

## Part 6- Clinical application of AQB implants

### Chapter 1- Examples of the single to multiple implantation treatment – Lack of intermediary teeth

#### 1. A case of implant prosthesis installed into a missing mandibular molar

Director of Ohmori Dental Clinic

Keiji Ohmori

The implant prosthesis treatment is not only considered effective for the recovery of the particular area to which the implant is inserted, but also in protecting and in facilitating the neighboring teeth, subsequently leading to improvements in the safety of the remaining natural teeth, and in motivating the patient in looking after their oral health. Therefore implant treatment can be said to be an effective means to reduce the future tooth loss than when treated with other prosthetic solutions such as bridge prosthesis or partial denture.

Previously, implant treatment was only considered as the last resort having lost most or all of the masticatory ability, however, the current general consensus is to conduct implant treatment even on relatively young patients and even in those with only one to two tooth losses. By replacing the missing teeth in these patients, the probability of conducting pulpectomy or adjustments to the neighboring teeth can be reduced. Furthermore, it is possible to recover the original occlusion with the natural teeth with support from bone. It is evident that the implant treatment has become an indispensable tool both in terms of overall protection of natural denture as well as re-fabricating the missing teeth.

In this case study, we report of a successful implant prosthesis treatment in a 23 year-old female with a missing tooth.

Patient: 23 year-old female

First admission: July 2001

Chief complaint: Pain in the right side of the mandible at the time of chewing

Treatment plan: After the removal of No. 20, undergo prosthetics treatment with one-piece type

No. 20 was removed due to an advanced case of periodontal disease. Having waited two months for the wound to heal, the state of the bone was examined under X-ray radiography. Patient consented to the treatment after explaining what it entailed (Image-1 to 3).

The implant cavity was constructed with the usual drilling technique once gaining sufficient amount of view from the alveolar crest incision and a longitudinal incision. The bone quantity was adequate in terms of height and width, and the buccal exposure of the HA coating layer was able to be avoided by implanting the 4 SM size, 2 mm deeper in by than what had been originally planned (Image-4 to 9).

Exertion of excess tension could be avoided by limiting the use of the circular knife to a crescentric motion on the gingivae periosteal flap on the buccal side. The radiograph taken after the installation confirmed that the implant body had been inserted with sufficient depth, and that it was inserted in a suitable orientation. The stitches were removed 7 days after the surgery, where the wound healing process of the mucosa to have been satisfactory (Image-10 to12).

On the eighth week, the consolidation of the bone surrounding the implant was achieved. When tested with the probe, it could not be inserted more than 1 mm in depth, therefore confirming the periodontal tissues to have been recovered to a similar state to those surrounding the natural teeth (Image-13).

The abutment was fabricated on the tenth week, and the implant body fitted with a provisional resin crown for a period of roughly two weeks. It was then subsequently fitted with the hybrid crown as the final superstructure (Image-14, 15).

A satisfactory progress with absence of any complications was confirmed on observation, even after eight years since the attachment of the superstructure.

Had the patient requested bridge prosthesis eight years ago instead of the implant, I cannot, as a dental practitioner, be confident that the bridge would have retained the stability of the neighboring teeth in a similar manner. I believe it is because of the implant installation that the safety of occlusion, neighboring teeth and the hygienic environment could be maintained. The factors such as the ease in its management, alongside retaining the patient's motivation have played a role in retaining the sufficient level of oral hygiene. The lack of any abnormal symptoms arising for 8 years till this day, including whole of the oral cavity, can thus be said to be owing to the implant prosthesis. In addition, the regular check-ups by the dental hygienist was another important factor to the satisfactory outcome in the long run.

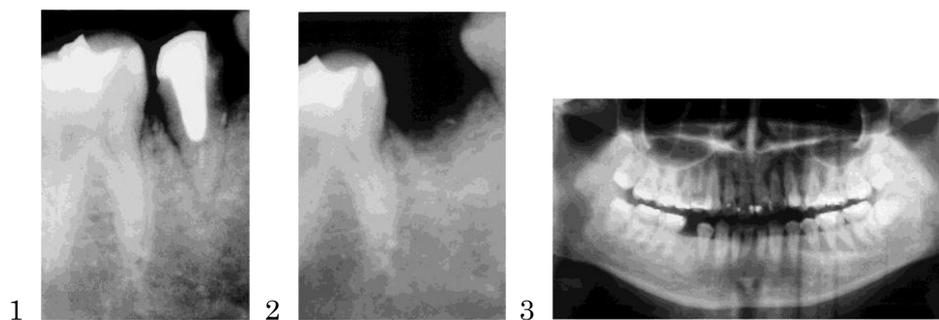


Image 1: Dental radiograph at the first medical examination.

Advanced case of bone resorption was observed around No. 20, and was decided, this should not be left untreated.

Image 2: Dental radiograph 2 months after the tooth extraction. The wound healing process had made a satisfactory outcome.

Image 3: Orthopantomogram featuring the state after 2 month of tooth extraction.

This showed sufficient bone quantity to be present for implant prosthesis. There were no traces of past dental treatment, and as the dental bridges would have required the milling of adjacent teeth, implant prosthesis was suggested to the patient instead. To which she gave consent.



Image 4: Photograph of the oral cavity pre-surgery.

Image 5: Alveolar crest incision was applied using the standard procedure. Sufficient view was able to be obtained.

Image 6: The pre-surgical examination indicated the suitability of 4SM size implant. The implant cavity was drilled 2 mm deeper than the standard, totaling to 10 mm in depth.



Image 7,8,9: The depth of the implant cavity was adequate, although some bone cleavage on the buccal side could be observed. The implant body could be inserted fairly deep into the cavity, therefore avoiding the exposure of the HA coating layer.

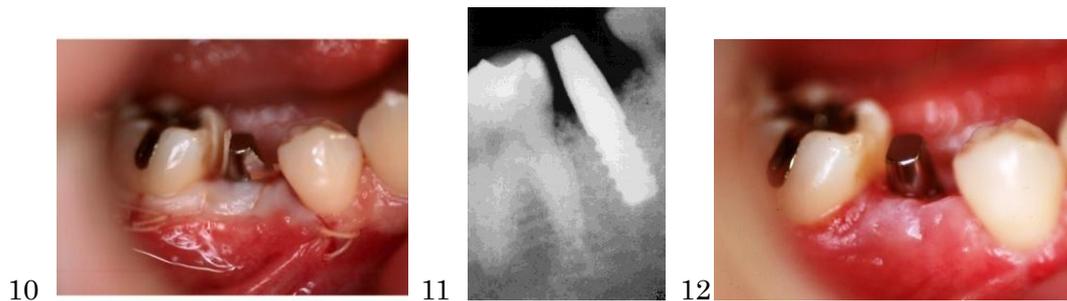


Image 10: With the aim to fully restore the original state, suturing was conducted carefully to avoid exerting excess tension to the mucosal flap.

