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Case Report

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Prosthetic Rehabilitation of Maxillary Anterior Dentoalveolar Fracture with Help of Immediate Implant Placement Using Vitamin D3 Injectable Solution as Surgical Adjunct: Case Report

Vijayata Singh[1,*], J.P.Singh[1], Kanta Daswani[2] and Ekta Singh[1]

[1]*Krishna Ayur-Impladent, Maharashtra, India.*

[2]*Daswani dental college and research centre, Kota, Rajasthan, India.*

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[*]***Correspondence:*** *Vijayata Singh, BDS, MDS, CHM, CNCC, Chief surgeon, Krishna Ayur-Impladent, Maharashtra, India.*

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ABSTRACT

Introduction: *Dental implantology, which is a specialized field of dentistry, deals with the rehabilitation of the damaged chewing apparatus due to loss of the natural teeth and is currently the most intensively developing field of dentistry. After initial assessment it was found that Patient had already lost tooth 21 at the accident site and tooth 22 and 11 were significantly mobile, broken and avulsed. The unique takeaway of this case is use of Vitamin d3, instead of non-native bone grafts for osteointegration of implants.*

Results: *Immediate implant placement in dento-alveolar fracture cases significantly reduced time (3 months) of the patient as previously requiring nine months period (grafting + delayed implant placement) on average in prosthetic rehabilitation of such cases.*

Conclusion: *This case report shows that in selective cases, immediate implant placement in dento-alveolar fracture cases can be done and would be successful if apical pitch of atleast 3 mm can be engaged in sound bone and also help of the densa bur for osteo-compaction is desirable whenever possible.*

Keywords: *dentoalveolar fracture, immediate implant placement, injectable vitamin d3, tooth avulsion, bone loss due to trauma.*

Introduction

Dental implantology, which is a specialized field of dentistry, deals with the rehabilitation of the damaged chewing apparatus due to loss of the natural teeth and is currently the most intensively developing field of dentistry. In this particular case the Patient had suffered trauma after hitting his head and face following a fall from motorcycle on a road bump, he was neurologically assessed for deficits which were found to be absent. After initial assessment it was found that Patient had already lost tooth 11 at the accident site and tooth 12 and 21 were significantly mobile, broken and avulsed. The unique takeaway of this case is use of Vitamin d3, instead of non-native bone grafts for osteointegration of implants.

Today, there are ever increasing demands from patients with missing teeth for aesthetic appearance of their replaced teeth and need of shortened period of osseointegration of implants and that also in economically reasonable way.

Patient Information

A 29-year-old South Asian male presented to Krishna Ayur-Impladent Institute following a bicycle (motorcycle) accident that occurred shortly after midnight on April 29, 2024. The patient reported a brief loss of consciousness at the time of the incident. A comprehensive neurological assessment was conducted. There was no reported history of vomiting, and no neurological deficits were identified upon clinical examination.

Clinical Findings

Intraoral examination revealed the avulsion of tooth #11. Visual inspection and palpation demonstrated gross mobility of the labial cortical plate in the region of tooth #12. Additionally, a deep crown fracture was noted in tooth #21 (figure 1).

Diagnostic Assessment

Patient was immediately advised for an OPG (Orthopantogram), after analysing the OPG, discontinuity was noticed in left dentoalveolar segment suggesting compound dentoalveolar fracture.

Figure 1: *Initial Diagnosis and Pre & Intra Operative Pictures.*

Table 1. Timeline of Treatment and Follow-up.

Visit	Date	Procedures Performed	Duration
1st Visit	29 April 2024	Diagnostics performed, surgical phase completed (tooth extraction, flap reflection, debridement, implant placement).	3 hours
2nd Visit	7 May 2024	Soft tissue healing evaluated, impressions taken for temporary prosthesis.	1 hour
3rd Visit	13 May 2024	Temporary prosthesis delivered.	Not recorded
4th Visit	13 July 2024	Final prosthesis procedure initiated.	Not recorded
5th Visit	20 July 2024	Impressions taken for final prosthesis.	Not recorded
6th Visit	28 July 2024	Final restoration delivered; patient received definitive prosthesis for edentulous spaces.	Not recorded
7th Visit & Follow-ups	Up to 15 July 2025	Periodic reviews conducted; excellent aesthetic and functional outcomes observed; follow-up period remained uneventful.	Ongoing

Therapeutic intervention

The face of the patient was externally disinfected with 5% povidone-iodine solution, and an oral rinse was performed using a diluted 2% chlorhexidine mouthwash. Local anesthesia was administered using 1:80,000 lignocaine with adrenaline via bilateral infraorbital nerve blocks and a nasopalatine block.

Following adequate anesthesia, crevicular incisions were made, and a full-thickness mucoperiosteal flap was elevated to expose and assess the extent of devascularized bone segments on both sides of the midline. Necrotic bone segments were debrided, and teeth in the affected regions were extracted. Labial bone loss was evaluated, and proposed implant lengths were determined based on the number of missing teeth, mesiodistal space available, and the requirement for a minimum of 3 mm of sound bone surrounding each implant (Figure 2).

