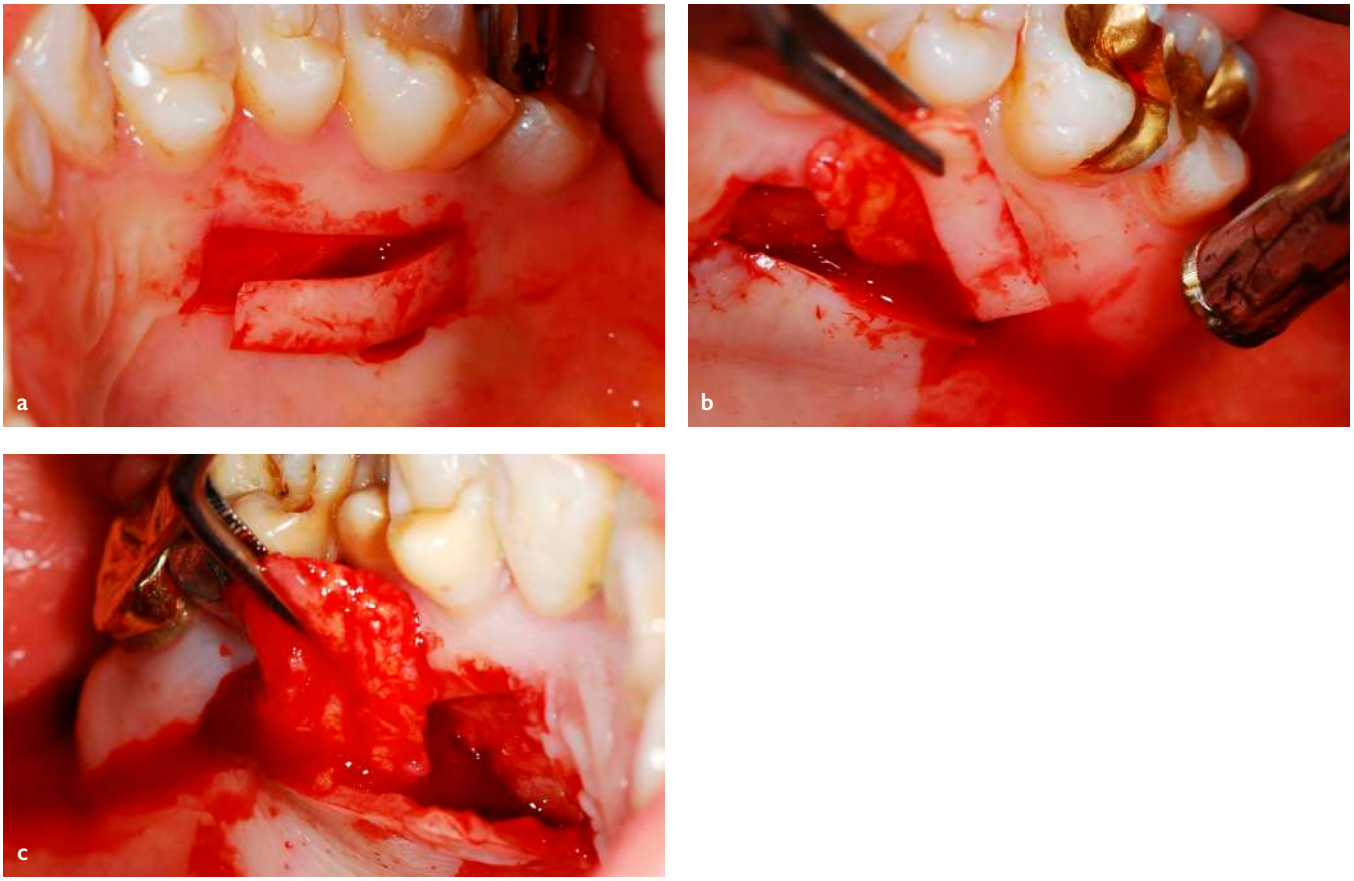


Fig. 3a-c. Harvesting the soft tissue graft from the palate using various methods
(a) The free gingival graft is harvested from the palate
(b) The connective tissue with an epithelial band is harvested from the palate
(c) The sub-epithelial connective tissue is harvested from the palate

Here, the soft tissue graft is often harvested from the palate. However, because of the difficulties in the procedure, as well as other problems, including postoperative pain and bleeding in the patient, the soft tissue graft is generally avoided in clinical practice (Figure 3).

Thus, as an alternative to the soft tissue graft from the palate, the soft tissue graft from the maxillary tuberosity will be discussed herein with regard to its characteristics, advantages and disadvantages, and the differences when compared with the soft tissue graft harvested from the palate.

<2>Tuberosity versus palatal donor sites for soft tissue grafting

The soft tissue graft harvested from the tuberosity site and the palatal site show several differences.

The thickness of the soft tissue at the tuberosity site is ≥ 4 mm, which is greater than the 3-mm thickness of the that harvested from the palatal site between the premolar and the second molar sites. Thus, the soft tissue harvested from the tuberosity site is thicker than that harvested from the palatal site. In contrast, the area of the soft tissue harvested from the palate site is larger, although it may be relatively thin. These properties influence the respective indications. In cases requiring thick connective tissue, such as ridge augmentation, the soft tissue harvested from the maxillary tuberosity is preferred. For connective tissue grafts, soft tissue graft from the palatal side is preferred as it allows the harvesting of thin but large areas of connective tissue.

The sub-epithelial connective tissue harvested from the tuberosity site is a far denser and rougher collagen-rich tissue with lower lipid and glandular tissue contents than the sub-epithelial connective tissue harvested from the palatal site. These properties affect the volume stability and revascularization of grafts; as compared to the more loosely structured connective tissue originating from the palate, that harvested from the tuberosity site allows less postoperative shrinkage but poses a challenge to revascularization, which leads to the disadvantage of necrosis occurring more easily. Thus, whenever possible, the connective tissue harvested from the tuberosity site should be completely covered with a flap.

From a clinical perspective, the most important property of the tuberosity donor site is that, compared to the palatal soft tissue donor site, the healing is more rapid, with far less complications, such as pain and bleeding.

<3> Harvesting technique

The soft tissue from the tuberosity is harvested during the procedure to remove the excessive soft tissue of the distal maxillary molar and create a thin pocket; this procedure is also known as the distal wedge operation.

This procedure involves two different incisions— the triangle incision and square incision; the latter allows an easier approach to the palate such that a relatively large graft can be obtained (Figure 4).

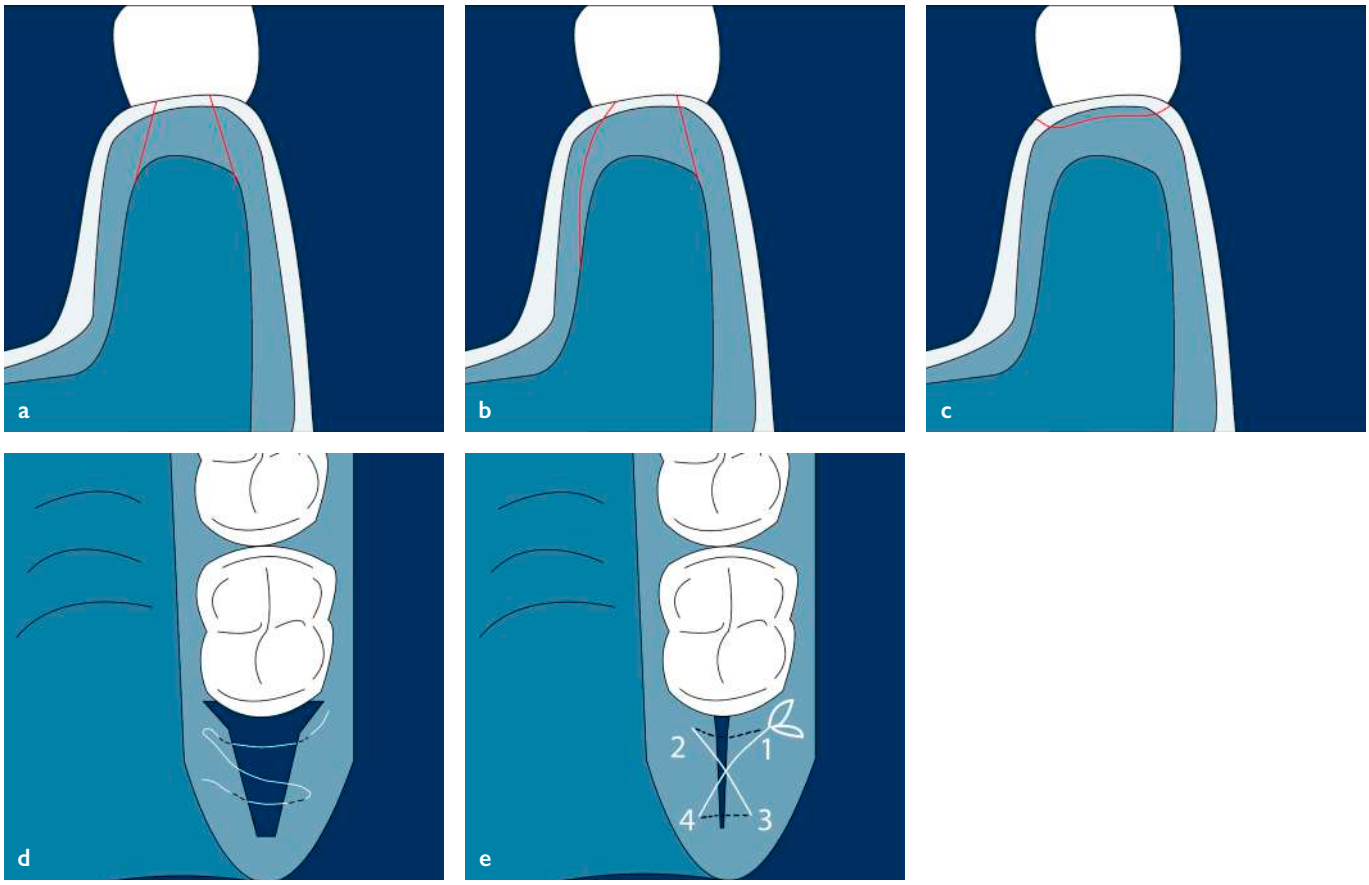


Fig. 4a-e. Harvesting of soft tissue graft from the tuberosity

Nevertheless, depending on the purpose, the graft can be harvested using various methods, and regardless of the chosen technique, and even upon exposure to a considerable amount of alveolar bone, the positive aspect of the procedure is the negligible level of postoperative pain or bleeding.

The personal preference of the author is the excision of the soft tissue in full thickness, after which the required part can be isolated in vitro (Figure 5).