Image 11: Post-surgical dental radiograph confirmed the HA coating layer to have been fully inserted into the bone, and that the orientation of the implant was favorable

Image 12: The view of the oral cavity at suture. Wound healing had shown good progress, but the mucosal membrane around the implant resulted in gingival bleeding with a slight probing.



Image 13: Photograph of the oral cavity after 8 weeks. Probing into the soft tissues surrounding the implant showed the tissues to have hardened, with only allowing the probe to enter 1 to 2 mm in. The periodontal susceptibility test result indicated -3.

Image 14: Abutment was fitted 8 weeks after implantation and provisional resin crown was then attached to the implant body.

Image 15: Photograph of the oral cavity, 3 years after the superstructure attachment. Currently, into the 8<sup>th</sup> year after its installation, there have not been any reports of abnormal symptoms arising.

## 2. A case where the implant was chosen over bridge prosthesis

Director of Kashima Dental Clinic

Kenji Kashima

The decision as to whether a case should be treated with implants or with dental bridges can be difficult. However since there are no difference in the cost between the two treatment options, the advantages of the implant prosthesis to improve taste sensation and hygiene, implant option is perceived to be the superior of the two except in cases where surgical invasions should be avoided. The final determining factor lies in the health conditions of the two neighboring teeth that may become the abutment teeth for the bridges. Also practically, in terms of minimal intervention, the implant treatment is preferred where the two neighboring teeth have not been modified.

I present here, a case where dental prosthesis was installed while leaving the neighboring teeth intact.

Patient: 60 year-old male

First admission: October 2008

Chief complaints: Missing teeth. Requested replacement treatment with bridge or implant

Treatment plan: Implant prosthesis was placed to the right side of the jaw, after the occlusion was stabilized with the application of bridge prosthesis to the left side of the jaw. There were intermediary deficiencies and previously treated teeth on both upper and lower jaw on the left

The mesiodistal diameter of the No. 21 tooth cervix was measured to be 6.6 mm in the study model (Image-1). The distance to the maxillary sinus was confirmed to be 10 mm from the radiograph (Image-2) therefore the 4MS size AQB Implant was selected.

First an incision was applied to the alveolar ridge between the No. 20 and No. 22 teeth to form a flap. The implant cavity was drilled carefully to avoid any damages to the roots of the neighboring teeth, for the installation of one-piece 4 MS implant (Image-3). The implementation of CT scan as an examination tool in the recent diagnostic practices has furthered understanding of the conditions; however, the key to a successful implant surgery still lies in the experienced skills of the surgeon. For example, the contra-angle handpiece must be held stable, with certainty and to be operated with the utmost discretion. If possible, it is preferable to apply a surgical guide constructed with simulation software.

The impression for this case example was taken once the buccal portion was prepared after a seven week post-surgical monitoring period (Image-4). The neighboring teeth were able to be left intact (Image-5).

Platinum added gold alloy (PGA) based hybrid ceramics (Esthenia) was applied as the replacement of the molar teeth. In order to prevent it from fracturing, clearance space was established to accommodate Esthenia of 2 mm thickness (Image-6). It was then treated with a primer (Image-7) and sand-blasted (Image-8) before its placement with super-bond adhesive.

The missing teeth on the right mandibular was also installed with implant prosthesis (Image-9,-10).

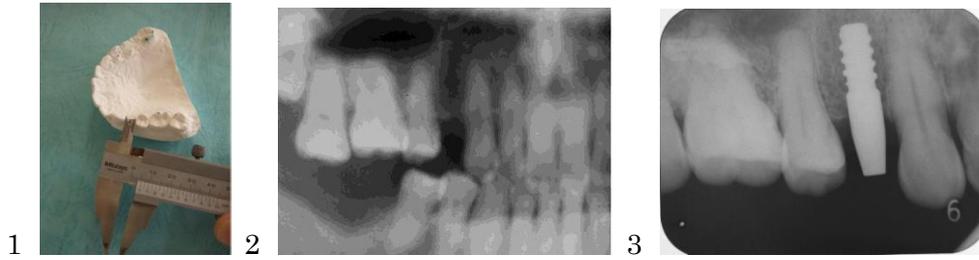


Image-1: Taking study model measurements

Image-2: The panorama X-ray photograph at the primary examination

Image-3: The dental X-ray radiograph after implant body installation



Image-4, -5: The neighboring teeth were left intact by using implant

Image-6: Esthethia with the cavity PGA lining.



Image-7: Treated with primer, then adhered with super-bond

Image-8: Sand blast treatment

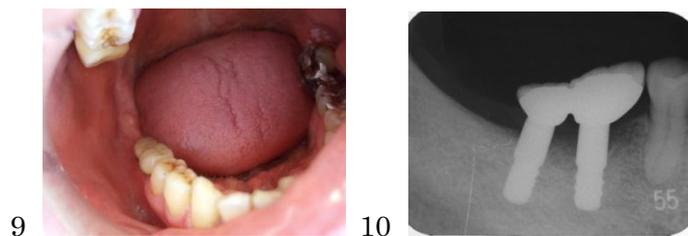


Image-9,-10: Implant prosthesis placed on the right mandible.

### 3. Restoring occlusion by installing one-piece implants to the lower free-end multiple defects

Director of Kashima Dental Clinic

Kenji Kashima

Problems such as dental caries and looseness of the anchoring teeth are relatively frequent encounters in the long-term use of partial dentures. The most distressful sensation for the patient, especially among those who are highly sensitive, is where the sense of discomfort of the artificial denture attachment does not disappear.

Here, we report of a case where a patient came complaining of discomfort from an unidirectional removable partial denture on the mandible that was installed 25 years ago (during which period it was replaced several times), and requested for it to be replaced with implant prosthesis. This problem that persisted over the years was able to be solved by installing one-piece implant, which was able to achieve a rapid occlusal recovery.

Patient: 75 year-old female

First admission: April 2008

Chief complaint: Continuous discomfort felt when wearing the partial denture.

Treatment plan: Three one-piece implants were installed to the No. 28 to 31 positions to recover the occlusion on the left side

A lower extension partial denture had been fitted onto the left mandible however, the sense of discomfort was never relieved even though this was replaced five times within the 25 years. There were periods in which the denture was not worn by the patient, therefore the condition also presented with elongation of the maxillary molars (Image-1).

In the implant surgery, the alveolar crest incision was applied to the left mandible, and the mucoperiosteal flap was elevated (Image-2), followed by 4SM, 4SS, 4SS installation, in this order starting from the anterior region. Defects to the No.1 tooth were also evident but the installment at this position was decided against to retain the sufficient level of oral hygiene (Image-3).

