

## Prosthetic rehabilitation in the Posterior Mandible with Tissue Level Implant: A Case Report

Lamichhane K<sup>1</sup>, Pradhan S<sup>2</sup>, Gorkhali R<sup>3</sup>, Shrestha B<sup>4</sup>

<sup>1</sup>Lecturer, Department of Periodontics, T.U. Dental Teaching Hospital, IOM, Maharajgunj Medical Campus, Maharajgunj, Kathmandu, Nepal.

<sup>2</sup>Professor, <sup>3</sup>Associate Professor, Department of Dental Surgery, Periodontology and Oral Implantology Unit, National Academy of Medical Sciences, Bir Hospital, Mahabouddha, Kathmandu, Nepal.

<sup>4</sup>Consultant Periodontist, Udayapur District Hospital, Government of Nepal, Gaighat, Udayapur, Nepal.

### ABSTRACT

Implant is becoming the most appropriate option nowadays for replacement of single or multiple missing teeth which offers the predictable long-term results. Continuous innovations in implant design and approaches for placement have been proposed to achieve good osseointegration, esthetics and predictable soft tissue contour. Soft tissue level (STL) implants are placed trans-mucosally with platform away from alveolar bone crest so the microbial deposits in the micro-gap at implant abutment connection has less effect on alveolar bone. This type of implant has a rough surface placed subcrestally to facilitate osseointegration and a polished coronal part to facilitate soft tissue adaptation. This case report highlights about soft tissue level implant, its advantages and clinical success on replacing single missing posterior tooth.

**Key words:** Replacement, Soft tissue level implant, Platform, Micro-gap, Osseointegration, Soft tissue adaptation

### INTRODUCTION

Currently, implant has become the most appropriate alternative to removable dentures and traditional teeth supported fixed dental prostheses. It offers the predictable long-term results for replacement of single or multiple missing teeth. Continuous variations in implant design and modifications have been proposed over the years to achieve good osseointegration and implant success. However, with all such innovations lacking solid evidence, often complicate the decision making for the choice of implant approaches. Presently, the objective

in implant treatment is based not only to achieve good results in bone integration, but also in aesthetics and predictable soft tissue contour.

Bone level (BL) implant is placed at the level of bone crest during the first phase of surgery allowing submerged healing in the period of osseointegration. However, a second surgical procedure is necessary during the prosthetic phase. Two interfaces are created; one between the implant and the abutment and one between the abutment and the prosthesis when the abutment is adopted. These two interfaces may create the micro-gaps between the components and may be prone to bacterial colonization and development of peri-implant tissue inflammation. Recent systematic review by Ceruso et al. highlighted the one-piece implant where only one interface is created with the prosthesis.<sup>1</sup> It has decreased morbidity and shortened the treatment period, with a similar success rate and less marginal bone reaction

*Conflict of Interest: None*

#### **\*Corresponding Author**

Dr. Krishna Lamichhane  
Lecturer, Department of Periodontics, T.U. Dental Teaching Hospital, IOM, Maharajgunj Medical Campus, Maharajgunj, Kathmandu, Nepal.  
E-mail: lmchkp@gmail.com

compared with implants placed at the epicrestal level.<sup>2,3</sup> This type of implant has a rough surface which is placed subcrestally to facilitate osseointegration and a polished coronal part that facilitates the adaptation of soft tissue.

Soft tissue level (STL) implants are typically placed trans-mucosally in a single surgical phase. Implant platform is away from alveolar bone crest so the micro-gap between implant and abutment connection is away from alveolar crest and microbial deposits has less effect on alveolar bone. This type of implant has good results in the medium and long term and allows immediate loading of prosthesis either screw retained or cement retained. STL implant is indicated for the posterior region, while BL implant is indicated for aesthetic requirements especially in the anterior region. This case report highlights about soft tissue level implant, its advantages and clinical success for the rehabilitation of single missing mandibular posterior tooth.

### CLINICAL REPORT

A 21-years old female patient presented to the Department of Periodontics, National Academy of Medical Sciences, with a chief complaint of missing a tooth on lower left back region of jaw for 1 year. Patient opted for fixed dental prosthesis with dental implant. On clinical examination, 36 was missing and edentulous ridge was very narrow buccolingually at the crestal region and 37 was slightly mesially migrated but the available space for implant was adequate. (Fig 1).