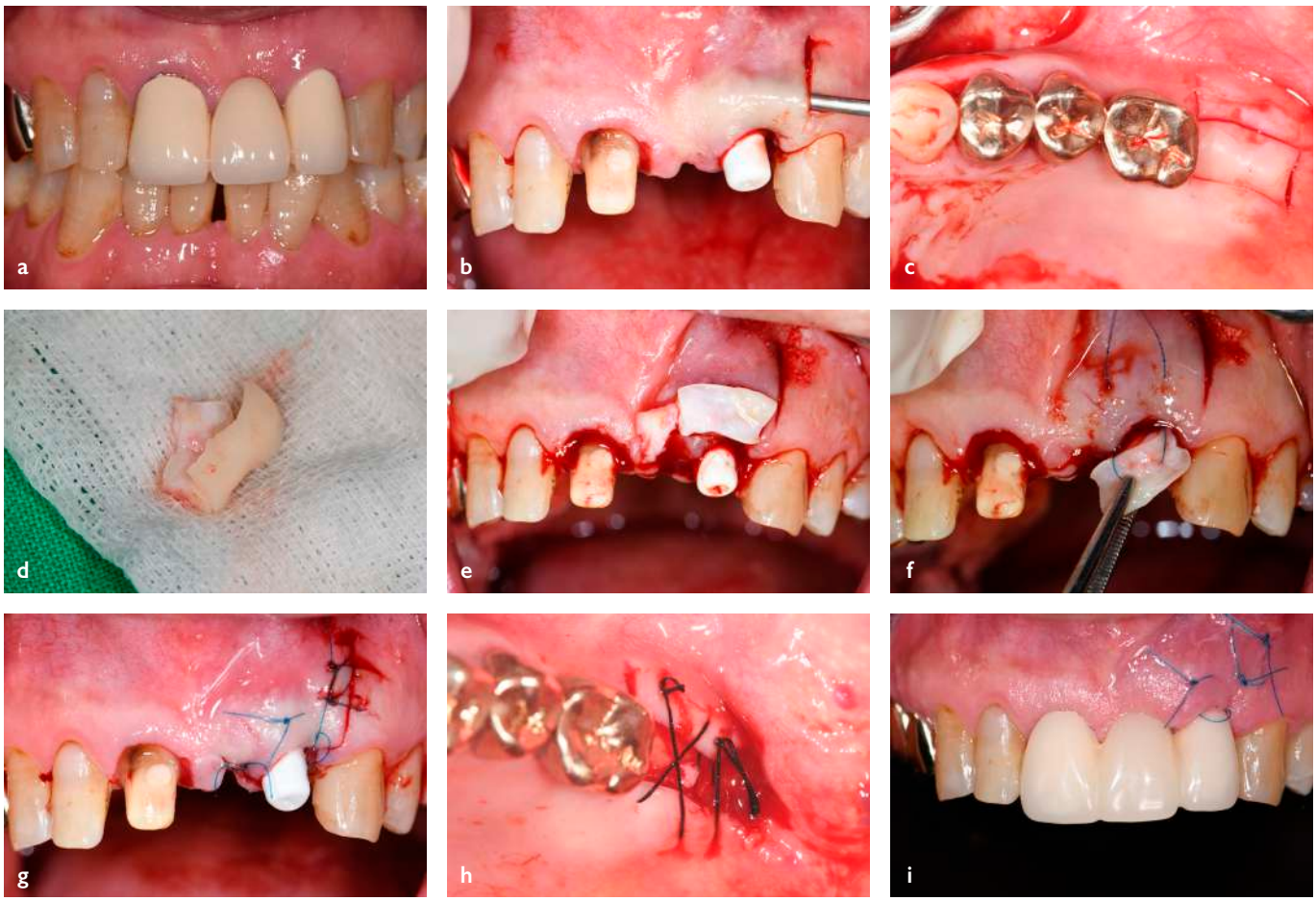


Fig. 5a-i. The secondary caries at the #22 abutment of an aged bridge that led to tooth extraction. For implant placement at #22, the excision of full-thickness soft tissue from the tuberosity was followed by in vitro removal of the epithelium, and the connective tissue was grafted to the #21 pontic and #22 labial sites. Upon suture of the maxillary tuberosity after the soft tissue excision, a considerable amount of alveolar bone was exposed, but the patient only experienced minimal discomfort

(a) #11–#22 aged bridge. Ridge absorption is seen at the #21 pontic

(b) For connective tissue grafting at the labial site after the implant placement, an incision was made at the vestibule site and a pouch was created

(c) In the absence of #27, a large area of soft tissue could be excised from the maxillary tuberosity site

(d) From the excised full-thickness soft tissue, an approximately 1-mm thick epithelium was removed in vitro

(e) The connective tissue used for grafting

(f) The connective tissue used for grafting was sutured towards the inner side of the labial gingiva

(g) The completed suture

(h) The area of the maxillary tuberosity for the soft tissue excision was also sutured. The exposed alveolar bone is visible

(i) The surgical site at S/O . The healing appears stable

Case Report

1) Case 1

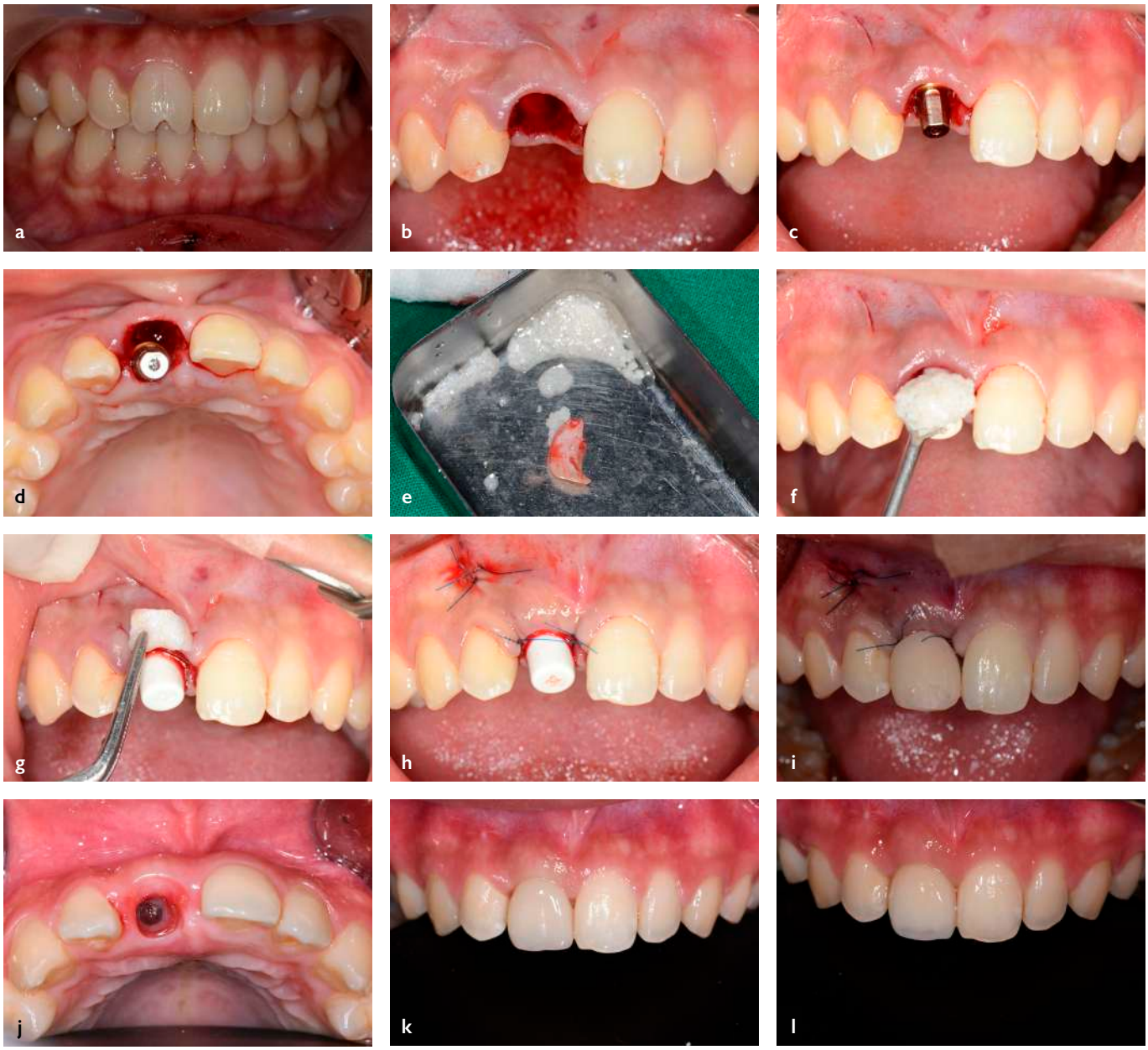


Fig. 6a-l. For the immediate implant placement after tooth extraction, the gap between the implant and the socket was filled with the xenograft, and a labial pouch was created and grafted with the connective tissue harvested from the tuberosity. After the procedure, gingiva of adequate thickness and a marginal gingiva of stable height were observed

(a) The patient visited the clinic with #11 vertical fracture caused by a trauma

(b) A relatively stable labial gingiva and alveolar bone plate were observed in the state after tooth extraction

(c) An abutment connection for immediate loading after implant placement. For the connective tissue grafted at the labial site, a vertical incision was made towards the vestibule

(d) Adequate space between the labial alveolar bone plate and the fixture can be seen

(e) The xenograft to fill the socket and the gap, and the soft tissue harvested from the maxillary tuberosity

(f) The gap between the labial alveolar bone plate and the fixture was filled with the xenograft

(g) For the labial gingiva, the connective tissue harvested from the maxillary tuberosity was grafted

(h) The completed suture

(i) Immediate loading of temporary restoration.