The occlusal plane was adjusted by grinding the elongated maxillary teeth in preparation for the dental prosthesis. Even though the patient was in the seventies, the post-surgical progress was smooth and a rapid osseointegration could be achieved rapidly, and the impression was able to be taken four weeks later. This was followed by trials with metal connected crown, and the final superstructure was fitted six weeks after the implantation (Image-4, -5).

Since the patient was freed from the sense of discomfort of partial denture that she had endured over the years, she was very appreciative, and commented, "My life has changed. I should have changed to implant much sooner".

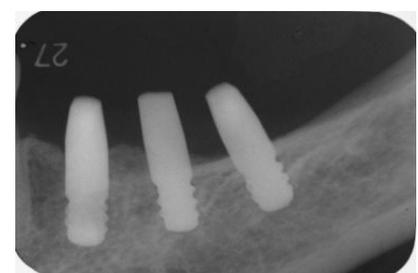


Image-1: The presence of elongated maxillary teeth was evident from the pre-surgical panorama radiograph.

Image-2: The constructed implant cavity

Image-3: Dental radiograph after implantation

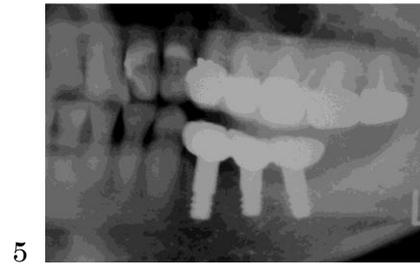


Image-4: The prosthesis was attached six weeks after the installation

Image-5: Panorama radiograph after attachment

#### 4. A case of implant prosthesis to the missing intermediary maxillary molar

Director of Ohmori Dental Clinic

Keiji Ohmori

Due to the high success rate of the implant treatments in the recent years, it has become known as a highly predictable treatment method. It had previously been used as a means to restore occlusion to those that had lost all or most of its masticatory ability. However, with its advantage of not necessitating the milling down of the remaining healthy teeth, it is considered to be one that is superior of the other prosthetic treatments, such as attachment of the bridges or partial dentures. The current consensus therefore is to conduct implantation even with the loss of one or two teeth. By the placement of implant prosthesis to replace few teeth it can contribute to occlusal stability with respect to the disclosing or adjacent teeth, and thus leading to prevention of further tooth losses.

Patient: 38 year-old female

First admission: March 2006

Chief complaint: Occlusal pain on the right maxillary molars.

Treatment plan: After overall periodontal disease treatment, a two-piece type to be installed to replace the No. 13.

In 2003, the No. 14 tooth lost was replaced with a one-piece type implant and had been completed up to the attachment of the prosthetics. The loosening of the No. 13 teeth was discovered by the dental hygienist at the time of tooth cleaning (PMTC) during the patient's visit for a maintenance checkup. The state was further examined using the X-ray radiography, when No. 13 was decided to be removed.

Informed consent was given to install AQB two-piece implant after conducting a socket-lift procedure (Image-1).

The best position for the application of the incision line usually is thought to be on the alveolar crest. However, since the width of the alveolar crest was found to be relatively wide, indicating that a stabilized surgical procedure was possible, the mucoperiosteal flap was formed carefully from the incision line that extended in the buccal direction instead (Image-2, -3). The implant cavity was drilled using the standard procedure to the point just below the maxillary sinus, and AQB osteotome was then used to perform socket preservation technique (Image-4,-5).

The elevated portion of the maxillary sinus was filled with simplex HA granules (Image-6).

At the time of insertion of size 4102 AQB two-piece type, the pressing force was restricted to a minimum to avoid causing any damages to the mucous membrane of the maxillary sinus. The insertion procedure was done carefully, relying solely on the rotational force of the ratchet movement (Image-6).

The surgery was completed with a three-stitch suture. The postsurgical X-ray radiography confirmed an elevation of 3 mm thickness in the sinus floor (Image-10, -11).

The healing abutment was placed, ten weeks after the initial installation, as a secondary procedure. The periodontal susceptibility test was -3 (Image-12). The hybrid crown was fitted onto the straight abutment after adjusting its orientation. Concurrently, the superstructure of the No. 14 was also replaced (Image-13 to -15).

The postsurgical progress was satisfactory, and there have not been any reports of abnormal symptoms

such as bone resorption, three years later (Image-16).

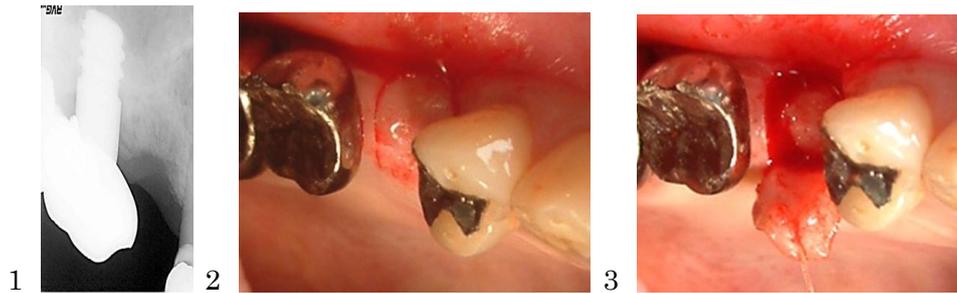


Image-1: No. 6 position had been placed with one-piece type roughly three years ago. Two-piece type was selected for No. 5 position.

Image-2: The incision line was applied in an arch-shape that extended to the buccal side. The wound healing process is thought to be improved if the incision line is designed so that it does not lie on top of the healing cap.

Image-3: Flap elevation



Image-4: Drill with a drilling guide

Image-5: Performing socket-lift procedure using osteotome. The damages and fissures to the mucosal membrane of the maxillary sinus can be avoided by a gradual elevation of the maxilla and filling the space with grafting agents.

Image-6: Boneject (Koken Co., Ltd.) as the HA granules, was injected, using the plastic syringe made specifically for bone grafting.



Image-7: The AQB two-piece type implant was removed from its case for it to be inserted.

Image-8: Where the socket lift procedure has been performed to facilitate implant installation, the implant cavity depth should only be inserted further using the rotational force, and limiting the pressing force to a minimum. The risks of the implant body entering further in than planned increases and could lead to perforating through to the maxillary sinus if too much pressure is applied.

