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CASE REPORT

Crestal Bone Regeneration in Defective Bone Implants

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ABSTRACT

Implant placement in narrow alveolar bone ridges end with buccal bone dehiscence and implant thread exposure. In this conditions, bone graft need to be placed in a addition to the collagen membrane to cover the dehiscence with primary wound closure.

This paper presents an implant case with a medical history of diabetic type II and smoker patient. Implant placed in narrow ridge and three coronal threads of the fixture exposed when the implant torque into the final position.

After 3 months healing period, the implant site exposed with complete bone formation and coverage of the threads.

From this case, one might conclude that: first the type of the implant surface may enhance bone formation, second the periosteum may contribute in the bone regeneration. Third the medical condition of the patient may has no local influence on the implant site.

Keywords: Crestal bone, Bone regeneration, Periosteum, Modified surface, Exposed implant, Submerged implant.

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INTRODUCTION

Buccal bone dehiscence can occur during implant socket preparation and implant placement and may be due to a thin buccal bone or the wide diameter of the implant. Usually this condition is treated with different types of bone graft and collagen membrane coverage. The membrane will preserve space and permit only osteogenic cells to host the grafting site.[1] After grafting, the implant should be left in place for 6 months for bone regeneration to occur before the re-entry procedure is performed.[2] Any systemic medical conditions that could have a negative effect on bone turn over or the tissue healing should be treated or controlled. For example, diabetes may adversely affect the bone density and mineralization;[3] therefore, it is reasonable to expect that the healing of endosseous implants could also be affected.

Studies have shown that a history of smoking in diabetic implant patients is a cofactor for implant failure.[4] A study by de Souza et al[5] has shown that smoking results in increased bleeding around the dental implant platform and subsequent vasoconstriction of the peri-implant and periodontal tissues.

This paper reports a case with exposed implant threads after final placement into the alveolar bone, as well as the management and the ultimate fate of the implant in question.

The patient was treated at the oral and maxillofacial surgery department at the dental faculty of the Mahsa University. All procedures performed were explained verbally and in writing to the patient. Informed consent was obtained and signed prior to the surgical implant placement.

CASE REPORT

The patient was a 62-year-old previously medically compromised Indian man, suffering from type II diabetes that was treated with oral hypoglycemic drugs and had preoperative HbA1C of 7. He was considered a heavy smoker (20 cigarettes per day). The patient was advised to stop smoking 2 weeks before implant placement and for 3 weeks afterwards. He had a partially edentulous upper jaw (Fig. 1) and presented to this facility for restoration of the missing teeth with an upper implant-tissue born supported overdenture.

Careful clinical examination of the ridge was performed to determine the ridge width and height, and occlusion was checked. An orthopantomogram was taken, and after clinical and radiographic examination, a four tapered implant, 10 mm

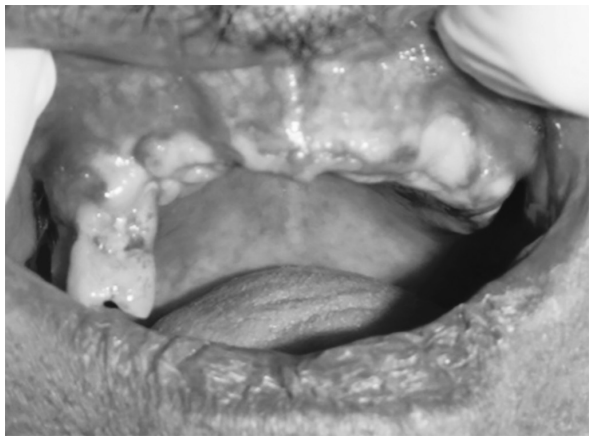

Fig. 1: Clinical evaluation preoperatively

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in length and 4.0 mm in diameter (superline, dentium), with sandblasted large grit acid-etched (SLA) surface coated was selected for placement.

The full thickness three-sided flap was raised at the area of the upper left canine, and the appropriate implant position was selected according to the surgical stent. The preparation of the implant was carried out with spiral drills of increasing diameters. The bone was dense and difficult to drill (Type I bone). Then, the implant was placed manually into its final position with the aid of a ratchet. The insertion torque was very high (more than 35 Ncm). Three threads were exposed from the implant (Fig. 2) when the implant was torqued into final position.

The implant was submerged with a cover screw that was screwed into the implant. The flap was repositioned and sutured for primary intention healing. The implant was allowed to heal and osseointegrate for 3 months. After 3 months, the re-entry surgical procedure was performed with a two-sided flap. The threads that had been exposed during implant placement were completely covered by new bone up to the cover screw (Figs 3A and B). A healing cap was positioned, and the flap was closed around it with stitches.