### TREATMENT PLAN

Diagnostic impressions of both maxillary and mandibular arches were made with irreversible hydrocolloid. Cast was poured and surgical guide was fabricated. The available bone volume was analyzed in Cone beam computed tomography (CBCT) of edentulous site using

Sirona Galileos implant software. Mesiodistal width was 8.87 mm, buccolingual width was 6.62 mm subcrestally and distance from 2 mm sub-crestal region to inferior alveolar nerve canal was 14 mm. (Fig 2) A 4.1 X 10 mm implant with 1.8 mm smooth per-mucosal extension (Straumann STL) was planned.

### IMPLANT SURGERY

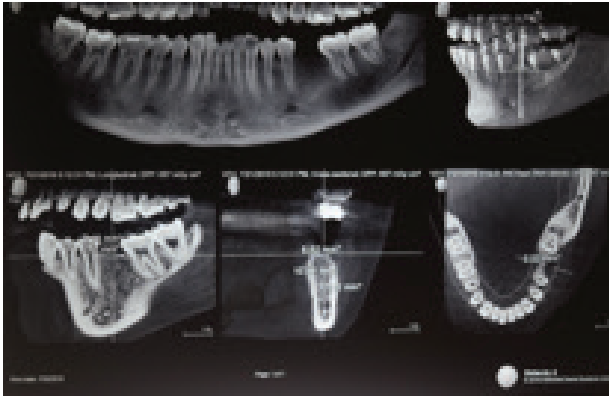
Mid crestal incision was given, full thickness mucoperiosteal flap was raised and osteotomy was prepared (Fig 3). The implant was installed, and the implant platform was at the soft tissue level (Fig 4 and 5). Intraoral periapical radiograph was taken (Fig 6) and buccal and lingual flaps were approximated with suture. (Fig 5). Healing was uneventful and sutures were removed after 1 week.

### IMPLANT PROSTHESIS

Prosthetic phase was planned 3 months after implant surgery. Open tray putty wash impression was made with addition silicone (Fig 7). Laboratory analogue was attached to impression coping, cast was poured and porcelain fused to metal crown was fabricated. (Fig 8,9) The fit and occlusion of the crown checked and intraoral periapical radiograph was taken to verify the fit of the prosthesis and proximal contacts with adjacent teeth. (Fig10, 11).



**Figure 1:** Clinical picture of edentulous space at 36 region



**Figure 2:** *Implant planning on CBCT*



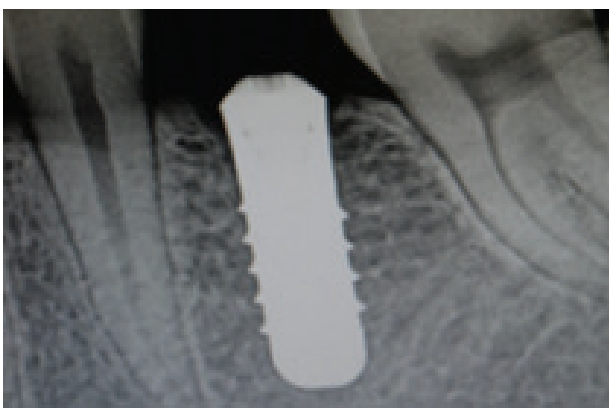
**Figure 3:** *Osteotomy preparation*



**Figure 4:** *Straumann Tissue level implant*



**Figure 5:** *Suturing of flaps*



**Figure 6:** *Intraoral radiograph of installed implant*



**Figure 7:** *Open tray impression technique*



**Figure 8:** Impression with impression coping and laboratory analogue



**Figure 9:** Porcelain fused to metal crown



**Figure 10:** Crown and abutment screwed to implant



**Figure 11:** Intraoral radiograph of implant with prosthesis

## DISCUSSION

The advantages of tissue-level implants with a convergent collar includes its ability to seal the implant-abutment junction, avoiding a micro-gap at the trans-mucosal level, and increase in peri-implant soft tissue thickness by improving the space for the supra-crestal tissue.<sup>4</sup> As a consequence, the use of a convergent implant improves the thickness and stability of the soft tissue around the implant.<sup>5</sup> Traditionally, a bone loss of <1.5 mm around the implant during the first year has been considered to be optimal. However, this figure needs to be redefined, since recent studies have found that bone loss is approximately between  $0.8 \pm 0.4$  mm and

is dependent upon a range of factors such as morphology and geometry of implant, surface of implant neck, technique used to place implant, patient's habits, and type of prosthesis.<sup>6,7</sup>