Image-9: Placement of the healing abutment

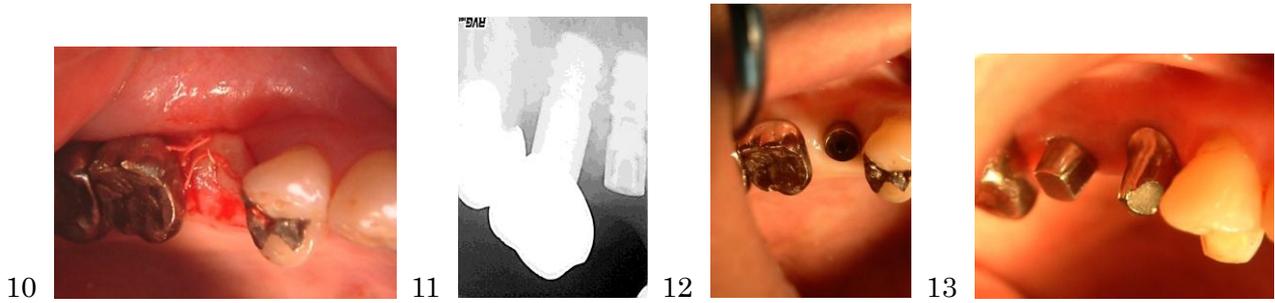


Image-10: Oral cavity, post-suture

Image-11: Postsurgical dental radiograph, confirming 3 to 4 mm elevation.

Image-12: Healing abutment was fitted ten weeks later, and impression was taken two weeks after that.

Image-13: The state of the oral cavity, after the placement of the abutment.



Image-14: Provisional crown attached

Image-15: Final placement of hybrid crown as the superstructure.

Image-16: There have been no reports of abnormal symptoms with either No. 13 or No. 14 implants since their installation for roughly 3 and 5 years ago.

## 5. A case where one implant was used as an anchor tooth to stabilize an artificial denture

Director of Kashima Dental Clinic

Kenji Kashima

There are situations in which multiple implant installation in the elderly is not possible, for reasons of their wellbeing and financial circumstances.

Here, we report a case where No.18 tooth was the only tooth remaining, acting as an anchor for a partial denture, but due to a significant resorption of the alveolar ridge the partial denture had become unstable. To which case, AQB one-piece implants was installed to act as the anchoring tooth achieving stability of the denture.

Patient: 77 year-old female

First admission: April 2006

Chief complaint: Instability of the partial denture on the mandible. The patient requested its replacement.

Treatment plan: Install one-piece implant to the No. 27 and 28 positions to act as the anchor teeth for stabilization of partial denture.

The patient came to the clinic complaining of difficulty to chew due to the instability of the partial denture. The No. 18 tooth was the only tooth remaining, and was acting as an anchor with wiring, but the overall resorption of the alveolar ridge (Image-1) had caused the partial denture to become unstable.

AQB one-piece implant, 4MS was installed into No. 27 and 28 positions (Image-2), and waited for the bone integration to be achieved with the application of a denture by drilling a hole at the positions that corresponded to the implant abutment. The metal-base denture that had been worn on the mandible had been constructed by another dentist a year earlier. The drilling into the metal denture was so hard that the time and effort that it took to drill through the metal, was more than the implant insertion.

Impression for fabrication of the superstructure prosthesis was taken six weeks after the implantation (Image-3), and concurrently, the hook wire was prepared for the anchoring tooth.

Having gained anchorage in the left mandible as well as the No.18 position (right mandible), the denture was able to be finally stabilized, relieving the patient from the unease and dissatisfaction felt when eating (Image-4,-5).

Two years have passed since the installation of implant, yet there have not been any complaints of discomfort (Image-6,-7). The cost effectiveness of this treatment was high since the patient has continued using the denture that had been constructed previously.

This example differs from those cases whereby the installation of the multiple implants to result in the removable prosthetics, but it is similar in terms of significant improvements made with insertion of one-piece implants.

To overcome the drawbacks of implant treatment such as that the outcome can be influenced by the patient's health or financial circumstances, these types of treatments could be the key, and should become more common in the future.

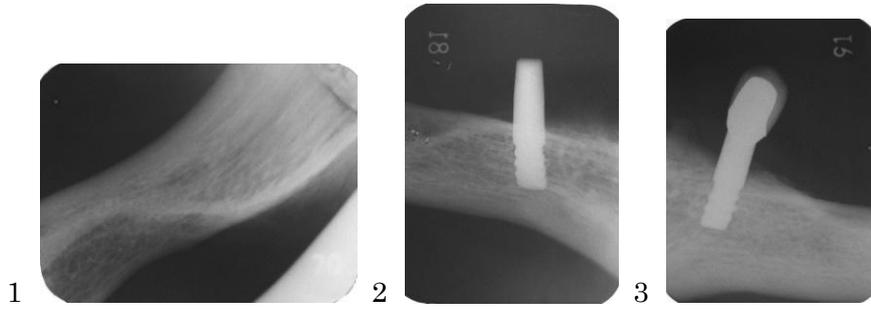


Image-1: A significant bone resorption of the mandible was evident.

Image-2,-3: Dental radiograph after the implant installation, and the placement of the superstructure.

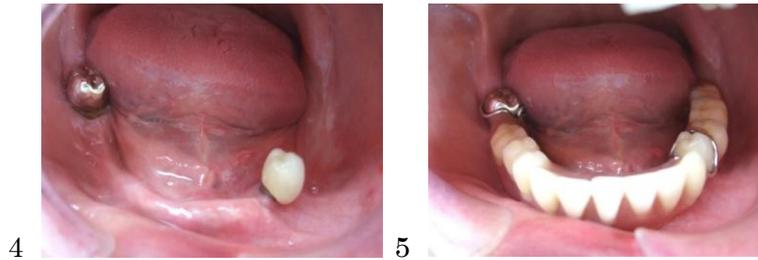


Image-4: Preoperative image of the oral cavity

Image-5: Image of the oral cavity after the placement of the superstructure.



Image-6: The state two years after the implant installation.

Image-7: Dental radiograph two years after the implant installation.

## 6. A case where a denture was fitted using implant as an anchor

Chief Director of Niwa Dental Office

Ken Niwa

The implant treatment is usually complete with the placement of fixed bridge prosthetics however there are instances where a removable prosthetics has to be used. The patient in this example arrived at the clinic complaining of dysfunctional occlusion.

Patient: 66 year-old female

First admission: October 2006

End of treatment: May 2008

Chief complaint: Could not chew due to the pain felt with the use of artificial denture.

Treatment plan: Socket-lift procedure and GBR, in conjunction with the installation of implants to act as the anchor for the placement of Dolder-bar overdenture.

Patient's maxilla had been significantly resorbed (Image-2 to -6). The artificial denture had become displaced with the majority of the jaw ridge disappearing. Fixed bridges can be applied even to these cases by applying techniques such as sinus-lift procedures. However the danger lies in overlooking the importance of improving the overall dental profile. Adverse reactions have been induced and encountered in the past in neglecting this factor.