(j) After 3 months, the labial gingiva appeared adequately thick

(k) The Zirconia custom abutment was followed by temporary restoration

(l) The final restoration. The labial marginal gingiva appears to maintain stability

2) Case 2

Fig. 7a-i. For the immediate implant placement after tooth extraction, the gap between the implant and the socket was filled with a xenograft, and a labial pouch was created and grafted with the connective tissue harvested from both the palate and the tuberosity. After the procedure, a gingiva of adequate thickness and a marginal gingiva of stable height were observed
(a) The secondary caries of the previous PFM crown led to tooth extraction
(b) Relatively stable labial gingiva and alveolar bone plate were observed in the state after tooth extraction despite slight recession
(c) Implant placement
(d) The connective tissue harvested from the palate and the tuberosity. A clear difference in their appearance can be seen
(e) First, the gap between the fixture and the socket was filled with a xenograft
(f) After the labial grafting of the connective tissue harvested from the palatal side
(g) The connective tissue harvested from the tuberosity was grafted for the marginal gingiva
(h) The completed suture
(i) Immediate loading of the temporary restoration
(j) The final restoration after 4 months. A stable marginal gingiva can be seen

3) Case 3

Fig. 8a-h. For the mandibular molar showing a lack of attached gingiva, free gingival graft was performed using gingiva harvested from the maxillary tuberosity via gingivectomy. The result was a stabilized attached gingiva that could adequately resist the muscular movements
(a) A lack of attached gingiva at the buccal site was observed after the revision surgery
(b) The recipient site was created
(c) A large keratinized gingiva observed at the tuberosity site. The tuberosity that allowed less postoperative discomfort was determined as the donor site for the keratinized gingiva
(d) A #12 blade was used to harvest the keratinized gingiva
(e) The harvested keratinized gingiva
(f) The tuberosity after the excision of the keratinized gingiva. Minimal bleeding is observed.
(g) The harvested keratinized gingiva was sutured to the recipient site
(h) Two months after the surgery, the final prosthesis is inserted

4) Case 4

Fig. 9a-m. The #22 tooth was extracted because of severe periodontitis, leading to bridge restoration. At the pontic site of the temporary bridge, severe ridge deficiency was observed, which caused aesthetic as well as functional problems, such as food retention. Thus, ridge augmentation was performed using the connective tissue harvested from the tuberosity, which resulted in bridge restoration with a functional and aesthetic ovate pontic

(a) The lateral incisor was extracted due to severe periodontitis
(b) The prognosis of the temporary bridge restoration was predicted to be poor
(c) The residual ridge as seen from the occlusal surface. A severe horizontal ridge defect was observed
(d) After extraction of #17 root rest, the connective tissue was harvested from the maxillary tuberosity through the distal wedge operation
(e) The harvested connective tissue
(f) At the site of the ridge deficiency, an adequately large pouch was created and grafted with the connective tissue harvested from the tuberosity
(g) The completed suture
(h) The pontic of the temporary bridge was adjusted to prevent compression of the ridge area with the connective tissue graft
(i) Front view after two months of the surgery
(j) View from the occlusal surface after two months of the surgery. An adequate volume of ridge could be secured
(k) Front view of the final prosthesis. The ovate pontic with a natural emergence profile could be formed based on the adequate ridge diameter
(l) The final prosthesis as seen from the occlusal surface. The adequately thick ridge can be seen
(m) The functional and relatively aesthetic final prosthesis

Conclusion

Soft tissue graft from the maxillary tuberosity, compared to that from the palate, leads to comparatively mild postoperative complications, such as pain and bleeding, while the harvested connective tissue is substantially more dense to minimize postoperative shrinkage. Thus, for cases requiring soft tissue grafting, it is recommended that graft harvest from the maxillary tuberosity be considered a priority, although it is necessary to first see whether the required amount of graft can be obtained, as only a limited amount is available for harvest.

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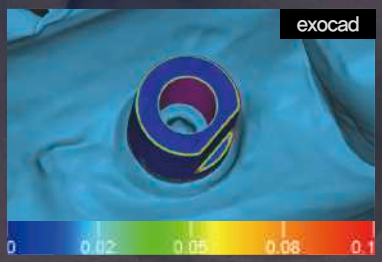
DENTIS ScanBody

Remarkable Accuracy!



스캔데이터와 라이브러리가 일치하는 모습
(손쉬운 정합으로 보철물의 정확도 향상)

DENTIS

고객센터 1899-2804

Digital technique to fabricate implant crown by using customized abutment and stock abutment : Clinical Case Report

Hyundong Kim, DDS, MSD

Introduction

In the field of implant dentistry, cone-beam computed tomography (CBCT)-based surgery planning and computer-aided design/computer-aided manufacturing (CAD-CAM) have become popular recently. The clinical case can be recorded digitally using a contact-free transfer with an intraoral scanner. Contrary to the laboratory procedure, intraoral scanners can be used chairside for immediate digitization of the patient's oral cavity.

Conventional impression taking with different techniques is common in dental practice. However, it is time-consuming and causes physical discomfort to patients. Implementation of the intraoral scanner has eliminated many prosthetic procedures, increased patient comfort, simplified protocols, and reduced the time taken for clinical treatments.

Recently published randomized controlled trials compared outcomes of digital implant impressions with those for conventional implant impressions. Those clinical studies revealed consistent findings with an overall patients' preference significantly in favor of the intraoral scanner rather than the conventional technique for registering the 3D implant position.

This clinical report presents the digital workflow of the fabrication of implant-supported crowns by replacing the teeth in the maxillary and mandibular posterior areas.

Hyundong Kim

Dr. Hyundong Kim has graduated from Seoul National University, School of Dentistry in 2009. He had a residency of Prosthodontics in Asan Medical Center, Seoul. He is a member of Korean Academy of Esthetic Dentistry. He is a clinical assistant professor in medical school of Ulsan University. He works at a private dential clinic in Seoul, Republic of Korea.

Case Report

A 32-year-old man visited the clinic because of loss of the left maxillary first molar caused by extensive dental caries. Due to a shortage of healthy dental tissue in the left mandibular first molar for a root canal treatment or crown restoration, and because dental caries had progressed extensively in the interradicular area, implant restoration was planned following extraction.

As the left maxillary first molar had been missing for several years, the left maxillary second molar had inclined and shifted mesially. Although uprighting of the left maxillary second molar was recommended, the patient wanted limited treatment because of economic reasons; therefore, only implant restoration was planned according to the current gap between the teeth.

Fig 1. Pre-operation panoramic radiograph(#26 tooth missing, #36 severe dental caries)

Fig 2a-d. Pre-operation Intraoral Photo

Stage 1: Digital Implant Surgery planning

Based on the data after superimposing the intraoral SCAN and CBCT DICOM data using the Dentiq program by Dentis, placement of an implant of appropriate dimensions according to the inferior margin of the maxillary sinus floor, path of the inferior alveolar nerve, and shape and volume of the alveolar bone are planned on a computer.

In our case, the vertical height of the left maxillary first molar in the desired location of implantation, measured from the alveolar bone crest to the maxillary sinus was approximately 8 mm; therefore, maxillary sinus floor elevation with born grafting using the crestal approach was planned. As for the left mandibular first molar, implantation was planned to be performed immediately after the extraction. The septal bone was used for the initial fixation, and bone grafting was planned for the gap formed by the extracted tooth.

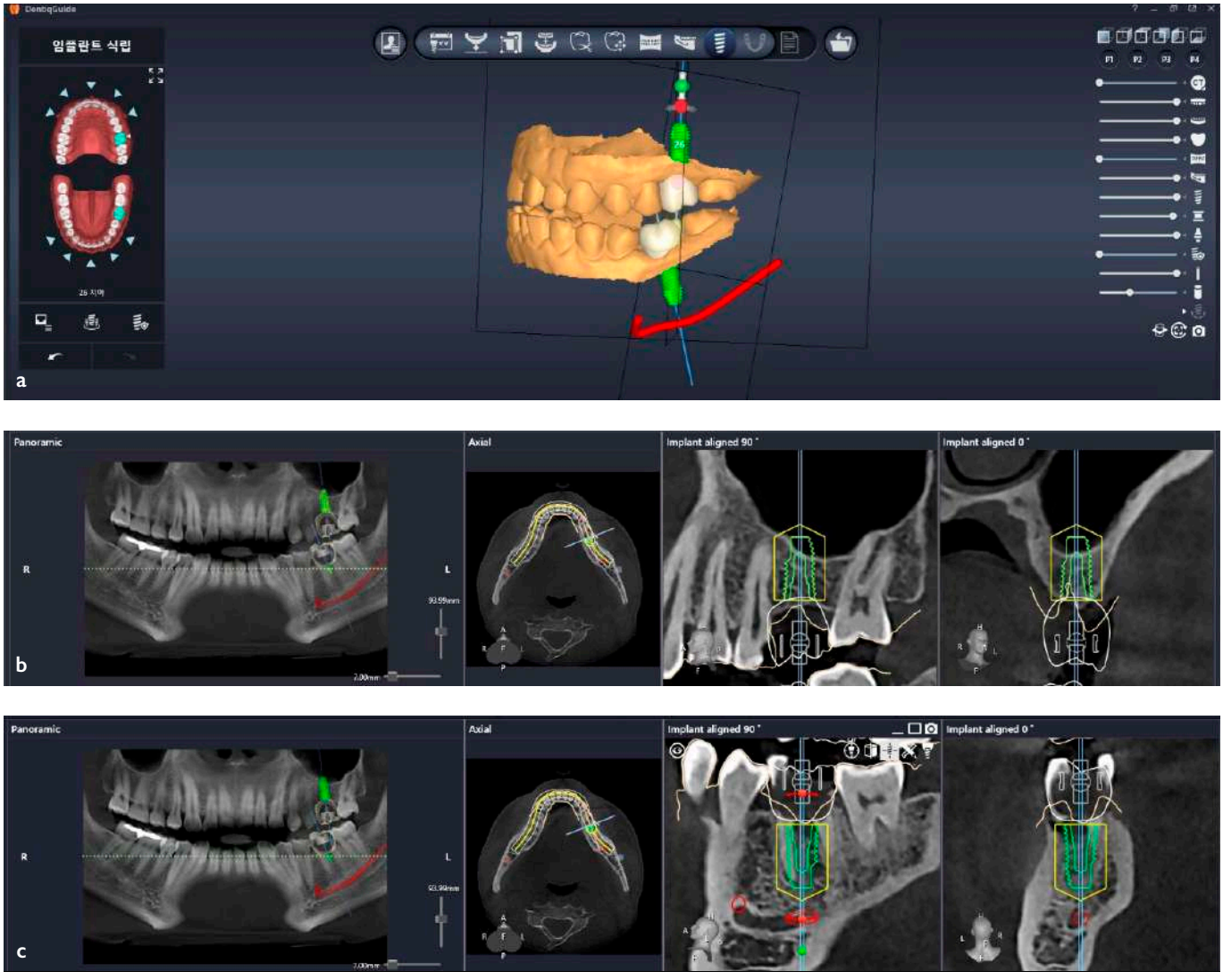


Fig 3a-c. Digital Implant Surgery Plan using intraoral scan data and CBCT DICOM data based from a restorative perspective

Stage II : Implant fixture placement

After performing sinus floor elevation at the location of the left maxillary first molar using a hatch reamer and osteotome, bone grafting using xenograft materials was performed, followed by implantation of a fixture. An atraumatic extraction of the left mandibular first molar was performed, followed by implantation of the fixture upon initial fixation using the septal bone.The gap between the extraction socket and the fixture was filled with xenograft materials and covered with a collagen membrane. Both regions were submerged and sutured once the cover screws were fastened.

Fig 4. Implant placement on missing spaces of #26 and #36

Stage III : 2nd surgery and healing abutment placement

In particular, after a healing period following the implant placement of 3 months, to reveal the connection part, a second surgery, securing the healing abutment was performed, and the flap was repositioned. The healing abutment (ø6 mm; gingival height, 7 mm) was placed in connection to create an adequate emergence profile in the molar area.