Various studies have revealed significantly lower bone loss in all the tissue level implant groups.<sup>8-10</sup> However, other studies have recorded no statistically significant differences.<sup>11-13</sup> This difference could be due to the location of the micro-gap between the prosthetic connection and the transepithelial abutment with respect to the bone crest. In the case of the tissue level implants, this zone is located away from the bone, preventing bacterial penetration of the bone crest. In contrast, in the bone level

implants, the micro-gap is located at bone level, which may result in bacterial filtration with subsequent inflammation and greater bone loss.<sup>14</sup>

## CONCLUSION

This case report presents the use of soft tissue level implant for the single tooth rehabilitation in mandibular posterior region. Patient did not experience any pain and discomfort throughout the procedure and healing of implant surgical site was good during subsequent follow-up visits.

## REFERENCES

1. Ceruso, F. Implant-abutment connections on single crowns: A systematic review. *Oral Implantol* 2017; 10: 349.
2. Moeintaghavi, A., Fallah tafti, A., Talebi ardekani, M. reza, Haerian ardekani, A. & Ansari, G. hossein. An evaluation on the relationship between fixed prosthesis (crown) and periodontal health. *JIDA* 2005; 17: 52–60.
3. Walter, F., Haynes, M. B. & Markel, D. C. A randomized prospective study evaluating the effect of patellar eversion on the early functional outcomes in primary total knee arthroplasty. *J. Arthroplasty* 2007; 22: 509–514.
4. Canullo, L., Menini, M., Covani, U. & Pesce, P. Clinical outcomes of using a prosthetic protocol to rehabilitate tissue-level implants with a convergent collar in the esthetic zone: A 3-year prospective study. *J Prosthet Dent* 2020; 123: 246–251.
5. Rompen, E., Raepsaet, N., Domken, O., Touati, B. & Van Dooren, E. Soft tissue stability at the facial aspect of gingivally converging abutments in the esthetic zone: A pilot clinical study. *J Prosthet Dent* 2007; 97: S119–S125.
6. Prati, C. et al. Factors Affecting Soft and Hard Tissues Around Two-Piece Transmucosal Implants: A 3-Year Prospective Cohort Study. *Int J Oral Maxillofac Implants* 2020; 35: 1022–1036.
7. Suárez-López Del Amo, F., Lin, G.-H., Monje, A., Galindo-Moreno, P. & Wang, H.-L. Influence of Soft Tissue Thickness on Peri-Implant Marginal Bone Loss: A Systematic Review and Meta-Analysis. *J Periodontol* 2016; 87: 690–699.
8. Agustín-Panadero, R. et al. Peri-Implant Behavior of Tissue Level Dental Implants with a Convergent Neck. *Int. J Environ Res Public Health* 2021; 18: 5232.
9. Agustín-Panadero, R., León-Martínez, R., Labaig-Rueda, C., Faus-López, J. & Solá-Ruiz, M. Influence of Implant-Prosthetic Connection on Peri-implant Bone Loss: A Prospective Clinical Trial with 2-Year Follow-up. *Int J Oral Maxillofac Implants* 2019; 34: 963–968.
10. Bilhan, H., Kutay, O., Arat, S., Çekici, A. & Cehreli, M. C. Astra Tech, Brånemark, and ITI Implants in the Rehabilitation of Partial Edentulism: Two-Year Results. *Implant Dent* 2010; 19: 437–446.
11. Vianna, T. T. et al. Evaluation of peri-implant marginal tissues around tissue-level and bone-level implants in patients with a history of chronic periodontitis. *J Clin Periodontol* 2018; 45: 1255–1265.
12. Lopez, M. A. et al. Retrospective study on bone-level and soft-tissue-level cylindrical implants. *J Biol Regul Homeost Agents* 2016; 30: 43–48.
13. Kumar, V. V., Sagheb, K., Kämmerer, P. W., Al-Nawas, B. & Wagner, W. Retrospective Clinical Study of Marginal Bone Level Changes with Two Different Screw-Implant Types: Comparison Between Tissue Level (TE) and Bone Level (BL) Implant. *J Maxillofac Oral Surg* 2014; 13: 259–266.
14. Callan, D. P., O'Mahony, A. & Cobb, C. M. Loss of crestal bone around dental implants: a retrospective study. *Implant Dent* 1998; 7: 258–266.