The C-ray radiography straight after the implantation is shown in Image-7. Two-piece type implant, 4082 and 4102 were implanted in conjunction with sinus-lift and GBR techniques.

The secondary surgery was conducted roughly 20 weeks later (Image-8 to 11), with the abutment installed once gingivae had stabilized (Image-12) and then the impression was taken with the Dolder-bar. The placement of artificial denture was completed with the standard procedure (Image-13,-14). The dental profile was significantly improved from its preoperative state (Image-15), and the patient was satisfied with the treatment outcome.



Image-1: The preoperative profile. The cheeks are sunk in, with a low vertical occlusal height.

Image-2: Preoperative radiograph. The vertical distance of the bone is non-existent, at the No. 11 position.

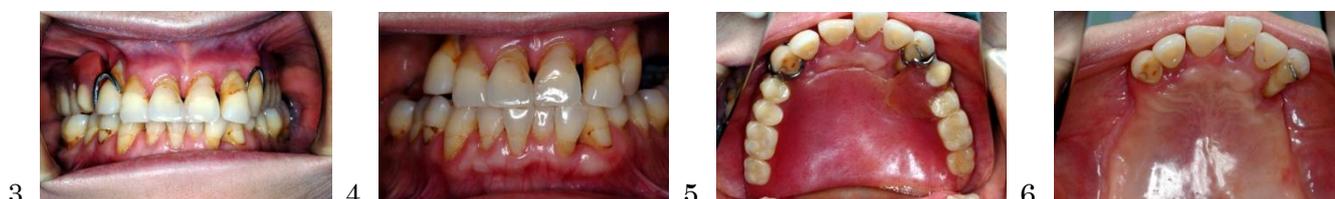


Image-3,-4,-5,-6: The oral cavity interior featuring an extremely destabilized denture, along with the maxilla that is significantly resorbed. Chewing is evidently difficult with this condition.

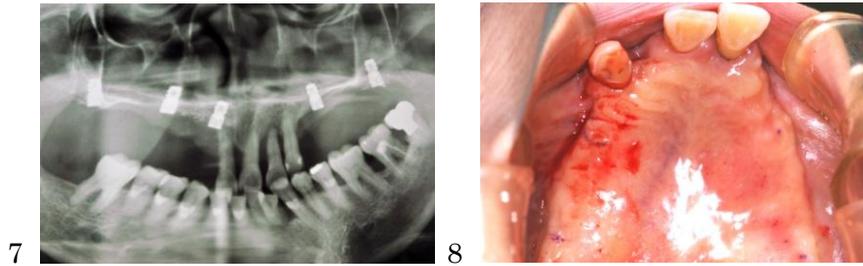


Image-7: Postoperative radiograph. After GBR and the sinus-lift procedures, the two-piece type implant was sufficiently installed.

Image-8: Image of the maxillary ridge before the secondary surgery.



Image-9: The position check of the implant with probing.

Image-10: The No. 11 position at which GBR technique was conducted is filled with sufficient bone quantity.

Image-11: It is necessary to confirm the condition of the healing abutment with X-ray radiography.

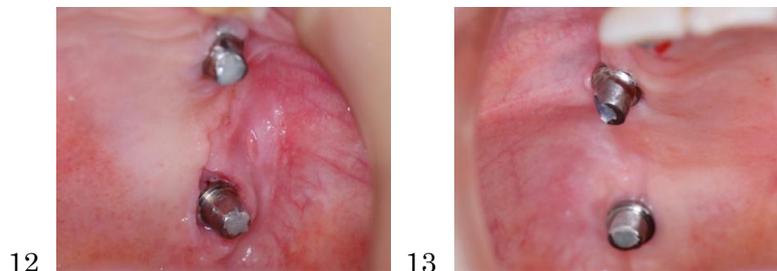


Image-12,-13: The abutment was placed two week after the secondary surgery. Even though there were traces of gingival inflammation, the placement was still possible as the Dolder-bar margin was set over the ridge.



Image-14, -15: The completed Dolder-bar supported partial denture. The palate is left uncovered since firm support can be established (Collaborator: Mr Takahashi, Takahashi Dental Clinic, Oogaki, Gifu-prefecture).

Image-16: Improved dental profile. A significant modification in the facial structures can be observed in comparison to the state before the surgery. It probably feels like the denture has been restored to its original state.

**7. A case of safe insertion and prosthesis of 3 mm diameter AQB implant into regions other than the anterior teeth of lower mandible.**

Director of Kinebuchi Dental Clinic  
Takao Kinebuchi

Originally, the AQB implant with 3 mm diameter was developed with the intention of installing it to the anterior section of the mandibles, since this narrow body had the tendency to lead to traumatic bone resorption or fracturing, when placed in the molar regions where it was subjected to strong masticatory forces. For this reason, the AQB implant of this size had only been used in the anterior teeth in the mandible up till now.

Initially, 4 mm diameter implant was planned to be used in this example, however, upon opening the flap, it was discovered that the 4 mm size would be too wide and only the 3 mm size would be a suitable fit. It was therefore decided that the connected crown would be placed with the installation of multiple implants. The implant installation was initiated in 2003 to a region other than the anterior section of the mandible (For details of the treatment plan, refer to Part 2, Chapter 4 of this book).

The patient had lost four of her anterior teeth where aestheticism is considered important. The treatment plan for achieving an aesthetics finish that was devised by the author (refer to Part 6 Chapter 6 of this book) was followed, which enabled aesthetic finish to be retained till now.

Patient: 51 year-old female

First admission: September 2004 (Image-1,-2)

Chief complaint: Missing teeth, No.7 to 10 and No. 29 to 30, referral from another clinic for implant to replace the missing teeth.

Primary treatment plan: Implant into the positions No. 29 and 31 for anchorage for bridge placement for occlusion support of the left mandible.

Secondary treatment plan: Implant into positions No.7 to 10, and attachment of connected metal bonded crown.

On October 22<sup>nd</sup> 2004 implants of sizes 4MM and 5SS were inserted into the No. 29 and 31 positions, respectively, followed by the bridge placement on the January 29<sup>th</sup> 2005 to establish occlusion of the left molars (Image-3,-4). On March 11<sup>th</sup> 2005, 3ML, 3MM, 3MM, 3ML, were inserted into the positions No. 7 to 10, respectively (Image-5-a,b, -6). Those that gave rise to a narrow occlusal clearing were milled down prior to the impression taking for the connected crown. On the next day, after the antiseptic wash (Image-7), the connected temporal crown was provisionally attached with Neodyne (Zinc oxide-eugenol cement), after the surface of the abutment was matted for finish (Image-8).