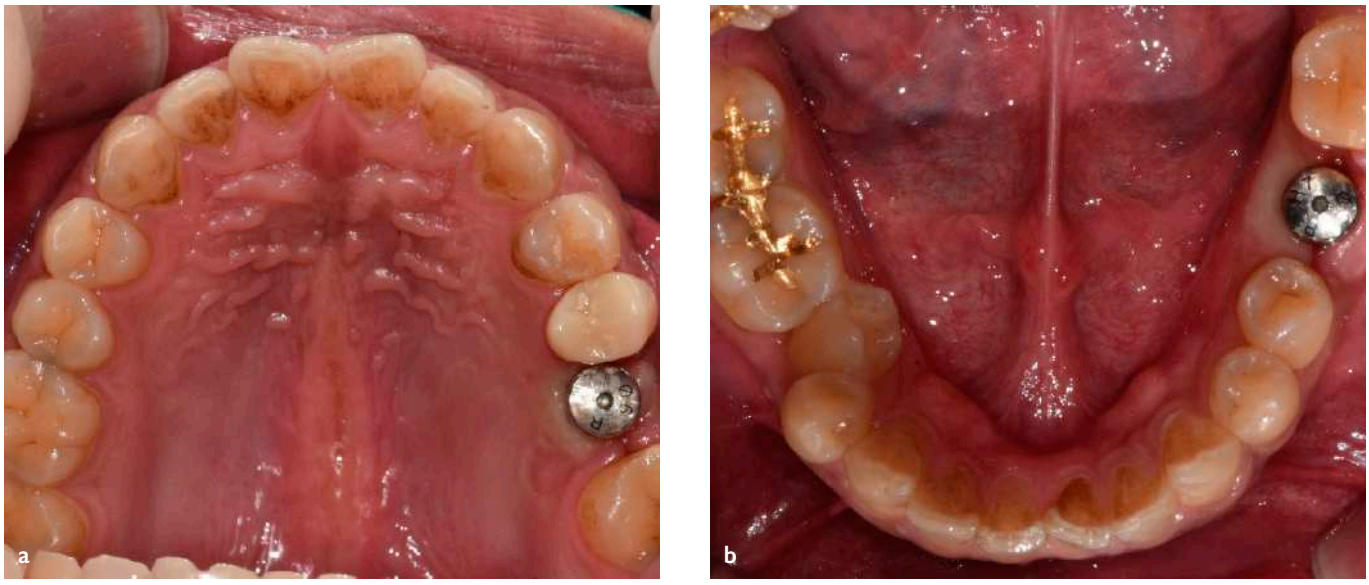


Fig 5a-b. The healing abutment was placed on the implant fixture, and flap was repositioned

Stage IV: Digital impression using an intraoral scanner and a scan body

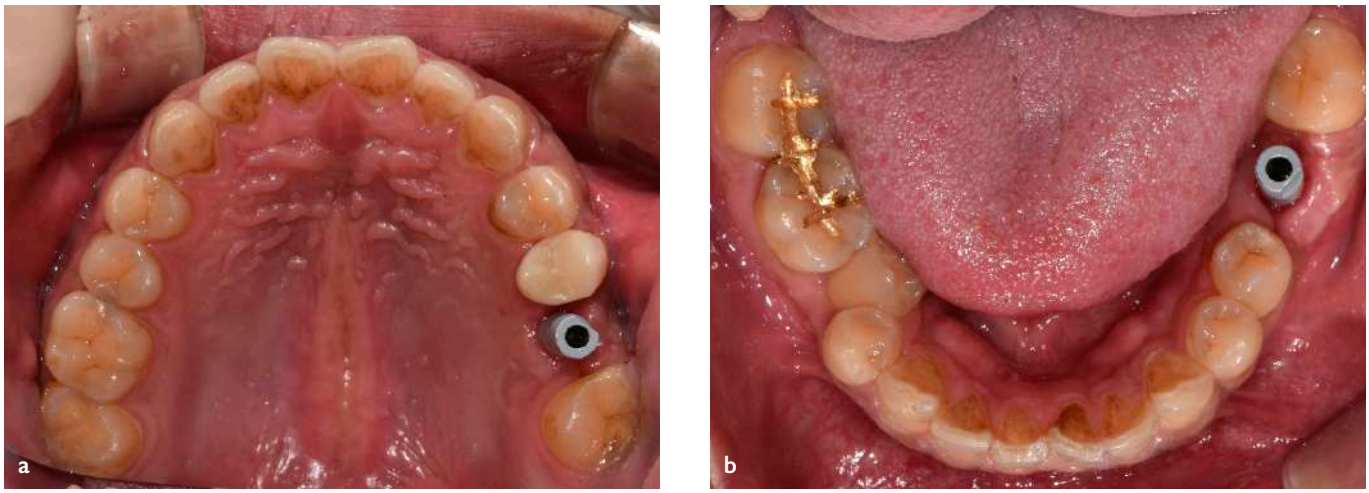


Fig 6a-b. Digital impression with scanbody

After a healing period following the 2nd surgery of 2 weeks, a digital implant impression was taken.

The scan body was placed and screwed at the position.

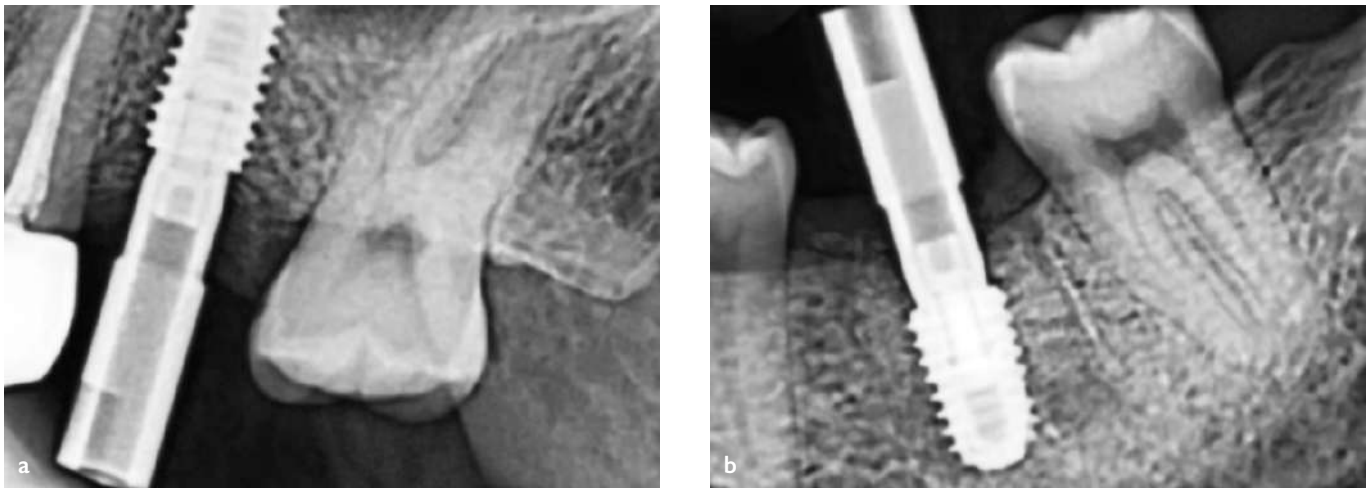


Fig 7a-b. Visible in clinical X-rays to confirm fit to the implant, a periapical radiograph confirmed the seat of the scanbody

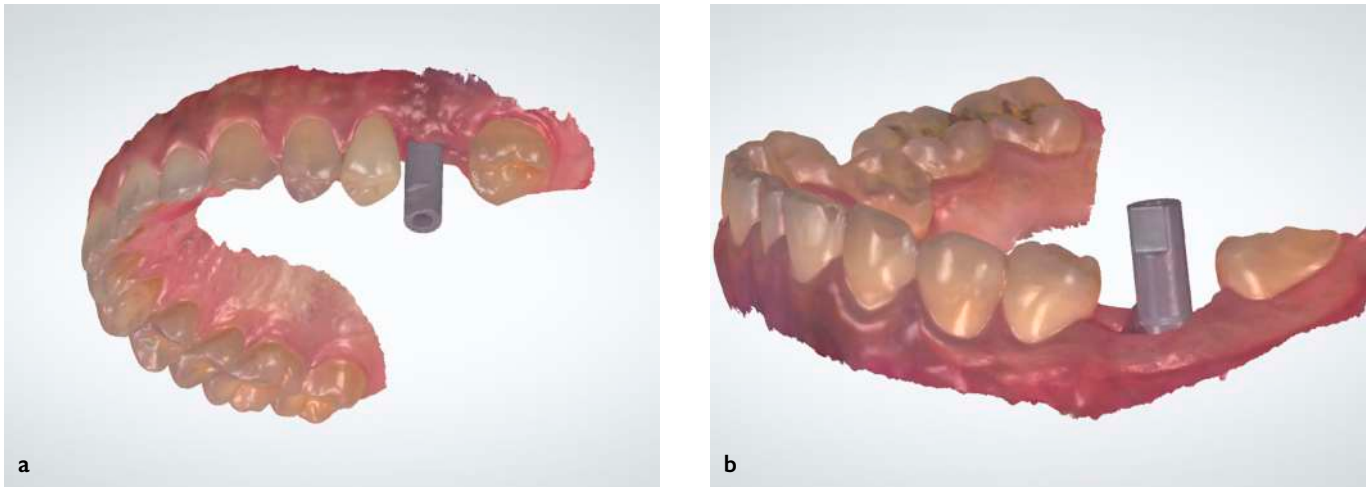


Fig 8a-b. The scanbody scan digitally captured the position and orientation of the implant fixture

The impression was captured by the acquisition software, Trios desktop version (3shape). The impression consisted of the capture of the upper arch, lower arch, upper gingiva scan, lower gingiva, and occlusal bite registration.

After placement of the scanbody and its capture, the quality of scan data was checked. Particular attention was necessary to secure the capture of contact points with the adjacent teeth and whole shape of the scanbody.

