Overcome the Limitation in Surface Processing of Implant! UV Irradiation

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III. Utilization of UV irradiated implant in difficult case

Clinical usefulness of UV irradiated implant was examined in the previous issues. It was confirmed that the extent of short-term osseointegration was more outstanding for UV irradiated implant on the basis of the changes in the ISQ value after having embedded UV irradiated implant and SLA surface processed implant in left to right symmetry in the same patient. In this issue, I will examine whether UV irradiated implant can be applied as an efficient alternative to existing SLA implant on the basis of the results of cases of embedding UV irradiated implant in various difficult cases on the grounds of the theoretical and experimental results dealt with in the previous issues.

III. Utilization of UV irradiated implant in difficult case

[Clinical Case 1]

A 61-year old woman with only high blood pressure (being controlled with drug with good status of control) as the only medical underlying illness has been using full denture for the maxillary teeth. After having experienced failure in the maxillary overdenture implant at a private dental clinic about 1 year ago, she was given the opinion by 3 other dental clinics thereafter. She then visited our hospital as the last resort for assessment of her conditions for application of implants.

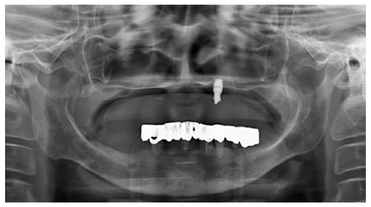

Fig. 1 Panoramic view at the time of initial examination

#23 implant presumed to have been embedded 1 year ago under full edentulous maxillary conditions was in floating state while the 4 remaining mandibular teeth (#31, 33, 34 and 43) were connected with long bridge and were floating as well (Fig. 1).

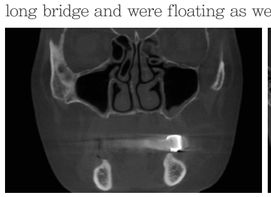

Fig.2-1 CT coronal view

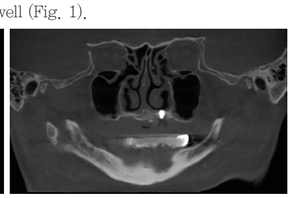

Fig.2-2 CT panoramic view

Maxillary alveolar ridge under the CT coronal view was completely absorbed in the state of connection without boundary with maxillary palate. The residual bone between the fundus of maxillary sinus and the alveolar ridge was presumed to be about 1mm (Fig. 201). Moreover, the alveolar ridge including basal aspect of nasal cavity was measured in the range of 1~2mm at the time of evaluation of alveolar ridge in canine tooth and premoral tooth under the CT panoramic view (Fig. 2-2).

Treatment plan included removal of the exiting #23 implant, extraction of all residual mandibular teeth, augmentation of the nasal floor, fenestration of lateral wall of maxillary cavity and bone graft accompanied with augmentation first. It was then followed by full fixed type full mouth rehabilitation and establishment of Baroverdenture by embedding 4 implants in the mandible. 6 weeks after the extraction of residual maxillomandibular teeth, augmentation of nasal floor and bone graft accompanying fenestration of lateral wall of maxillary cavity were executed first, which was then followed by embedding implant for overdenture for the mandible (Fig. 3-1 ~ 3-5).

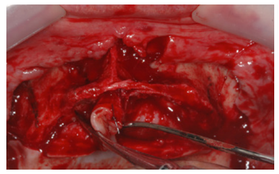

Fig. 3-1 Immediately after incision and augmentation of mucous membrane of nasal floor

Fig. 3-2 State of preparation of autologous tooth graft material and BMP

As the bone graft material, the autologous tooth bone graft material obtained by extracting mandibular tooth was mixed with heterogeneous graft material, OCS-H bone, which was then hydrated with solution prepared by mixing 0.25mg of BMP with lidocaine. This was used by coagulation by using Tisseel. The area of surgery was covered with shielding membrane before being sutured.

