

SQUVA

CLINICAL REPORT

Vol. 1

SQ UV Activator

Change to Hydrophilic Surface

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Introduction

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The most important factor for osseointegration of implants is the correct interface between macro- and micro-design, which varies depending on the classification of implants into three types based on external bone level, internal tissue level, and internal bone level. Complete understanding of the nature of implant interface may not be possible; however, it would be correct to assume that the degree of osseointegration would depend on the overall shape and macro- and micro-design of the implant.

The surface of the first-generation implant is machined. The surface of the second-generation implant is roughened through sandblasting and etching. Third-generation implants have a chemical application on the surface, and fourth-generation implant surfaces have biomimetic coating on top. I have doubts regarding whether generational “change” can be considered true “development” based on accumulated clinical data. However, one fact commonly accepted by researchers is that the surface treatment of third-generation implants significantly increases early bone response than the surface treatment of second-generation implants. This suggests that a hydrophilic surface has a higher bone-implant contact than a hydrophobic surface.

The implant surface has an approximately 50-nm-thick TiO2 oxide film. With time, hydrocarbons in the air are adsorbed on to the oxide film, leading to a biologic aging process that prevents osseointegration. The surface of implant begins to change from hydrophilic to hydrophobic after the manufacturing process. Efforts have been made to reverse this biological aging process and to induce the original hydrophilic state through UV irradiation. In line with this trend, in the present report, I will share my experience with “SQUVA” by DENTIS CO.,Ltd.

SQUVA has been applied in six cases, and the surgical video is available for five cases. Through the QR code, you can observe the entire surgical process. To increase the reliability of the clinical data in this report, a split-mouth design was applied to compare the left and right sides in one patient or anterior and posterior implants on the ipsilateral side in one patient.

Panoramic X-ray, clinical image, CBCT, and ISQ values were used to assess the effects of UV irradiation on reversing the biological aging process of implants. Implants that have not been treated with SQUVA have been indicated in yellow and those treated with SQUVA in blue.

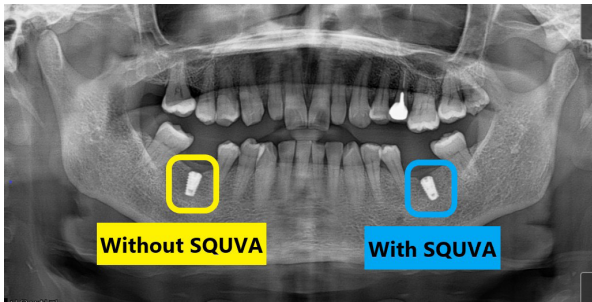
¹YH Kim et al JOMI 2003
²Niklaus P. Lang et al COIR 22,2011 / 349-356

1. SQ Implant placement on Healed ridge

The left and right sides of the healed ridge with nearly identical bone density were compared. After applying a similar drilling sequence on both sides, SQ implants were placed on the healed ridge on both sides. Both #36 and #46 implants were placed on completely healed ridges with extraction several years ago. Two SQ implants were placed bilaterally.



[Fig. 1] Pre-operative panoramic radiograph



[Fig. 2] Post-implant placement panoramic radiograph



[Fig. 3] Post-upper prosthesis installation panoramic radiograph



[Fig. 4] #36 ISQ measurement



[Fig. 5] #46 ISQ measurement

	Day of operation	Six weeks after operation	Twelve weeks after operation
● With SQUVA (#36)	67	75	82
● Without SQUVA (#46)	81	82	85

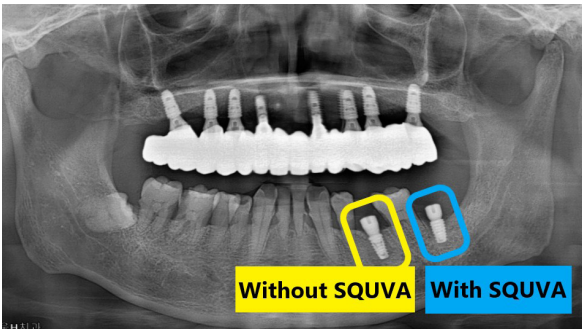
The ISQ value was measured three times: immediately after operation, six weeks after operation, and 12 weeks after operation. The ISQ value was approximately 15% higher in implants with SQUVA than in implants without SQUVA up until six weeks. The ISQ value was stable in case of both implants with and without SQUVA when the upper prosthesis was installed.