Stage V: Implant crown and abutment design using the CAD program

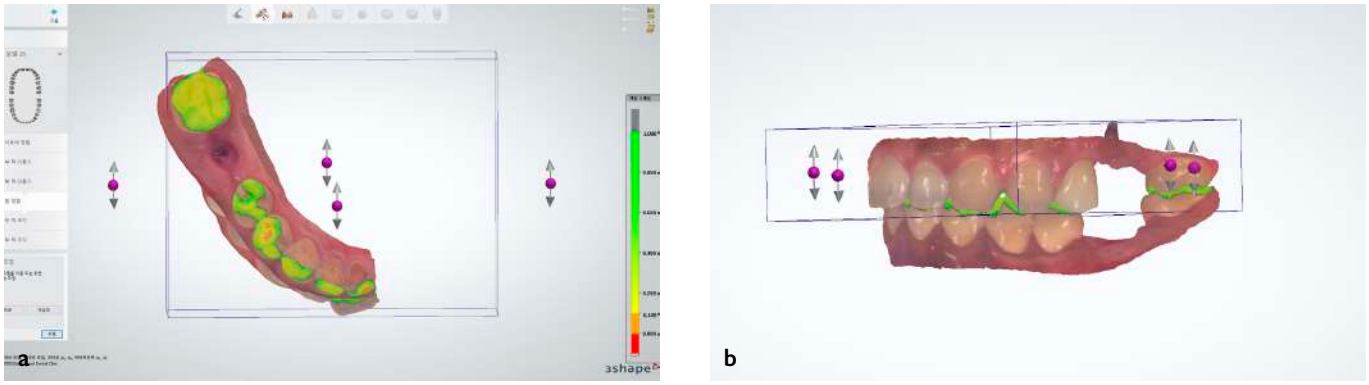


Fig 9a-b. Verification of the occlusal bite registration in CAD

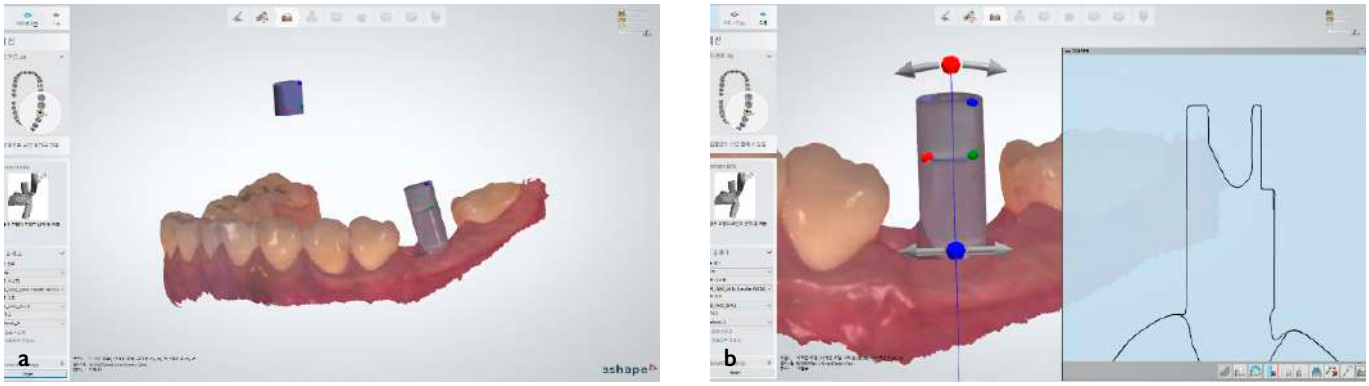


Fig 10a-b. (a) Superimposed digital impression of the scanbody and library
(b) cross-sectional view of alignment between digital impression of scanbody and library

The bite registration status must be verified by loading the intraoral scan data onto CAD. Before oral scanning, the maxillary and mandibular areas of occlusion and non-occlusion must be verified in advance using an articulating paper to check whether or not they match the contact points presented in the digital data. If the information of bite registration is inaccurate, bite registration data must be re-obtained; if that is impossible, the maxillary and mandibular connections must be rearranged arbitrarily on CAD.

When the accuracy of bite registration is verified, the scanbody library provided by the implant manufacturer and that obtained from the intraoral scan must be aligned. The alignment is performed using one or three points of a clearly located landmark. The accuracy of the alignment between the intraoral scan data of the scanbody and the virtual scanbody in the CAD library must be verified in the cross-sectional view. If intraoral scanning is deemed accurate, the two data can be aligned easily using a best-fit algorithm, but if the intraoral scanbody data is unclear, demonstrating a significant difference between the two data in the cross-sectional view, the scanbody must be re-scanned.

Once the alignment was approved, the next step was to use an auto-crown tool where the software creates a suggested ideal crown. The software has different and excellent tools to shape and improve this initial auto-design. After the crown was designed, the appropriate abutment was selected, and the emergence profile was designed.

In this case, the implant of tooth #36 was placed in a favorable position, in addition to a favorable gingival form, leading to a decision to manufacture a crown using a stock abutment (D: ø6.0 G/H: 5.0 mm H:5.5 Hex Transfer Abutment).

In the case of the implant of tooth #26, a crown manufactured using a customized abutment was deemed to be more appropriate considering the height of the gingival margin and location of implant placement.

In cases where a stock abutment is selected, the stock abutment library provided by the implant manufacturer is used. The diameter and height of the gingival margin of the abutment are selected on an individual basis (Fig. 11). Although there may be differences depending on the manufacturer, there are cases in which the cement gap between the maxillary crown and the abutment are fixed and cases in which the cement gap can be set arbitrarily and adjusted in the laboratory according to the manufacturing environment.

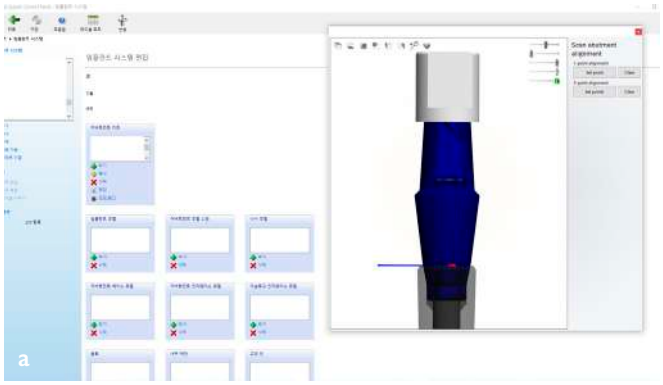


Fig 11. Various library of a stock abutment registered in the CAD program (Dental Designer, 3Shape, Denmark)

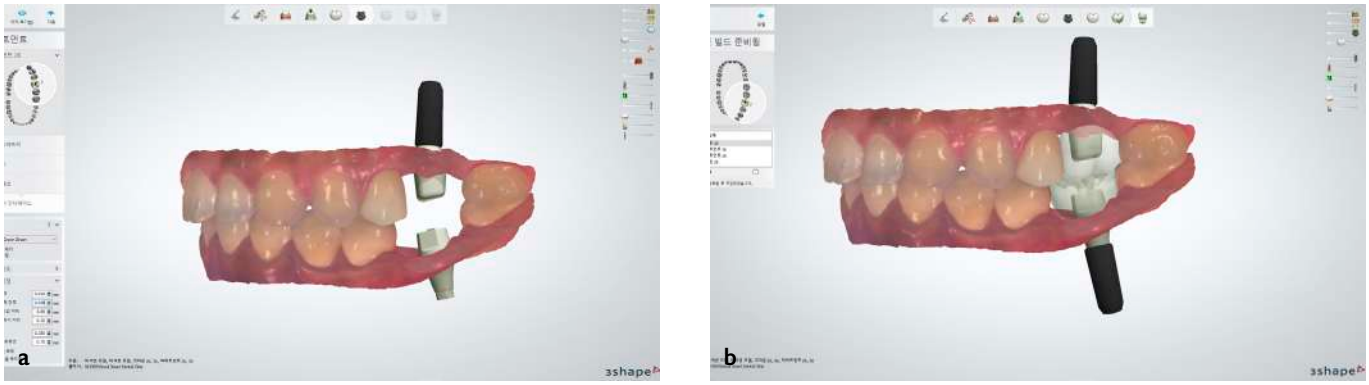


Fig 12a-b. (a) The customized abutment for #26 was designed, and appropriate stock abutment for #36 was selected
(b) A monolithic zirconia crown was designed considering the emergence profile

Designing a custom abutment has the advantage of flexibility in designing the emergence profile in the CAD program, depending on the contours of the maxillary crown. In setting the cement gap between the abutment and the maxillary crown, the CAD program distinguishes between the cement gap near the marginal area and the extra cement gap found a certain distance away.

Theoretically, this is similar to applying a die spacer above the marginal area and setting a cement gap, while leaving a certain section above the margin clear when manufacturing a gold crown using the conventional casting method.

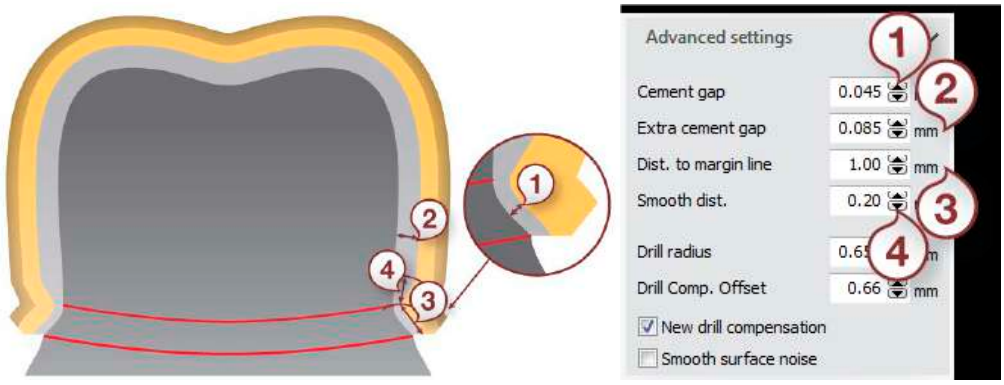


Fig 13. Determine the properties of the die interface in the CAD program (Dental Designer, 3shape, Denmark)

Stage VI: implant monolithic zirconia crown and customized abutment fabrication using CAM

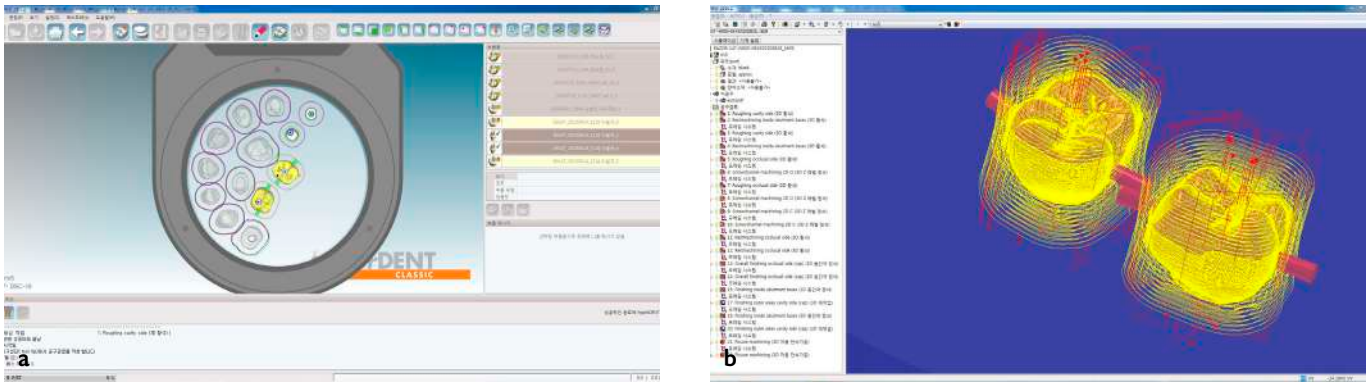


Fig 14a-b. (a) The designed zirconia crown was arranged on a blank zirconia disc in the CAM program.
(b) The tool path was calculated to process the milling of the zirconia crown in the CAM program (hyperdDENT, follow-me technology GmbH, Germany)

A monolithic zirconia crown was manufactured using a 5-axis milling machine (Arum 5X-200, Doowon, Korea). For manufacturing a customized abutment, a pre-milled abutment blank cylinder provided to the implant manufacturer was used to manufacture parts aside from the fastener using the 5-axis milling machine.

Fig 15a-c. Zirconia crown adaptation on a 3D-printed master model

To track inconsistencies in design during the milling process of the monolithic zirconia crown and volume shrinkage during the sintering process, a 3D-printed master model was created to check for proximal contact with the adjacent tooth and occlusion to the opposite tooth. If the 3D-printed master model is produced along with the positioning jig, which determines the abutment connection in the Hex direction, a more efficient delivery may be possible.

