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Single Piece Implant- Rehabilitation within 72 Hours

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Abstract

Unlike conventional implants, basal implants are designed to engage the highly dense and stable cortical bone, which provides robust support even in cases with significant bone loss or poor bone quality. This technique often allows for immediate loading, meaning patients can receive functional teeth shortly after implant placement. This is the case report of a 55-year-old diabetic male reported to our department with missing lower front teeth. After careful examination and treatment planning cortical implants with immediate prosthetic rehabilitation was initiated. Using the flapless technique two one-piece KOS implants were placed in the region of 31 & 32 followed by prosthetic rehabilitation within the 72 hours of implant splacement.

Keywords: Basal Implants, KOS Implants, Single Piece Implant, Osseointegration.

Introduction

The trend among edentulous patients is shifting towards fixed implant therapy instead of removable dentures.[1] Successful implant placement requires adequate bone volume, ideally 13-15mm (millimetres)in length and 5-

7mm in width, for optimal results. When these criteria are not met, treatment planning needs to be modified to restore lost alveolar dimensions, ensuring a more predictable and successful outcome.[2-4] The risks, costs, and number of necessary surgeries associated with dental implant treatment can be increased by augmentation procedures.[5] Basal implants offer a simpler and faster treatment option compared to traditional implant therapy because they eliminate the need for augmentation procedures.[6] The basal implantology approach, often referred to as cortical or bicortical implant system, involves placing implants in the cortical region of the jaw. This technique secures strong retention by anchoring the implant in the dense basal cortical bone. [7-9] Basal implants, sometimes referred to as lateral or disk implants, are mainly designed for use in patients with atrophied jaw bones.[10]Here, we present the case of a 55-year-old man with missing teeth in his anterior mandible which was managed by fixed prostheses supported by immediately loaded basal implants. This case report discusses the use of single-piece immediate implants to restore an edentulous area.

Case Report

A 55-year-old man visited the oral and maxillofacial surgery outpatient clinic with the main concern of missing teeth in the lower front jaw region for the past 6 months. He expressed dissatisfaction with the resulting change in his appearance. During an intraoral examination, all teeth were present in the 1st, 2nd, and 4th quadrants. However, the central and lateral incisors were missing in the 3rd quadrant (Fig.1).

Figure 1: Missing Central and Lateral Incisors in 3rd Quadrant

Patient gave history of cyst removal followed by extraction of central and lateral incisors 7 months back. The patient also reported a history of diabetes over the past five years and was under medications. On radiological examination with the help of CBCT (cone beam computed tomography), there was a bony defect or perforation noticed over the buccal bone in the region of central and lateral incisors of 3rd quadrant (Fig.2).

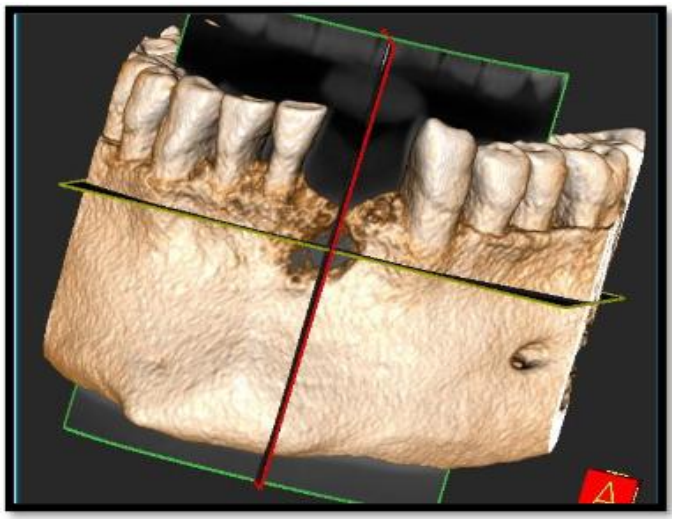

Figure 2: 3 D view of CBCT representing the bony defect/perforation of buccal bone

After measuring the mesiodistal width of the ridge in the edentulous area on the cast models, it was found to be 10 mm. The patient preferred a fixed treatment option and wanted the procedure completed as quickly as possible due to his concerns about aesthetics and discomfort with removable prosthetics. Based on the results of his CBCT scan and mesiodistal width measurement, the edentulous

region was chosen to be restored through surgical intervention which includes placement of KOS (king of single piece) one-piece implants due to its excellent suitability for narrow ridge. A routine blood test was conducted for the patient, and the results were normal.

Surgical intervention

One hour before the surgical procedure, a prophylactic dose of 625 mg (milligram) amoxicillin-clavulanate was given orally.

The clinician anesthetized the anterior mandibular region by infiltrating buccal and lingual tissues with 2% lignocaine containing 1:80,000 adrenaline. A flapless approach was utilized to create an implant bed of predetermined length using a pathfinder drill. Placement of two KOS MICRO IMPLANTS, each measuring 3.0 mm in diameter and 10 mm in length, in the region of central and lateral incisors of 3rd quadrant was performed (Fig.3)

Figure 3: KOS MICRO IMPLANTS placed in the region of central and lateral incisors

After the surgery, the patient was informed of detailed postoperative instructions. Additionally, suitable oral antibiotics and analgesics were prescribed to manage any discomfort.