2. Comparison of implants with and without SQUVA

An incompletely healed ridge was drilled on the anterior and posterior regions on the ipsilateral side. Subsequently, the SQ implant was placed, and minor GBR without membrane was performed.



[Fig. 6] Panoramic radiograph four months after extraction of #35 and #37



[Fig. 7] Post-implant placement panoramic radiograph



[Fig. 8] Post-upper prosthesis installation panoramic radiograph



[Fig. 9] Intra-oral image post-upper prosthesis installation

	Day of operation	Three months after operation
● With SQUVA (#37)	57	85
● Without SQUVA (#35)	78	84

In this patient, #34 and #36 were extracted three months after operation in #35 and #37 due to existing periodontitis. A prosthesis was constructed using a four-unit bridge supported by two fixtures without additional implant placement. Four months after extraction, implants were placed on the alveolar bone. Both implants had an insertion torque of 30 N, but had different ISQ values. The implant treated with SQUVA had a 30% increase in the ISQ value by three months than the implant untreated with SQUVA.



Watch the Surgical Video

3. Immediate placement with SQUVA

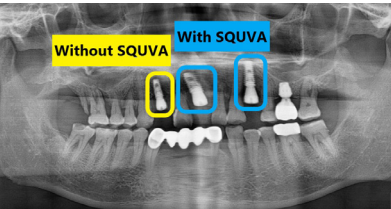
After bilateral extraction of teeth in the maxillary anterior region, an identical drilling sequence was applied on both the and right sides for immediate placement with small GBR after extraction of premolars. Cases with SQ implants were compared.



[Fig. 10] Pre-operative panoramic radiograph



[Fig. 11] Pre-operative intra-oral image



[Fig. 12] Post-implant placement panoramic radiograph



[Fig. 13] Post-operative intra-oral image



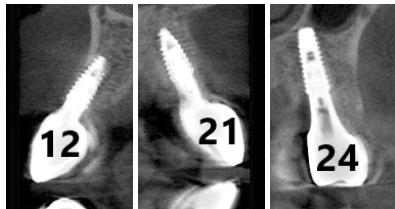
[Fig. 14] Post-abutment fastening intra-oral image



[Fig. 15] Post-upper prosthesis installation panoramic radiograph



[Fig. 16] Post-upper prosthesis installation intra-oral image



[Fig. 17] Post-upper prosthesis installation CBCT image

	Day of operation	Three months after operation
● With SQUVA (#21)	68 / 69	82 / 83
● With SQUVA (#24)	68	85
● Without SQUVA (#12)	73 / 76	81 / 79

The ISQ value was measured three months after immediate placement following extraction of the maxillary anterior teeth. The implant treated with SQUVA had appropriately 5% increase in the ISQ value than the implant untreated with SQUVA. The bone density of the maxillary anterior region is not low, which may have led to non-significant changes in the ISQ value. Premolar implant #24 treated with SQUVA showed a slightly higher increase of 8% in the ISQ value.



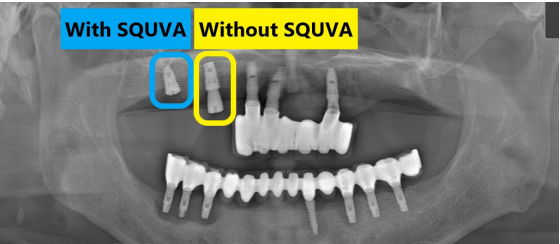
Watch the Surgical Video

4. Sinus grafting with simultaneous placement with SQUVA bleeding control

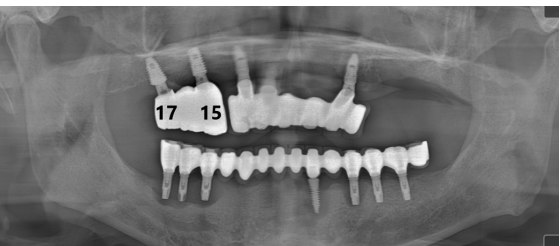
After the unilateral lateral approach in the maxillary sinus with a residual bone height of 3-5 mm, the same drilling method and bone graft material were applied in both the anterior and posterior regions. Finally, SQ implants were placed.