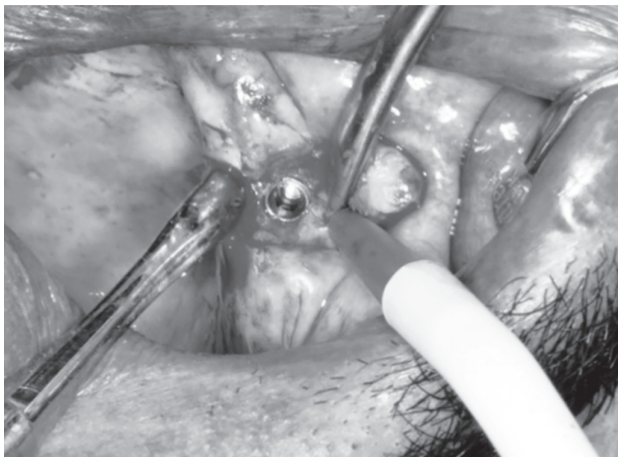


Fig. 2: Exposure of the implant threads during implant placement

After 6 weeks, the implant was loaded with complete profile denture, and the implant was followed up radiographically after 6 months. The radiographs showed stable crestal bone around the implant after loading (Fig. 4).

DISCUSSION

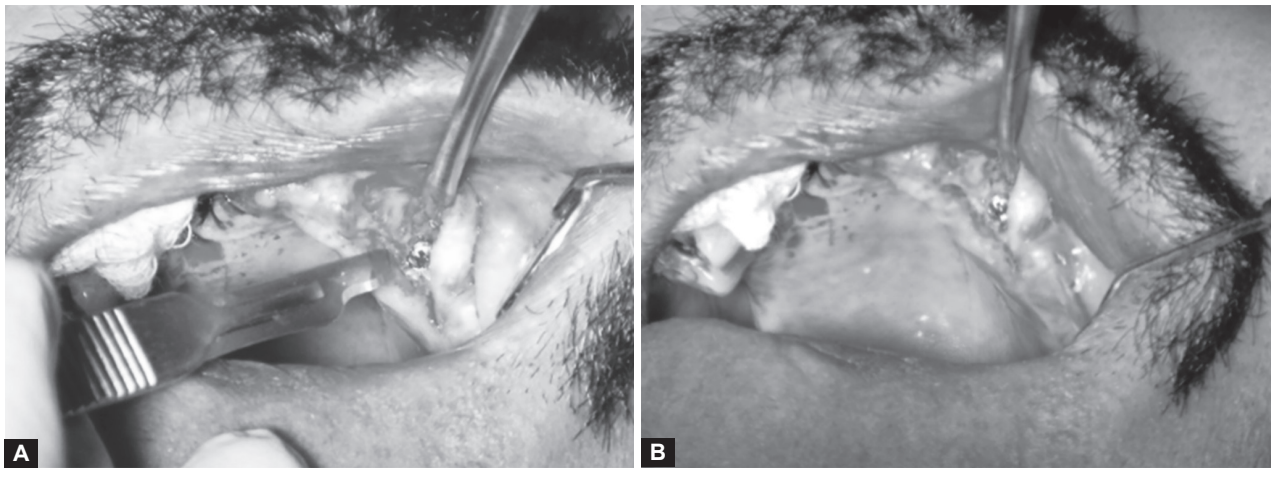
This case report demonstrates the potential for bone formation around the implant without bone grafting or collagen membrane isolation. In spite of the medical condition of the patient, which included type II diabetes, we still observed bone formation and regeneration. Importantly, the newly formed bone was found to be mature and stable even after loading.

Some review studies have concluded that bone formation disturbances that have been reported systematically and locally at the periodontium cannot be assumed to apply to endosseous implants.[4] Many authors have proposed that implant placement in diabetic patients can be successful.[6-8]

A study conducted by Balatsouka et al[9] showed that in the short-term, nicotine alone does not have any negative impact on osseointegration.

Bone regeneration in this case may be due to the technique of the implant placement, which is a submerged technique with complete implant isolation from the environment.[10] The advantage of this technique, with the incision line away from the implant itself, is that there is no contamination of the implant from the oral environment.[11] This may allow the bone to regenerate without disturbance.

Another factor is the implant-treated surface. Many studies have shown that SLA surface implants can enhance bone formation and act as chemotactic to the osteogenic cells.[12] A study by Grassi et al[13] reported that the SLA surface may enhance the bone quality close to dental implants placed in soft bone. The type of bone surrounding the implant may play a role in bone regeneration, as the implant was placed in very dense bone.[14] This case may be an indication that the periosteum may provide the implant site with osteogenic



Figs 3A and B: Bone formation and cover the exposed implant threads after 3 months healing period

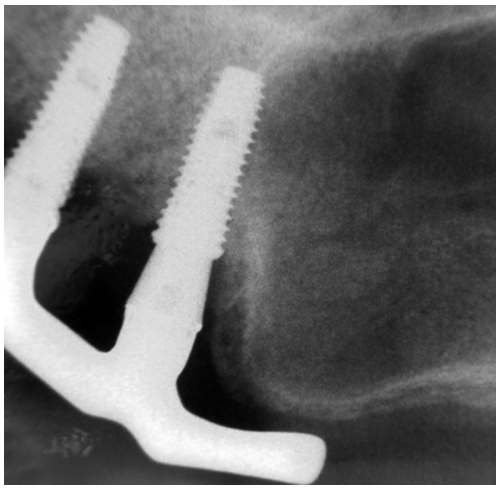


Fig. 4: The radiograph shows stable crestal bone around the implant after 6 months loading

cells that are capable of forming bone and not only fibrous or epithelial cells.

CONCLUSION

Our conclusions are as follows: first, the type of implant surface may enhance bone formation; second, the periosteum lining of the flap may contribute to bone regeneration; and third, the medical condition of the patient may have no local influence on the implant site.

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