Stage VII: Delivery of an abutment and a screw-cemented retained implant crown

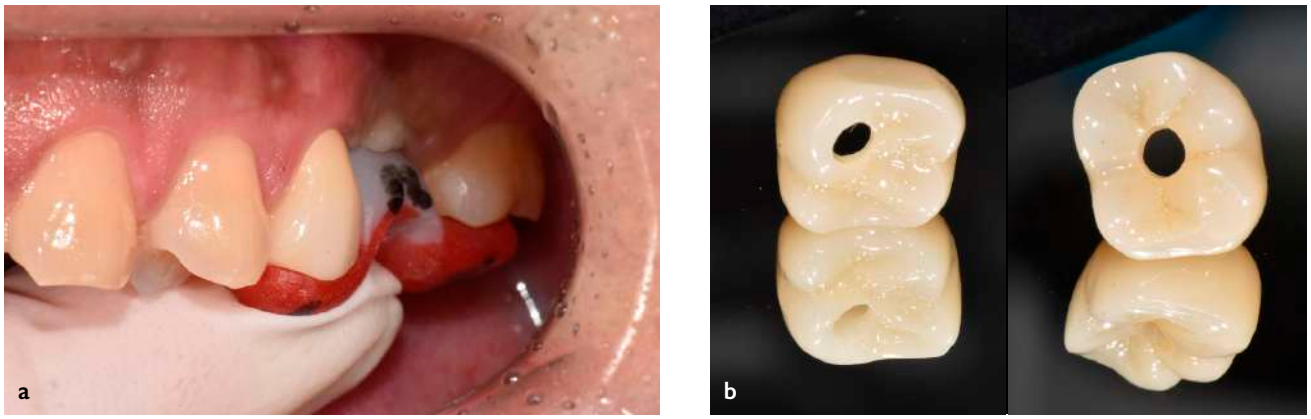


Fig 16. (a) Positioning jig for implant abutment placement(b) final monolithic zirconia implant crowns (#26, 36)

Fig 17a-f. Delivery of a customized abutment (#26), stock abutment (#36), and zirconia implant crown

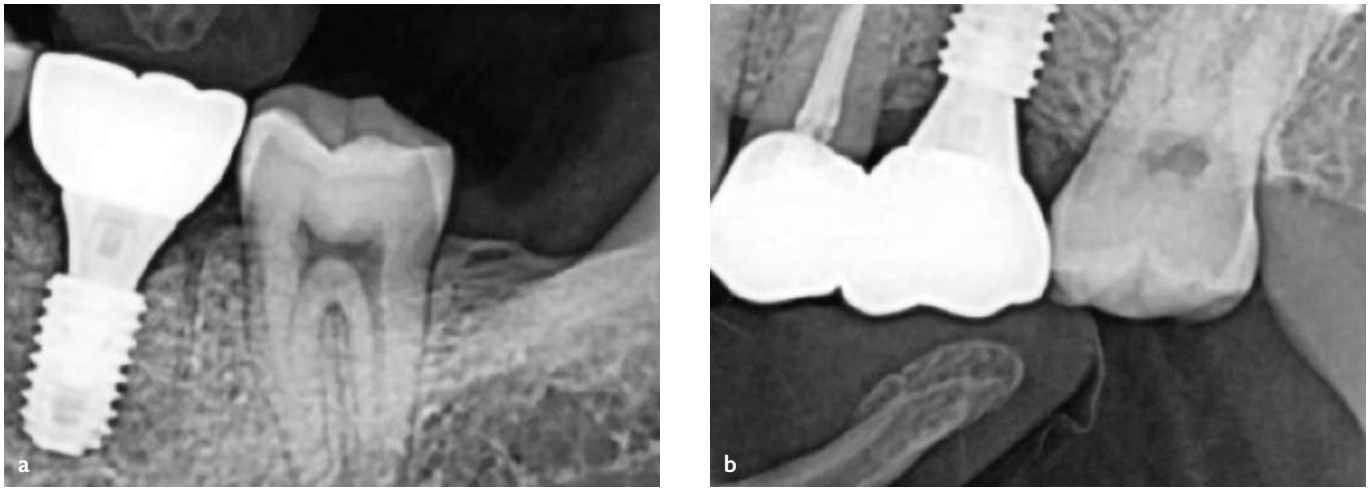


Fig 18a-b. Final periapical radiograph to check the fitting of the abutment and implant crown

Fig 19. Final panoramic radiograph after implant crown delivery

The abutment was placed using the positioning jig, and adaptation of the zirconia crown took place. A periapical radiograph was used to check for interferences between the abutment and the surrounding alveolar bone and whether or not the abutment was properly secured within the fixture.

The RMGI cement (3M Rely X Luting Plus) was used for intraoral luting of the abutment and zirconia crown, while excessive cement was removed extraorally. For treatment completion, a torque controller was used to tighten the screw to 30 Ncm, followed by sealing of the screw hole using a PTFE tape and flowable resin.

Conclusion

The present case showed how advances in digital technologies could provide clinicians with the tools for diagnosis, treatment planning, and placement and restoration of dental implants in a truly transformative way. Simplification of clinical protocols, increased accuracy over conventional analogue techniques, and improved patient comfort and outcomes are compelling benefits of a full digital workflow in the provision of implant-retained restorations.

A previous study showed the 5-year radiographic and clinical outcomes, including survival and success rates of digitally CAD/CAM-processed single implant crowns at posterior sites. One implant was lost, resulting in implant survival and a success rate of 95%.

As the first step in a full digital workflow for implant prostheses, a digital impression taken with an intraoral scanner and scanbody play an important role. The implant position and oral condition can be recorded using an intraoral scanning technique. Several studies have shown the advantages of the direct digital impression technique performed by intraoral scanning, including less chair time and a more stress-free procedure. Moreover, the data from intraoral scanning can be easily stored, transmitted, and reused.

Although each implant manufacturer provides scanbodies of varying designs depending on the material used, several requirements must be met to ensure a stable digital process. Scanbodies should also provide the benefit of ease in simplifying the digital implant impression process.

Scanbodies manufactured from titanium are recommended because they are highly durable and autoclavable. They can be used up to 100 times if proper care and cleaning has been maintained between each use. Since they are made from titanium, scanbodies do not bend or deform if the screw is overtightened. Scan bodies are made only from PEEK, which is a softer material more prone to bending. Once a scan body is bent, the alignment is off, which results in errors in the final restoration design.

The scanbody should be visible in clinical X-rays to confirm the fit of the implant.

It is vital to be able to see the implant scanbody connecting accurately with the implant fixture.

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TEAM CTS GOLD COURSE 2020 REVIEW

From the last April to July, "Team CTS," a clinical dental research group, successfully organized the Team CTS GOLD course 2020.

The Team CTS GOLD course is the most basic program among many offered by Team CTS, and its purpose is as follows: 1. enhanced understanding and confidence in implant procedures, which is the essence of modern dental treatments; and 2. mandatory clinical training to become a member of Team CTS.

Although the schedule changed because of COVID-19, the seminar took place from April 18 to July 5, for 4 months, in the seminar room at the Seoul Sales Headquarters of DENTIS Co., Ltd. under strict social distancing guidelines. The course comprised mainly of hands-on training under the theme of "Implant Surgery & Basic Prosthetic Procedures" (eight sessions in total).

1. Curriculum of the Team CTS GOLD course

Session 1 – Basics of implants and treatment plan (1)

. Why Team CTS?
. Importance of implant treatment plans
. Dental radiology for implant treatment planning
. Anesthesia and medication for implants
. (Hands-on) The reality of radiograph readings for implants; panorama & CT

Session 2 – Basics of implants and treatment plan (2)

. Basic science (bone metabolism, association, conduction, and induction and biologic width)
. Type, classification, surface, selection, etc., of implants.
. Implant treatment plan
. Consideration of the number of implants, spacing, and intermaxillary space according to the condition
. Considerations for prosthetic design and biomechanical failure
. (Hands-on) Methods of preparation of various request forms, blood test analysis, and clinical training before implant surgery

Session 3 –Single implant surgery in the molars

. Basics of incision and suture for implants
. Introduction and use of the implant kit
. Primary implant surgery – single implant placement
. (Hands-on) Clinical training of molar implant surgery

Session 4 – Multiple implant surgery in the molars

. Primary implant surgery – multiple implant placement
. Considerations for single and multiple implant surgery
. Implant-supported overdenture
. (Hands-on) Multiple implant surgery in the molars
. (Hands-on) Implant surgery for implant-supported overdenture

Session 5 – Secondary implant surgery

. Incision and suture for secondary implant surgery
. Types of secondary implant surgery
. Basic soft tissue management for implants
. (Hands-on) Clinical training of incision and suture (pig jaw)
. (Hands-on) Clinical training of the APF technique (pig jaw)

Session 6 – Implant prosthesis

. Type of fixed implant prostheses, abutment selection, protocols of writing a procedure
. Impression taking of fixed implant prostheses, dealing with errors in the process
. Final selection and occlusion of fixed implant prostheses
. Basic theory and design of the implant overdenture
. (Hands-on) Clinical training of implant impression taking and bite registration
. (Hands-on) Clinical training of various implant overdenture prosthetics

Session 7 – Surgical guide for implant planning & surgery

. Clinical digital applications
. Explanation of terms for guide implants
. Demonstration of guide implant placement
. Disadvantages of guide implants and surgical methods of guide implants to reduce errors
. (Hands-on) Multiple implant placement surgery using a surgical guide

Session 8 – Implant on the maxillary incisors

. The importance of the maxillary incisor
. Implant placement immediately after extracting the incisor and flapless implant surgery
. Flap surgery for the maxillary anterior teeth
. GBR for staged implant surgery
. Implant prostheses for the incisors, including temporary restoration, and complications
. (Hands-on) Clinical training of implant placement using a surgical guide for the maxillary incisors
. (Hands-on) Clinical training of fabricating maxillary incisor implants for a temporary restoration

In this course, the coaches of Team CTS, including the head coach Dr. Wongun Chang (Milestones Dental Institute), Dr. Pil Lim (NY Pil Dental Clinic), Dr. Dohoon Kim (Seoul N Dental Clinic), Dr. Chulwhan Park (Boston Whan Dentist), Prof. Dongwoon Lee (Veterans Health Service Medical Center, Department of Periodontology), Prof. Kwantae Noh (School of Dentistry, Kyung Hee University, Department of Prosthesis), Dr. Hyundong Kim (Seoul Smart Dental Clinic), and Dr. Yongkwan Choi (LA Dental Clinic) participated in seminars and clinical training, along with hands-on clinical training for every session, which helped maximize the trainees' understanding and experience of the course.

Dr. Pil Lim

Following the seminar, Pil Lim , the director of the GOLD course 2020, expressed his thoughts on its progress as follows:

"The Team CTS 2020 GOLD course was a success, despite the challenges faced amid the COVID-19 global pandemic.