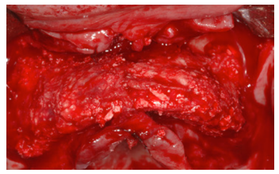

Fig. 3-3 Immediately following completion of bone graft

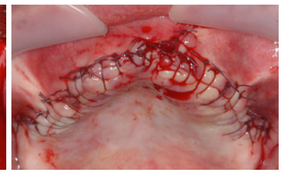

Fig. 3-4 Completion of suture after having applied shielding membrane

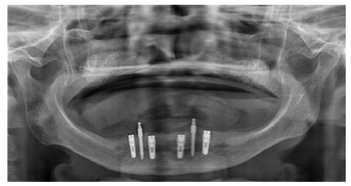

Fig. 3-5 Panoramic view after the procedure

There was no peculiar complication other than edema and pain after the surgery and the area of the bone graft at the nasal floor also displayed findings of normal healing. On the 7th month of the surgery, plans for embedding of maxillary implant was established with UV irradiated implant after having evaluated the conditions of the bones by manufacturing surgical stent. In the case of full maxillary edentulous condition, navigation stent was produced for application after having secured bone anchor on the palatal and buccal aspects. In my case, I used general surgical stent produced since there were cases in which unexpected error occurred at the time of embedding due to failure to obtain definitive support by bone anchor. Fair state of osteogenesis was confirmed under CT after the procedure (Fig. 4-1 ~ 4-3).

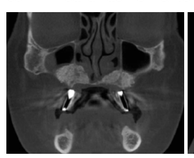

Fig.4-1 CT coronal view

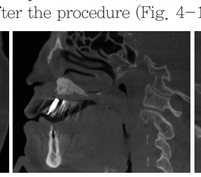

Fig.4-2 CT cephalic view

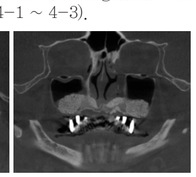

Fig.4-3 CT panoramic view after bone graft

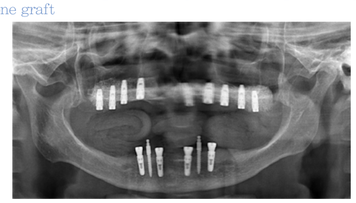

Fig. 5 Panoramic view after having embedded implant

치식 No.	Imp. Size	Bone Density	식립 Torque	ISQ 1ST OP	ISQ 4Week	ISQ 8Week
#16	DIO UV ø4.5×10mm	D3	31N	66	75	81
#15	DIO UV ø4.0×11.5mm	D3	32N	68	75	80
#14	DIO UV ø4.0×11.5mm	D3	35N	70	77	83
#13	DIO UV ø4.0×10mm	D3	33N	68	75	81
#21	DIO UV ø3.3×11.5mm	D3	28N	65	72	78
#23	DIO UV ø4.0×10mm	D3	33N	67	74	80
#24	DIO UV ø4.0×10mm	D3	32N	67	75	82
#25	DIO UV ø4.0×11.5mm	D3	33N	68	74	80
#26	DIO UV ø4.5×10mm	D3	30N	66	72	79

Fig. 6 Panoramic view after the 2nd surgery

After having executed delayed bone graft for reconstruction of fixation type implant in the case that displayed prolonged period of use of full denture for more than 20 years and severe absorption of alveolar ridge, it is presumed that the 1st ossification progressed after 6 or 7 months. Under the situation in which the stability of the area of bone graft cannot be 100% guaranteed, it is deemed that the clinical results would be fair if quick osseointegration can be achieved in early stage through the use of UV irradiated implant.

[Clinical Case 2]

A 69-year old woman with past history of stent surgery due to hyperlipidemia, high blood pressure, osteoporosis and myocardial infarction, and history of having undergone radiation therapy and chemical drug therapy on the lower portion of cervical region and thorax due to breast cancer visited our hospital for the purpose of the prosthetic restoration by using implant for 4 maxillary incisors. Although she was undergoing regular medical examination with determination of full remission of breast cancer as the result of collaborated examination with relevant medical department, she was continuing to take statin to treat her hyperlipidemia and was asked to stop taking this drug. Due to her osteoporosis, it was decided that surgical procedure will be executed after having waited 4 months of drug holidays and cessation of administration of injection drug after having executed total of 5 Bisphosphonate injection therapies at the interval of 3 months. She was allowed to continue to take aspirin aimed at preventing formation of blood clots in the area of stent surgery. Although the patient was under systemically frail condition, she wanted to have aesthetic restoration of the incisors simultaneously.