Figure 2: *Extraction of loose Tooth and bones, preparation for Implant Process.*

Figure 3: *Intra Operative and Post Operative Prosthetic Phase.*

Densa® burs were used for bone site preparation to consolidate the remaining bony structure. Prior to implant placement, vitamin D3 injectable solution was emptied into the implant containers to allow the dense, lipid-soluble compound to coat the implant surfaces, potentially enhancing local osteoconduction (figure 3).

Dental implants were placed and secured with cover screws. Sutures were placed, and the patient was instructed to return for regular follow-up visits. A temporary prosthesis was provided for use during the initial healing phase of two months.

At 2.5 months postoperatively, the patient returned for the intermediate prosthetic phase, which included uncovering the implants, placement of gingival formers to contour the soft tissue for improved aesthetics, and acquisition of digital impressions. This was followed by a metal trial and eventual placement of the final prosthesis, which significantly improved the patient's functional and psychological well-being.

Follow up and outcome: A one-year follow-up was conducted and found to be uneventful, with stable peri-implant conditions and satisfactory prosthetic performance.

Discussion

Successful dental implant osseointegration relies on a complex interplay of mechanical stability, bone quality, host immune response, and surface biocompatibility of the implant. Recent interest has focused on enhancing local microenvironmental factors to accelerate and improve bone healing and integration. In the present case, vitamin D3 was applied topically to the implant surface prior to placement, with the intent of optimizing local conditions for osteoconduction and early bone healing.

Vitamin D3 (cholecalciferol), a fat-soluble secosteroid, plays a well-established role in calcium-phosphate homeostasis and bone metabolism. In addition to its systemic effects, emerging evidence suggests that localized application of vitamin D3 may have direct osteoinductive and osteoconductive properties. It promotes the differentiation and activity of osteoblasts while modulating osteoclastogenesis, thereby facilitating a balanced bone remodeling process conducive to implant integration. Moreover, vitamin D3 exhibits immunomodulatory effects, potentially reducing peri-implant inflammation and promoting more favorable healing responses [1,2].

In this case, a concentrated injectable solution of vitamin D3 was used to coat the implants prior to insertion, creating a localized depot of the active compound around the implant threads. The rationale for this approach was to enhance the biological surface characteristics and stimulate early peri-implant bone formation. The uneventful healing, stable soft tissue contour, and successful prosthetic outcome observed at one year support the hypothesis that local D3 supplementation may contribute positively to clinical outcomes.

Several preclinical studies support the osteogenic potential of vitamin D3 in implant settings. Dvorak et al. demonstrated that coating titanium implants with vitamin D3 enhanced osseointegration in rat femurs [3]. Similarly, Cho et al. showed improved early bone formation and mineral density around implants treated with vitamin D3 in a rabbit model [4]. These findings suggest that the localized presence of vitamin D3 may act synergistically with implant surface properties to accelerate bone-implant contact.

While systemic vitamin D deficiency has been linked to delayed or impaired osseointegration in various human studies[5,6], targeted local delivery may offer advantages by bypassing systemic variability and maximizing concentration at the site of interest. However, randomized controlled trials and larger cohort studies are warranted to validate these findings and standardize protocols for local D3 use in implantology.

In conclusion, this case demonstrates that topical application of vitamin D3 may serve as a simple yet biologically meaningful adjunct to implant therapy. It underscores the importance of not only mechanical precision but also biochemical optimization of the surgical site for long-term success.

Patient Perspective

Following the completion of the prosthetic phase, the patient expressed significant satisfaction with the functional and aesthetic outcome. He reported feeling elated and relieved, as the restoration of his anterior teeth allowed him to confidently engage in his professional responsibilities, particularly client-facing interactions, which are central to his marketing career. The patient had initially feared that the traumatic dental loss might jeopardize career opportunities; however, the successful treatment outcome restored both his appearance and confidence.

Informed Consent

Written informed consent was obtained from the patient and his family for the use of clinical data and images for academic, research, and publication purposes. The patient was informed of the nature of the treatment and the intention to report the case while ensuring confidentiality.

Conflict of Interest

The authors declare no conflicts of interest.

References

1. Buzatu BLR, Buzatu R, Luca MM. Impact of Vitamin D on Osseointegration in Dental Implants: A Systematic Review of Human Studies. Nutrients. 2024; 16 :209.
2. Bikle DD. Vitamin D and bone. Curr Osteoporos Rep. 2012; 10: 151-159.
3. Dvorak G, Fügl A, Watzek G, Tangl S, Pokorny P, et al. Impact of dietary vitamin D on osseointegration in the ovariectomized rat. Clin Oral Implants Res. 2012; 23: 1308-1313.
4. Cho YJ, Heo SJ, Koak JY, Kim SK, Lee SJ, et al. Promotion of osseointegration of anodized titanium implants with a 1α,25-dihydroxyvitamin D3 submicron particle coating. Int J Oral Maxillofac Implants. 2011; 26: 1225-1232.
5. Alsulaimani L, Alqarni A, Almarghlani A, Hassoubah M. The Relationship Between Low Serum Vitamin D Level and Early Dental Implant Failure: A Systematic Review. Cureus. 2022; 14: e21264.
6. Alsaadi G, Quirynen M, Komárek A, van Steenberghe D. Impact of local and systemic factors on the incidence of oral implant failures, up to abutment connection. J Clin Periodontol. 2007; 34: 610-617.