The suture was removed a week later, and after 2 to 3 days, tooth brushing was initiated with a soft brush specifically designed for postoperative use, in a stoking manner. This then progressed to the level of normal tooth brushing in a period of three weeks. A through tooth brushing was conducted with a normal type of tooth brush in the following month.

On May 27<sup>th</sup> of the same year, the temporary crown was removed (Image-9,-10) and the impression was taken for the fabrication of connected crown. As mentioned in the chapter of a devised plan for aesthetic finish, first, it was cast to the point below the gingival margin, in a similar manner to the impression

taking for natural teeth. It should be noted here that the abutment is positioned lower than that of the natural tooth therefore there is no need for the formation of heavy chamfer or shoulders to form a boundary between the abutment and the gingival epithelium. On 10<sup>th</sup> June, the connected metal-bonded crown was placed (Image-11-a,b,c). Due to the fragile nature of 3 mm AQB implant, as it carried a risk of fracturing, the silicon mold was taken directly to the technical workshop for filling with epoxy-resin to fabricate a working model (Image- 12-1,b,c). A general cause for concern on the technical aspects is that in the typical removable separated die-type working model, fixed with dowel pin, the prosthesis cannot completely sink in due to a slight freedom in movement of the dowel-pin. For this reason, it was essential to ask for a removable non-separable-dye-type working model.

At the time of checkup on the November 15<sup>th</sup> of the same year, the absence of any abnormal symptoms was confirmed with the dental X-ray radiography and with gentle probing 8 months after the implant installation, and 5 months after the prosthesis placement. The subsequent follow up a year and a month later, on April 19<sup>th</sup> 2006, since implantation (Image-16,-17), or two years on, on the March 26<sup>th</sup> 2007 (Image-18, 19) both confirmed its satisfactory progress.

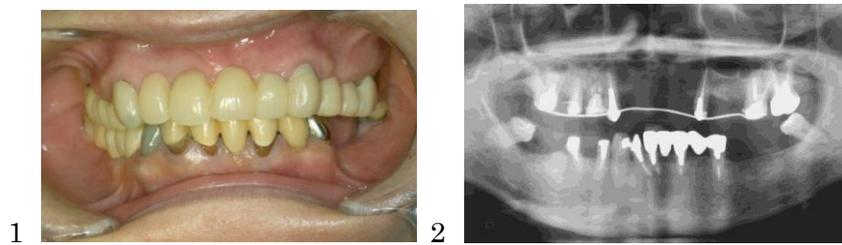


Image-1, -2: Panoramic radiograph at the time of first medical examination (09.18.2004)

A temporary crown that is close to a full bridge has been placed on the maxilla. A bridge that is anchoring only on natural teeth carries an extremely high risk, therefore, there was a request to place implant prosthesis to the positions of No. 7 to 10 and No. 29 to 30.

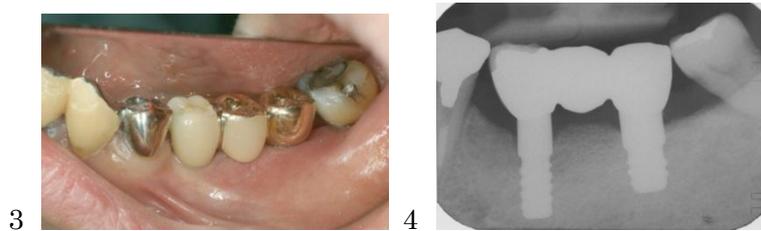


Image-3,-4: 4MM and 5SS were installed (10.22.2004) followed by bridge placement (01.29.2005). Image of the oral cavity, and a radiograph shown at the time of gaining occlusal support on the left mandible.

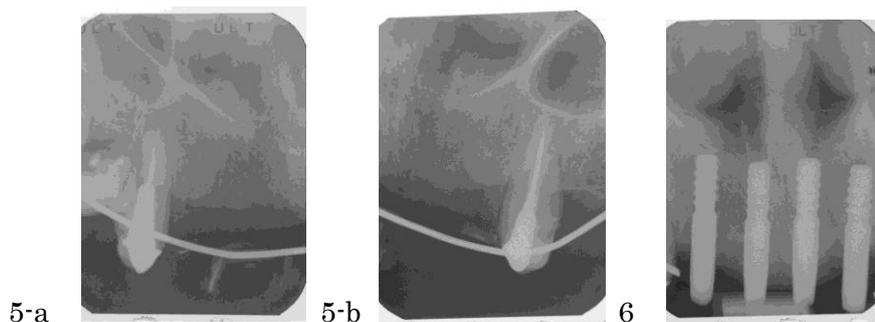


Image-5-a,b: Dental radiograph taken right before excision of the pontic from the temporal bridge (03.11.2005).

Image-6: Dental radiograph right after the installation of the implants, 3ML, 3MM, 3MM, 3ML to the No.

7 to 10, having excised pontic of the temporal bridge.

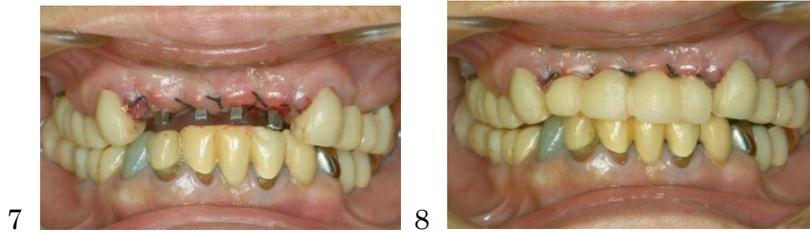


Image-7: Image of the oral cavity at the time of antiseptic wash, the next day (03.12.2005). To secure sufficient amount of occlusal clearance, some parts were milled down, for provisional attachment of the connected temporal crown which had been matted with diamond point. Neodyne was used as the adhesive.

Image-8: Image of the oral cavity at the time of attachment of connected temporal crown.



Image-9,-10: Image of the oral cavity, before and after the removal of temporal crown. The connected temporal crown was removed 2.5 months after the installation (05.27.2005). The impression was taken for the connective crown.



Image-11-a,b,c: Image before the placement of chrome plated connective crown (06.10.2005). As the implant of 3 mm diameter is very narrow, it does not have much lenience for various abutment orientations. Therefore it is necessary to prioritize its parallelism at the time of installation.



Image-12-a,b,c: The superstructure that was removable, non-separating die type was fabricated with epoxy resin. To achieve a good emergence profile, it is designed so that the crown emerges from directly off the margin, and also taking into account of the need for the brush tips to reach the peri-implant pockets to maintain a sufficient level of hygiene.



Image-13-a,b: Image of oral cavity interior at the placement of connective crown.