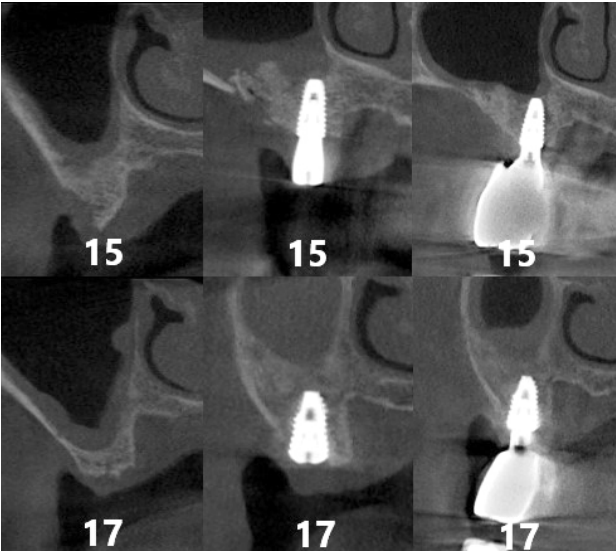
[Fig. 18] Pre-operative panoramic radiograph



[Fig. 19] Post-implant placement panoramic radiograph



[Fig. 20] Post-upper prosthesis installation panoramic radiograph



[Fig. 21] Pre-implementation, post-implementation, and post-prosthesis installation CBCT images

	Day of operation	Five months after operation
● With SQUVA (#17)	64 / 59	85 / 81
● Without SQUVA (#15)	85 / 84	85 / 90

In this patient, implants #17 and #15 did not have similar conditions. Implant #17 treated with SQUVA had a residual bone height of approximately 2-3 mm. In contrast, implant #15 untreated with SQUVA had a residual bone height of 4-5 mm. However, the same bone graft materials and drilling sequence were used to place the two implants in the same maxillary sinus. Therefore, the two SQ implants were compared in this condition. Although the residual bone height was different between the two implants, implant #17 treated with SQUVA had a 30% increase in the ISQ value at 5 months after operation than the implant untreated with SQUVA.



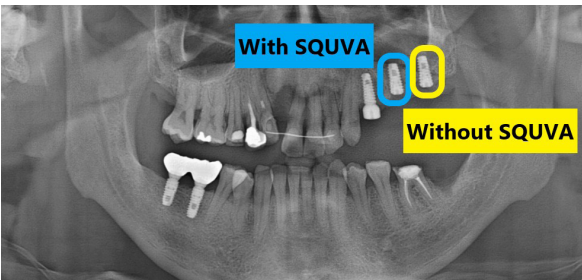
Watch the Surgical Video

5. Sinus grafting with simultaneous placement by SQUVA

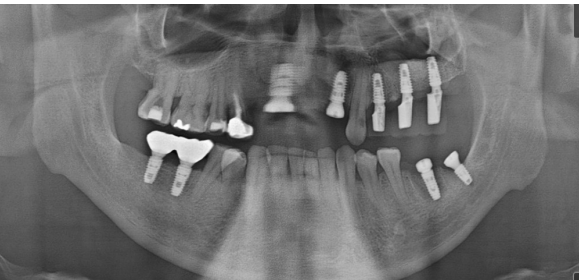
After the unilateral lateral approach in the maxillary sinus with a residual bone height of 1-2 mm, both the anterior and posterior regions were treated with the same drilling sequence, and the same bone graft materials were used for SQ implant placement.



[Fig. 22] Pre-operative panoramic radiograph



[Fig. 23] Post-operative panoramic radiograph



[Fig. 24] Post-progressive Loading panoramic radiograph



[Fig. 25] Post-upper prosthesis installation panoramic radiograph

	Day of operation	Five months after operation (Progressive loading)	Seven months after operation (Installation of final prosthesis)
● With SQUVA (#26)	75	84	89
● Without SQUVA (#27)	63	69	79

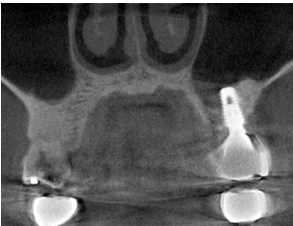
Progressive loading was applied for eight weeks at five months after operation due to a low residual bone height of 1-2 mm. After the ISQ value was stabilized, the final prosthesis was installed. In patients with low residual bone height, implant stability is mostly obtained from the implanted bone. In this case, the ISQ value showed stable increase in case of all implants without significant difference.