As the director, I am grateful for being able to wrap up the seminar safely and effectively despite concerns leading up to the event, thanks to the cooperation of everyone involved. As this was a foundational course for the basics of dental implants, eight speakers from various fields, such as periodontics, surgery, prosthetics, occlusion, and digital dentistry, aimed to deliver as much content as possible to the trainees. I would like to sincerely thank all students who attended the seminar for their participation. Us, CTS members, will try our best to make improvements based on the feedback received from the GOLD course 2020, our first event, for GOLD course 2021, scheduled for the next year. In addition, we will continue exchanging information and communicating with experts to become a lifetime society for clinical dentistry, rather than a one-time seminar, for the clinical expertise development of all dentists."

Dr. Yongkwan Choi

Yongkwan Choi, the vice-director, made the following remarks:

"The 2020 team CTS GOLD course took place amidst a pandemic because of which global communication had been halted since the end of 2019. There were many challenges to an extent where the seminar, originally scheduled for March 2020, had to be postponed, but looking back, I think such unexpected challenges were also a step towards successfully hosting a safer, higher quality event. The GOLD course was aimed at providing evidence-based information essential for the clinical practice of dentists who are new to implants and clinical training with time spent on practicing with as many implants as possible in various situations. Additionally, I believe that having all eight of the speakers participating in all components of the seminar provided an opportunity for them to share their experiences and beliefs with the trainees as well as the tips they acquired during clinical training. I also think that the seminar was worthwhile in increasing the depth and breadth of my clinical knowledge. The awkward and uncomfortable atmosphere of the trainees at the beginning of the seminar evolved into a friendly and comfortable one by the end of the 4 months, which felt too short considering the abundance of conversations and questions we had among us. The lessons learnt from this year's GOLD course experience will be the foundation from which Team CTS will work upon to improve the future Platinum and Survival courses. Through the formation of a CTS alumni, I believe that the 2020 Team CTS GOLD course will become a stepping stone for the continued and valuable efforts of Team CTS in evolving the field of dentistry. I hope that in the co-existing fear and excitement of Spring 2020, this year will be remembered as the year in which Team CTS members came together to achieve a milestone in their great passion of becoming good dentists."

Most trainees who attended this year's GOLD course expressed great satisfaction with the curriculum and contents of the course, particularly with the clinical training.

The trainees stated that it was a "memorable seminar," commenting on how the seminar "was conducted in a systematic manner, so it felt as though [they] were receiving one-on-one lessons for each course of treatment, from basic to advanced, from the eight CTS coaches, which was helpful in drawing clinical applications."

[Impressions from Trainee A]

What a memorable seminar! I would highly recommend it if you are new to implants or wish to learn about it in greater depths!

The event was worth the money. If anything, I feel bad about myself as the instructors were teaching so enthusiastically. I learnt so much from this experience, thank you!

[Impressions from Trainee B]

The word that comes to my mind when looking back at the CTS seminar is "passion."

The eight instructors presented lectures that complemented each other's and seeing them trying to explain as much as they could during the clinical trainings, I couldn't help but work hard myself.

Although there cannot be a perfect seminar, they tried their best, and so did I.

[Impressions from Trainee C]

The systematic, step-by-step approach that touched upon basic to advanced topics ensured that there were no difficulties in understanding or applying the curriculum, and the generous clinical trainings assigned to each lecture were helpful. Thanks to the eight speakers who went around the clinical trainings and tended to us as they would in a one-point lesson, it was easy to catch the key points in each clinical training session. It seems as though the seminars were easier to understand because they dealt with various dental subjects instead of being limited to the content on implants. I would recommend the seminar for many dentists.

2. Team CTS GOLD Course 2021

Team CTS GOLD course 2021 will take place from Saturday, March 13, 2021, to Sunday, June 13, 2021, under the direction of Do Hoon Kim and will comprise a total of eight sessions upgraded from this year. The director, Do Hoon Kim, expressed his ambitions for next year's seminar, as follows.

"The preparation for the first GOLD course that took place this year consisted of rehearsals for the seminars and clinical trainings from all eight coaches of Team CTS. Based on reviews from this year's trainees, we have come to understand the opportunities for growth in areas that would have otherwise been unnoticed.

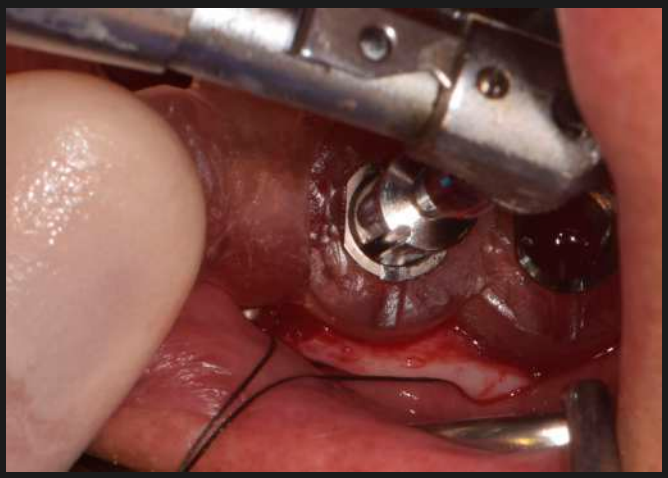
Next year, we hope to be able to offer a more complete, enjoyable seminar to the trainees, based on the feedback received this year. The aim of the CTS GOLD course is that the trainees who do not have a lot of clinical experience will continue to receive feedback and learn from mentors, rather than being a one-time workshop. Although there are many implant seminars, we strive to become a one-of-a-kind seminar for basic implant training."

3. Supervising a patient's implant surgery

The GOLD course involved a program in which students were given the opportunity to perform implant surgery on patients. A Team CTS coach helped a team of five trainees as they performed their first implant surgery on a patient, mentoring their way through the entire procedure, from preparation to all steps of surgery. Through this process, the trainees gained hands-on experience operating on real patients in addition to the training model provided in the seminar.

[Photos of trainees performing surgery]

Here is an example of an implant surgery performed by Y, a trainee, under supervision of Dr. Wongun Chang, the head coach. Before surgery, the treatment plan was established based on the patient chart, after which the OneQ-I clean implant was placed in #36 and #37 and the OneQ implant in #46.



Bone grafting was performed around a region of bone loss in #37 using the OVIS xeno-P and OVIS collagen membrane. Guide surgery using a SQ Full guide kit was performed on #36 and #37, whereas flapless surgery using Guidewheel was performed on #46.