At the time of reevaluation at the 5th month after the initial examination, there was display of intermediate level of absorption of alveolar bone for the 4 maxillary incisors. Moreover, the conditions of the alveolar bones at #12 and #22 were found to be fair in comparison to those of #11 and #21. Accordingly, immediate implant embedding was planned for the #12 and #22 after extraction of all 4 incisors (Fig. 1-1 ~ 1-3).

Fig. 1-1 Panoramic view at the time of initial examination

Fig. 1-2 & 1-3 Photograph of oral cavity at the time of initial examination

Fig. 2-1 Embedding DIO-UV implant
Fig. 2-2 Photograph of oral cavity after the procedure (occlusal surface)
Fig. 2-3 Photograph of oral cavity after the procedure (frontal view)

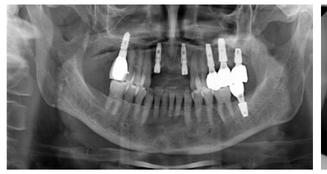

Fig. 2-4 Panoramic view after the procedure

Fig. 2-5 Photograph of cross-section of dental root after the procedure

There was no occurrence of complication other than customary edema and pain after the surgery, and confirmation of the photograph of the cross-section of dental root, ISQ measurement and clinical test were executed at 4 and 8 weeks after the surgery (Fig. 3-1)

치식 No.	Imp. Size	Bone Density	식립 Torque	ISQ 1ST OP	ISQ 4Week	ISQ 8Week
#12	DIO UV ø4.0×11.5mm	D2~D3	35N	70	78	82
#22	DIO UV ø4.0×11.5mm	D2~D3	40N	72	76	83

At the time of evaluation on the 8th wee, ISQ measured was higher than 80. As such, production of prosthetics was executed after having replaced the healing abutment with ScanBody (Fig. 3-2 and 3-3).

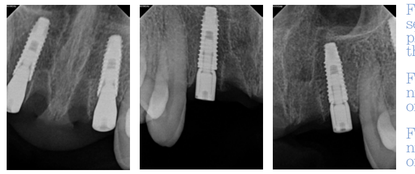

Fig. 3-1 Cross-sectional photograph of dental root at the 4th week

Fig. 3-2 Attachment of #12 ScanBody on the 8th week

Fig. 3-3 Attachment of #22 ScanBody on the 8th week

At the time of F/U after having attached the final prosthetics on the 9th week of the procedure, there was finding of good osseointegration without any particular clinical or radiological findings. Patient was also satisfied with the appearance of gum and prosthetics, etc. (Fig. 4-1 ~ 4-3). Although the margin on the lingual side of the #12 and #22 abutments were exposed slightly due to lack of stability of gum due to the attachment of final prosthetics on the 9th week, it was decided to make determination on re-production of final prosthetics if the gum tissues are stably maintained at the time of examination 6 months thereafter (Fig. 4-4 ~ 4-5).

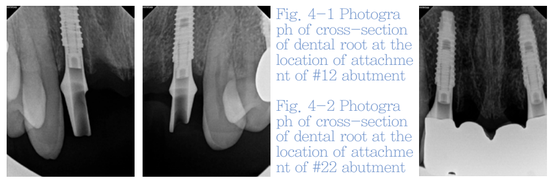

Fig. 4-1 Photograph of cross-section of dental root at the location of attachment of #12 abutment

Fig. 4-2 Photograph of cross-section of dental root at the location of attachment of #22 abutment

Fig. 4-3 Fig. 4-1 Photograph of cross-section of dental root after the attachment of prosthetics

Fig. 4-4 Photograph of attachment of final prosthetics (frontal view)
Fig. 4-5 Photograph of attachment of final prosthetics (occlusal surface)

In the event of suffering multiple numbers of systemic illnesses including metabolic disorders, cardiac disorders, osteoporosis and hyperlipidemia, etc., implant therapy needs to be conducted by temporarily stopping the administration of relevant drugs through collaboration with other medical departments. In such case, there is risk of manifestation of systemic medical complications due to cessation of drug administration if the period of implant treatment is prolonged. Therefore, it is necessary to achieve the osseointegration between implant and alveolar bone in as short period of time as possible. In the cases of such patients, UV irradiated implant could be a good clinical alternative.