[Fig. 26] Pre-operative CBCT image



[Fig. 27] Post-implant placement CBCT image



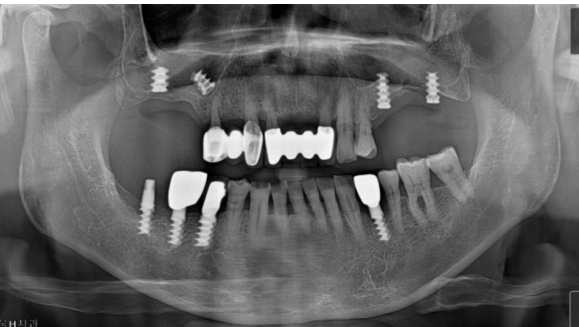
[Fig. 28] Post-upper prosthesis installation CBCT image



Watch the Surgical Video

6. Delayed placement on the sinus grafted area with SQUVA

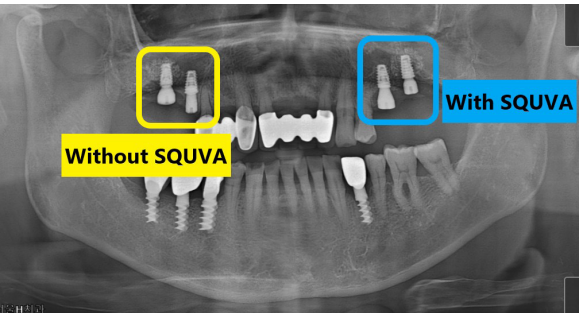
The failed implant and fungal-infected areas were removed. Using the same bone graft material, the maxillary sinus bone was grafted. After six months, the same drilling sequence was applied in the left and right sides for SQ implant placement.



[Fig. 29] Pre-operative panoramic radiograph



[Fig. 30] Post-fixture removal panoramic radiograph



[Fig. 31] Post-implant placement panoramic radiograph



[Fig. 32] Post-upper prosthesis installation panoramic radiograph

	Day of operation	Four months after operation
● With SQUVA (#25)	83	90
● With SQUVA (#26)	75	87
● Without SQUVA (#16)	79	85
● Without SQUVA (#17)	78	83

In these cases where the bone formed first in the maxillary sinus and delayed placement was performed, there were no significant differences between the sites of implants treated and untreated with SQUVA. However, as shown in the surgical videos, the left maxilla that underwent SQUVA treatment showed a lower bone grafting rate than the right maxilla. Therefore, considering that a core lifting technique using a universal kit was applied, the ISQ value increased more in the left maxilla than in the right maxilla.



Watch the Surgical Video

Conclusion

To secure the objectivity of the data, one dentist conducted all the procedures (from the surgical procedure to prosthesis installation). Additionally, the same drilling sequence was applied on the left and right sides and anterior and posterior regions of the split mouth design using the SQ implant surgical kit, and the same bone graft materials were used.

The purpose of the UV irradiation method, also known as photofunctionalization, is to increase the bioactivity of the implant surface. Although the effects are still controversial (clinical significance is observed without statistical significance), one noteworthy effect of UV irradiation is improved early bone response of the implant surface. Herein, we used SQUVA by DENTIS CO.,Ltd. for six different cases.

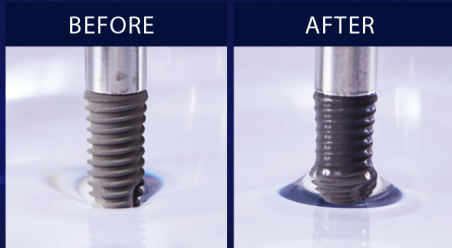
However, further studies must be conducted in the future. There may be differences between the results of animal experiments and clinical trials in patients. In the future, follow-up studies must actively assess the optimal duration of UV irradiation and how the converted hydrophilic surface affects the early bone response, as well as the final bone response. In particular, more case analysis studies must be performed to investigate the effect of UV irradiation on resistance to peri-implantitis, an increasing concern in case of implantation.

SQUVA
SQ UV Activator

ENHANCE YOUR IMPLANT SURFACE
10 SECONDS IS ALL IT TAKES!



The Benefits of UV Irradiation!



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