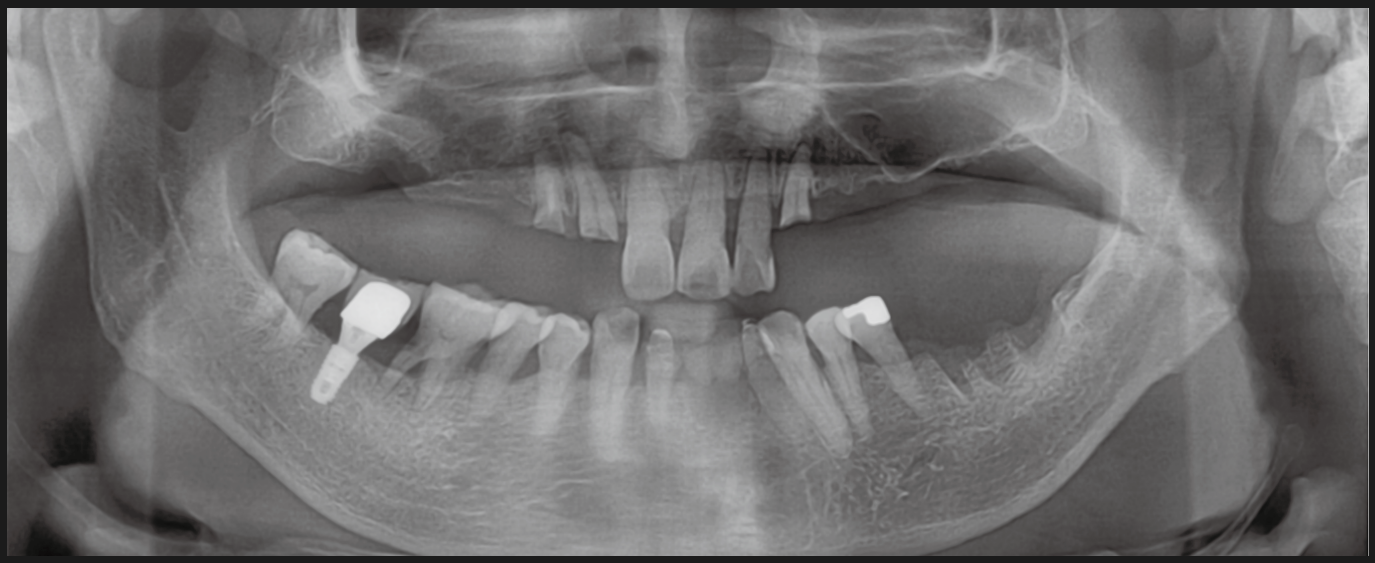


Fig 1. Before treatment

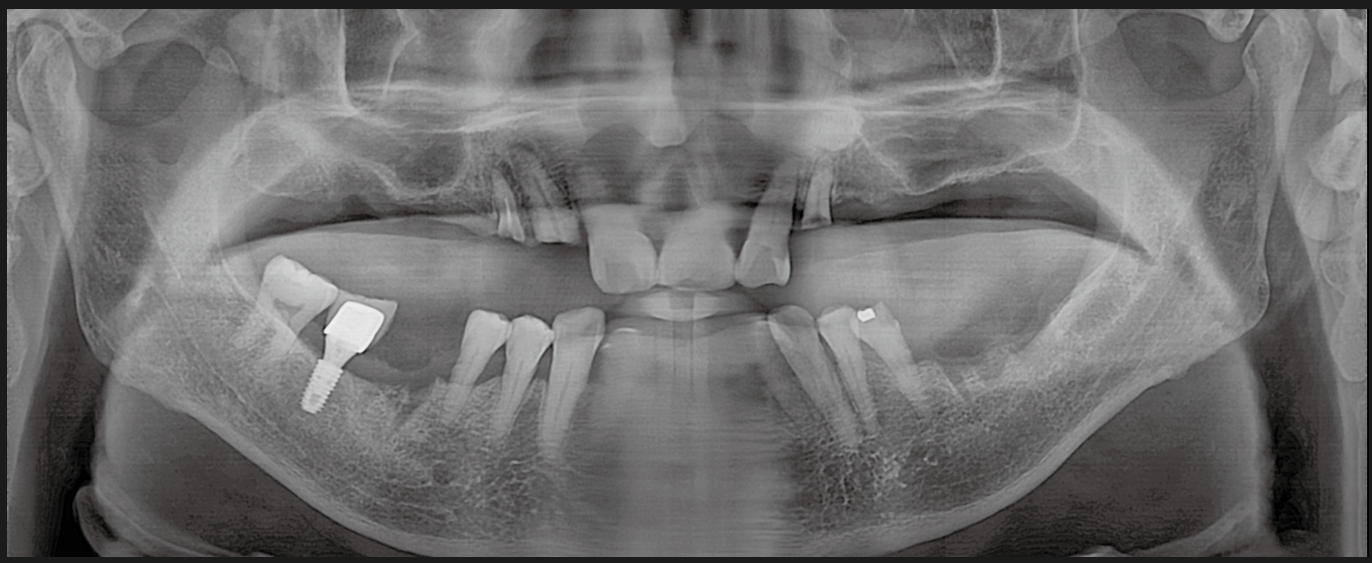


Fig 2. After extracting tooth #46

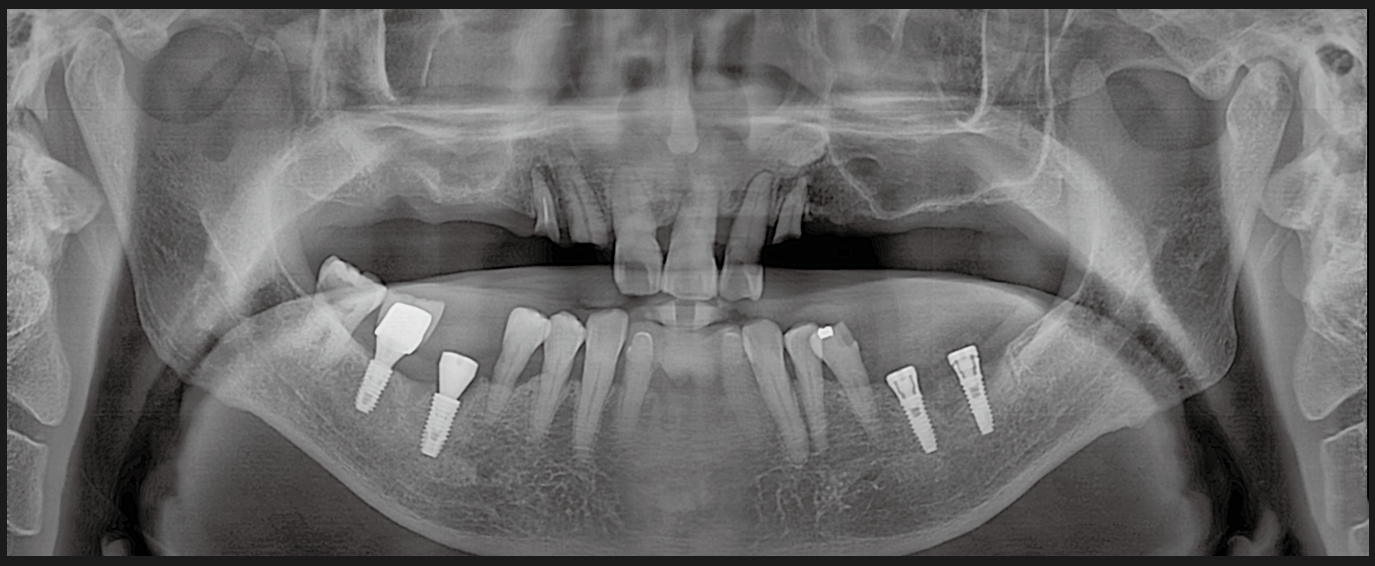


Fig 3. Immediately following implant surgery

4. Team CTS Platinum Course & Crystal Course

"Team CTS" will be hosting the "Team CTS 2020 Platinum Course" and "Team CTS Crystal Course" from October. The Platinum course is an advanced-level seminar for intensive training of specific clinical topics in a short time period, while the Crystal course is designed for students who have completed the existing GOLD Course or novice dentists who have little experience in general clinical dental practice apart from implants to summarize the core topics of each type of clinical practice and provide hands-on clinical training for procedures. Both courses will focus on hands-on clinical training.

PLATINUM COURSE

Course 1.

Conquering the GRAFT (mastering bone grafts & soft tissue grafts)

Conquering the Bone Graft & Gingival Graft

Speakers	Dr. Pil Lim / Prof. Dongwoon Lee
Date	October 17, 18, 24 2020 (3 days total)
Time	(Saturday) 15:00~22:00, (Sunday) 10:00~18:00
capacity	15 attendees


Dr. Pil Lim


Prof. Dongwoon Lee

Course 2.

Implant occlusion with answers – playing with dental articulators

Everything you need to know about implant occlusion and the use of dental articulators

Speakers	Dr. Wongun Chang / Dr. Dohoon Kim
Date	November 29, 2020 (one-day event)
Time	09:30~17:00
Capacity	12 attendees


Dr. Wongun Chang


Dr. Dohoon Kim

Course 3.

Tooth removal and the process of temporary tooth manufacturing (At least this one!)

Crown removal and temporary restoration seminar with Dr. Seungkyu Lee

Speakers	Dr. Seungkyu Lee
Date	December 12,13 2020 (2 days total)
Time	(Saturday)16:00~23:00, (Sunday) 10:00~18:00
Capacity	15 attendees


Dr. Seungkyu Lee

Course 4.

Lyrics by the maxillary sinus, composed by implants, arrangement by CTS (maxillary sinus surgery)

Everything about implants and maxillary sinus surgery

Speakers	Dr. Dohoon Kim / Dr. Yongkwan Choi
Date	January 24, 2021 (one-day event)
Time	10:00~18:00
Capacity	20 attendees


Dr. Dohoon Kim


Dr. Yongkwan Choi

Course 5.

Beautiful and functional mastery of full dentures

Everything about full dentures (advanced)

Speakers	Dr. Wongun Chang / Prof. kwantae Noh
Date	January 30, 31, 2021 (2 days)
Time	(Saturday)15:00~22:30, (Sunday) 10:00~18:00
Capacity	20 attendees


Dr. Wongun Chang


Prof. kwantae Noh

CRYSTAL COURSE

Course 1.

Dental resin composites/endo in Korean clinic openings: a field manual

Wise endo & resin composites – easier than inlays

Speakers	Dr. Minsik Choi / Dr. Changhoon Lee
Date	October 18, 2020 (one-day event)
Time	09:30~17:30
capacity	15 attendees


Dr. Minsik Choi


Dr. Changhoon Lee

Course 2.

Opening: the surgical perspective

A summary of "methods of oral cyst and benign tumor treatment minor oral surgery, I & D, incision and suture, and extraction surgery" needed for newly opened clinics

Speakers	Dr. Yongkwan Choi
Date	December 12,13 2020 (2 days total)
Time	(Saturday)15:00~22:00, (Sunday) 10:00~18:00
Capacity	20 attendees


Dr. Yongkwan Choi

Course 3.

Everything about the now unnecessary primary orthodontics (feat. partial orthodontics)

Everything about partial and primary orthodontics

Speakers	Dr. Wongun Chang / Dr. Chulwahn Park / Dr. Dohoon Kim
Date	January 9, 2021 (one-day event)
Time	15:00~22:00
Capacity	20 attendees


Dr. Wongun Chang


Dr. Chulwahn Park


Dr. Dohoon Kim

Course 4.

Complete dentures – waiting for patients

Covering the basics of complete dentures

Speakers	Dr. Wongun Chang
Date	January 17, 2021 (one-day event)
Time	09:30~17:00
Capacity	12 attendees


Dr. Wongun Chang

Those who have completed the Platinum and Crystal courses will be awarded with a CTS seminar certificate of completion and qualification score (10 points per course) for a Team CTS membership, which will be granted through a fair screening process when a score of 100 points is reached.
Additionally, at the request of instructors, the Platinum and Crystal courses will prepare the seminar on a greater diversity of topics in the future. Preparations are underway to support the establishment of a global dental society through the seminars provided by Team CTS, not only in Seoul but also nationwide and overseas. In 2022, we are planning to host various Team CTS courses in LA, USA.

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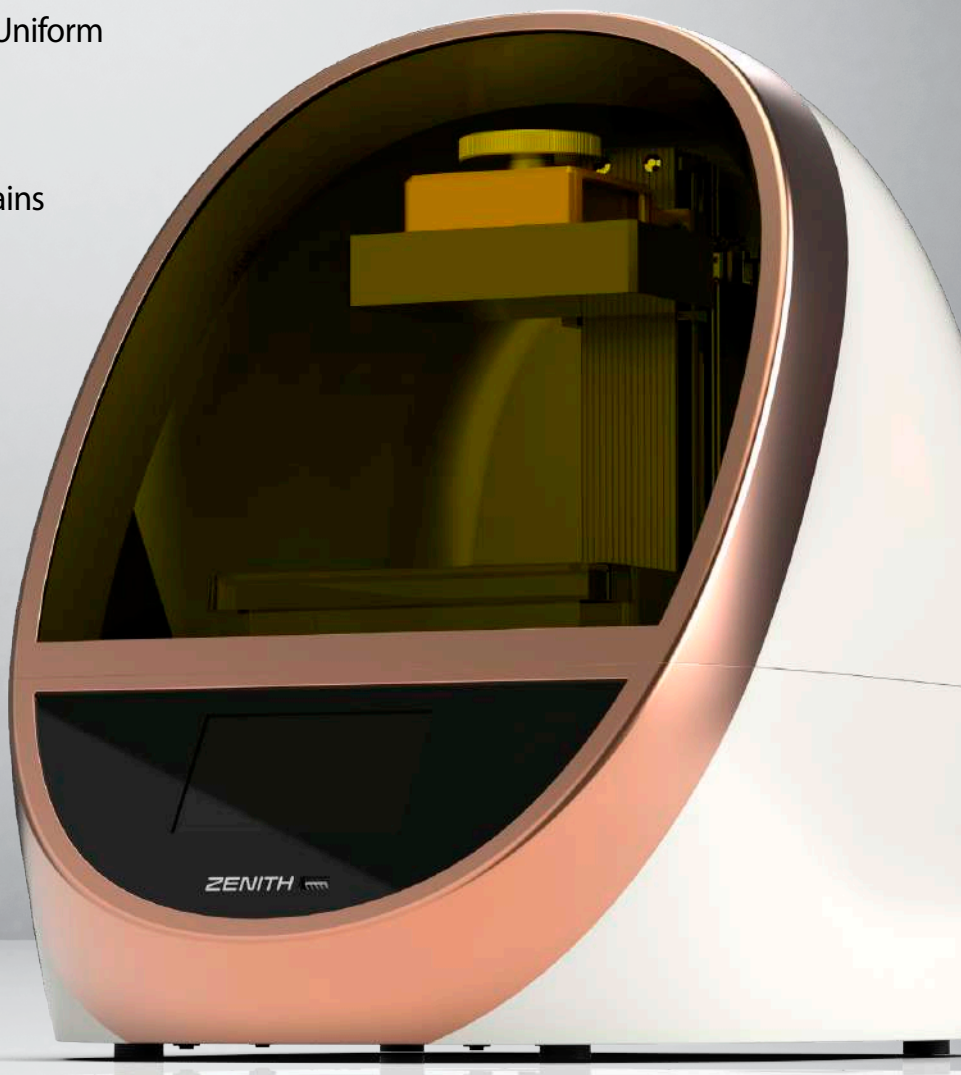

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