Image-14: Dental radiograph at the placement of the connected crown. At the placement of the crown, occasionally, gingivae are known to become temporary ischemic due to exclusion with pressure application, but in general, the peri-mucosal membranes adapt to the change in crown placement, and can resume the blood circulation in 15 to 20 minutes.



Image-15-a,b: Images of the oral cavity from the front and at an angle, eight months from the time of implantation, and five months from prosthesis placement (11.15.2005).



Image-16,-17: Dental radiographs of the oral cavity after a year and a month since implantation (04.19.2006).



Image-18,-19: Dental radiograph of the oral cavity, two years after the implantation (03.26.2007), showed satisfactory progress.

## 8. A case where a firm occlusal support was able to be achieved by “delayed-loading”

Director of Kinebuchi Dental Clinic

Takao Kinebuchi

There are instances where stabilization of dentures is made difficult for those with occlusal contact solely at the anterior teeth, or those that reach B-4 in Eichner’s classification, or worsened with other factors such as attrition or periodontal diseases even if they are not crossbite occlusion. In such cases, gaining occlusal support is of prime importance which is usually possible with implantation, but there are always the exceptions.

Here, a case is reported where implantation was not possible since the bones surrounding the extraction socket had not been set. Delayed loading method (refer to Page 68, Part 2 Chapter 4 ‘Treatment plan’) was chosen for this example instead, and rapid occlusal recovery could be achieved.

Patient: 61 year-old male

First admission: May 2005

Chief complaint: Displaced occlusion, requested to correct it.

Treatment plan: The implantation in the order, No. 28 to 30, followed by No. 10 to 13 is the most desirable to establish the occlusion on the molars first, however, as the No. 11 and No. 28 tooth were only recently extracted, these sites had to be left to heal. First, the implants were installed and prosthesis placed primarily to No. 29 and 30. The prosthesis placement was delayed to the implant at No. 28. Meanwhile, a partial plate denture was constructed for No. 10 to 15 in order to temporarily set the occlusion.

The No. 11 and No. 28 teeth had been extracted six months ago (Image-1,-2,-3,-4). First, the denture for the placement at the positions No. 10 to 15 was fabricated, and was placed on June 10<sup>th</sup> with slight occlusal correction.

The 5MS implants were installed to the positions No. 29 and 30 (Image-5). Image-6 shows the state of the oral cavity after two months. On October 17<sup>th</sup>, gold-alloy crown was fitted onto the No. 29 and 30 implants (Image-7,-8), which aided in establishing the left molar occlusal support. The occlusion was corrected by modifying its vertical distances, and the anterior teeth of the maxilla were corrected to the height that was elevated with composite resin fillings. Implants of sizes, 5SS, 4MM, 4MM were implanted into the positions No. 11 to 13 (Image-9), the implant to the positions No. 12 and 13 were installed after the socket-lift procedure. The denture was then cut into an arch shape.

On December 26<sup>th</sup>, a gold alloy crown was fitted onto No. 13, and connected metal bonded crown was placed onto No. 11 and 12 (Image-10,-11). The No.10 structure has been upheld by the artificial tooth of the plated denture. Implant, 5MM was planted into position No. 28 on March 3<sup>rd</sup> in the following year, with a delayed (Image-12). Image-13 shows the state of the oral cavity, two and a half months after the implantation. On May 30<sup>th</sup>, mesio-pontic attached metal bonded crown was fitted onto the implant at No. 28 position (Image-14,-15). On July 19<sup>th</sup>, 4LM implant was implanted into the position No. 10, with the delayed implantation procedure (Image-16,-17,-18). As an AQB metal bonded crown had already been placed on the No. 11, Y-shape incision was made instead of alveolar crest incision to prevent gingival

structures on both front and back of the alveolar crest from being affected. As a matter of fact, the author has been applying this Y-shaped incision not only to the parts that are affected by the aesthetic prosthesis, but as a general incision making method for 6 to 7 years.

The metal bonded crown was placed to the No. 10, on October 16<sup>th</sup> (Image-19, 20, 21, 22). The unstable occlusal contact just on the frontal teeth section, was corrected early on in the procedure by primarily restoring the occlusal support at the No. 11 to 13 and No. 29 to 30. As the bone loss after the tooth extraction of No. 10 and No. 28 was large, the implants were installed using the treatment method for the delayed installation once the bone of the extracted socket had set sufficiently. This achieved a strong occlusal support in the molar sections of the jaw.

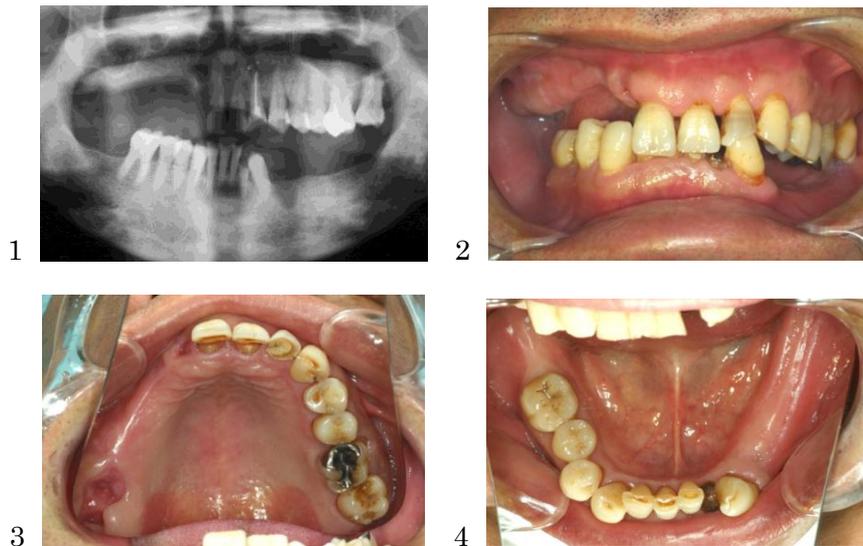


Image-1, -2, -3, -4: Panoramic radiograph at the time of primary medical examination and images of in the oral cavity. The No. 10 and No.28 teeth were extracted 6 months ago in the previous clinic that the patient was referred from (04.19.2005).

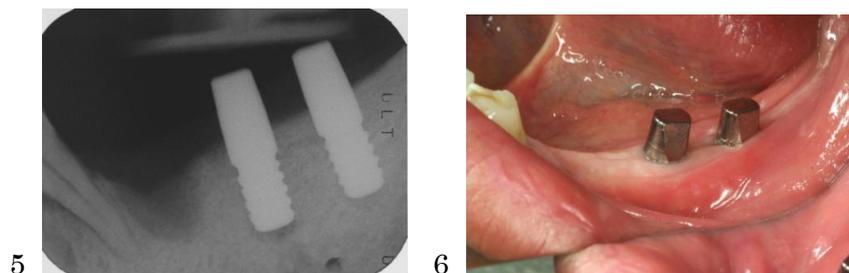


Image-5: Dental radiograph appearance at the time when placing 5MS implants to the No. 29 and 30 positions (05.25.2005). A partial denture was fitted onto the No. 10 to 15 implants after sufficient elevation of the bone.