Prosthodontic intervention

A diagnostic impression was made with irreversible hydrocolloid impression material and a cast was poured. On the cast acrylic teeth setting with wax up was done for fabrication of index which was used immediate after surgery for fabrication of temporary prosthesis using tooth coloured acrylic resin. (Fig.4).

Figure 4: Acrylic teeth setting with wax up was done for fabrication of temporary prosthesis

After surgery and placement of basal implants, a final impression was made with elastomeric impression material using putty and light body consistency (Fig.5).

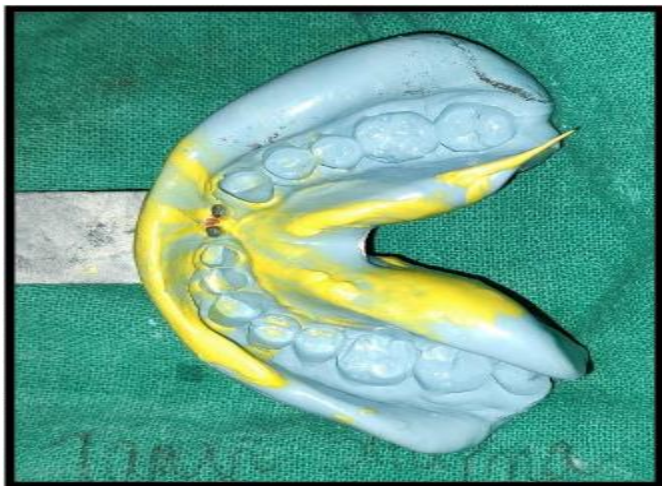

Figure 5: Final impression was made with elastomeric impression material

The impression was poured after 30 minutes, onto which the final PFM (porcelain fused metal) prosthesis was fabricated (Fig.6).

Figure 6: Final PFM prosthesis

Following the impression, a putty index was used for immediate temporization and temporary prosthesis was given (Fig.7).

Figure 7: Placement of temporary prosthesis

The final PFM prosthesis with wings was delivered within 3 days of the implant surgery (Fig.8).

Figure 8: Final prosthesis given within 3 days of implant surgery.

Discussion

Dr. Jean-Marc Julliet pioneered the development of the first single-piece dental implant in 1972 but faced adraw back due to the absence of a surgical kit, which was later enhanced by French dentist Dr. Gerard Scortecci in the mid-1980s with an improved basal implant system and matching cutting tools.[11] He developed two types of implants, known as "Disk implants," featuring both internal and external connectors integrated into the prosthetic framework.[12]These implants underwent further modifications, evolving into Basal Osseointegrated Implants (BOI). In1997, Dr. Stefan Ihde introduced lateral basal implants like Disk implants, initially designed with limited sizes and shapes and incorporating roughened outer surfaces, and further enhanced them by transforming their base plates into edges, effectively preventing rotation during the initial stages of the osseointegration process.[13]In the literature, basal implants are often referred to as "orthopaedic implants" or associated with an" orthopaedic technique," highlighting their unique approach compared to traditional "dental implants."[14]Currently there exist two separate approaches for immediate loading dental implants. The first approach involves compression screw implants, which induce lateral condensation of spongy bone and enhance stability through corticalization, while the second approach focuses on establishing cortical anchorage using thin screw implants or basal implants.[15] Basal implants are single-piece implants where the implant and the abutment are integrated into a single unit. This design reduces the risk of implant failure associated with the interface issues found in conventional two- and three-piece implants. The polished surfaces of these implants prevent bacteria and plaque from adhering to the neck or body. Their thin

bodies, combined with wide thread turns, improve vascularity around the implant and increase bone-to-implant contact.[16]There are four fundamental categories of basal implants based on their morphology. The first category is the screw form, which encompasses designs such as compression screw design, bi-cortical screw design, and compression screw with bi-cortical screw design. The second category is the disk form, which includes basal osseointegrated implants or trans-osseous implants. The third category is the plate form. Lastly, the fourth category comprises other designs, such as tuberopterygoid (TPG) implants and zygoma screw (ZSI) implants. [17]The screw able basal implants integrate through a dual process: one involves osseofixation of the force-transferring thread, while the other entails gradual integration along the vertical sections of the implant. The mode of integration for lateral basal implants includes dual integration in the area of force-transmitting discs and gradual integration along the other vertical implant sections. The integration of combination implants involves osseofixation of the force-transferring thread and compression of the cancellous bone along the vertical axis of the implant.[18]

Conclusion

In conclusion, basal implants provide a viable and effective alternative to traditional dental implants, particularly for patients with insufficient bone quality or quantity. Basal implants offer an added advantage over conventional implants by employing a flapless technique, requiring minimal surgical intervention, and resulting in decreased post-operative discomfort, swelling, and pain. Moreover, they enable the prosthesis to be loaded immediately, enhancing patients' self-assurance, and promoting seamless social engagement.

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