Image-6: The state of the oral cavity, two weeks after the implantation to positions No. 29 and 30 (07.27.2005).



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Image-7, -8: Dental and Panoramic radiograph appearances after the placement of gold-alloy crown to the positions No. 29 and 30. The left molar occlusal support was able to be achieved. Simultaneously, the elevation of occlusion was conducted by applying composite resin fillings to the frontal teeth of the maxilla to adjust it to the height of occlusion (08.17.2005).

Image-9: Dental radiograph after implantation of types 5SS, 4MM, 4MM to positions No. 11, 12 and 13.



Image-10, -11: Image of the oral cavity, after the placement of gold-alloy crown to the position No. 14, and connected metal bonded crown to No. 12 and 13. The No.2 structure is secured with the artificial tooth of the plated partial denture (12.26.2005).

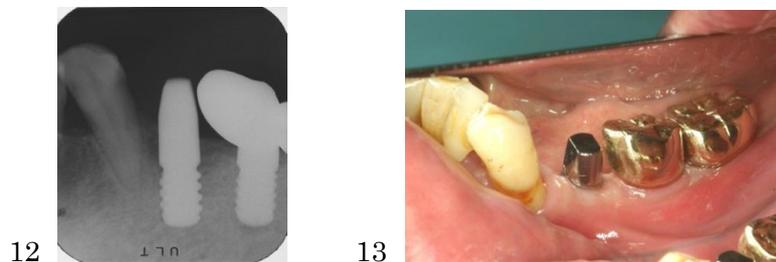


Image-12: Dental radiograph after the 5MM implant was installed with a delay, onto position No. 28.

Image-13: Image inside the oral cavity after two and a half months since installation at position No.28.



Image-14, -15: Image of the oral cavity, and dental radiograph featuring the placement of metal-bonded crown attached with pontic on the mesial side, to No.28 position (05.30.2005). The neighboring tooth on the mesial side of the implant was slanted in the mesial direction. If the crown is installed that is in contact with the neighboring tooth, it would result in a crown that has an unnatural over contouring profile that is difficult to maintain a sufficient level of hygiene. This issue was solved by the placement of the crown with pontic. Advice to the patient to not only brush the area, but also to thread the dental floss through the pontic, to clean the pocket that is present close to the tooth root, in the area around the implant.



Image -16, -17,-18: Image and dental radiograph of the oral cavity at the time of delayed installation of 4LM implant to the position No.10. As AQB metal-bonded crown had been placed onto position No.11, the mucosal membrane on the front and back of the alveolar crest (gingivae) were incised in a Y-shape to preserve the gingival structure (07.19.2006).



Image-19,-20,-21,-22: Dental radiograph and Image of the oral cavity at the time of metal bonded crown placement to the No.10 position. Delayed implantation was conducted to allow the extraction pocket for it to be set, and resulted in establishing strong occlusal support (10.16.2006).

9. A case study where the implant body has been installed into the tooth extracted pockets to retain occlusal stability.

Director of Matsumoto Dental Clinic  
Yasugi Matsumoto

Patient: 36 year-old female  
First admission: February 2001  
Chief complaint: Inability to chew

This patient was referred from another clinic having extracted No. 29 to 31 teeth in preparation for implant treatment.

Occlusal stability was achieved after three AQB one-piece implants were installed and prosthesis placed. The patient lost molars on the right of the maxilla, two years later.

Facilitated with the socket-lift technique, three implant bodies were installed and prosthesis placed, occlusal stability was able to be established.

Loss of No. 6 and No. 18 teeth followed 5 years later. Two implant bodies were installed into No. 18 extraction socket, and another implant to No. 6.

Patient's request to retain the occlusal stability of the whole jaw was able to be met by inserting the implant bodies to replace the lost teeth. Thus led to patient satisfaction, and have been able to retain a high level of QOL.

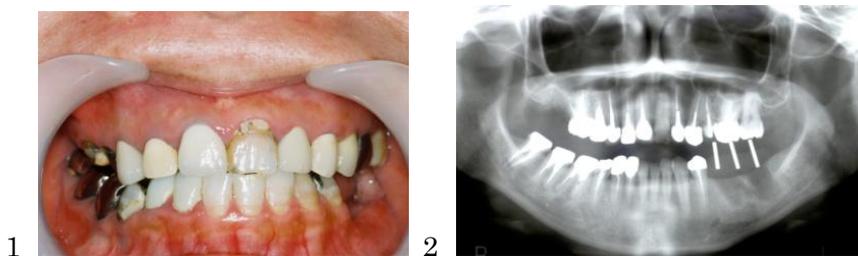


Image-1: Image of the oral cavity at the time of primary medical examination.

Image-2: Panoramic radiograph at the time of primary medical examination.

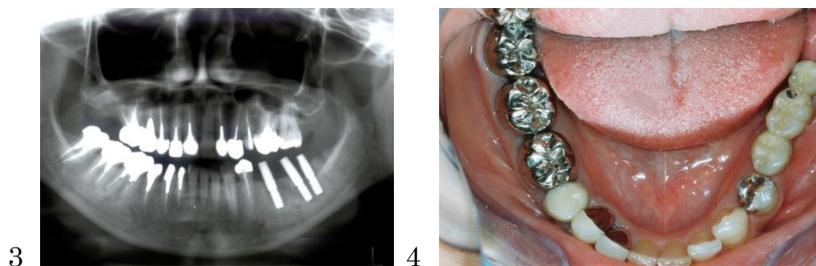


Image-3: Panoramic radiograph after the implant body installation

Image-4: Image of the oral cavity after the placement of superstructure.



Image-5: Panoramic radiograph after the placement of superstructure.

Image-6: Image of the oral cavity before implant to the right side of the jaw.

Image-7: Image of the right maxilla during surgery.



Image-8: Panoramic radiograph after implantation.

Image-9: Image of the oral cavity after the placement of the superstructure.

Image-10: Image of the oral cavity after the placement of the superstructure.



Image-11: Panoramic radiograph after the placement of the superstructure.

Image-12: Image of the oral cavity before implanting into No. 18 and No. 6 positions.

Image-13: Panoramic radiograph before implanting into No. 18 and No. 6 positions.



Image-14: Panoramic radiograph after implanting into No. 18 and No. 6 positions.

Image-15: Image of the oral cavity after the placement of the superstructure.

Image-16: Panoramic radiograph after the placement of the superstructure.