Indian Journal of Forensic Medicine and Toxicology
Volume 16 No. 3, July-September 2022
DOI: http://dx.doi.org/xxxxx/ijfmt.xxxx.16322.48

Esthetic and Prosthetic Rehabilitation of Maxillary Lateral Incisor: A Case Report

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How to cite this article: Neetha J Shetty, Sweta Pradhan. Esthetic and Prosthetic Rehabilitation of Maxillary Lateral Incisor: A Case Report. Indian Journal of Forensic Medicine and Toxicology 2022;16(3):270-274.

Abstract

Introduction: The maxillary anterior region poses the highest number of aesthetic challenges in implant dentistry as any tooth loss in the region leads to bone resorption and collapse of gingival architecture leaving inadequate bone for implant placement. However, immediate implant placement and provisionalization has been a viable option for replacing failing maxillary anterior teeth as it preserves the vertical existing osseous and gingival architecture. A proper case selection guided by an appropriate step-by-step treatment plan can ensure the success of any immediate implant placement.

Case Summary: This case report describes atraumatic extraction of a fractured right maxillary lateral incisor, followed by immediate placement of a dental implant in the prepared socket. Implant was successfully loaded and was functional during 24 months follow up period. The patient exhibited no clinical or radiologic complications post operatively. Recall visits exhibited patient's high-level confidence of smile with optimum satisfaction and successful aesthetic outcome.

Conclusion: Immediate implant placement into fresh extraction socket reduces the treatment time, cost, preserves the gingival aesthetic and increases the comfort of the patient.

Keywords: 1. Atraumatic Extraction; 2. Immediate Implants; 3. Maxillary lateral incisor.

Background

Implant dentistry has progressed considerably since its introduction, with modifications and enhancements being made to the surgical techniques, restorative protocols, and the implants themselves.

Traditional guidelines as suggested, that following tooth extraction, 2 to 3 months of alveolar ridge remodeling occurs. If there is loss of the buccal alveolar plate following tooth extraction which mostly is seen in cases of maxillary anteriors, may lead to palatal implant positioning with esthetic complication. The initial delayed loading and placement protocols have been modified to expedite the treatment process. These modified protocols (immediate placement and immediate loading) have

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been successfully applied in both fully and partially edentulous patients. Immediate implants have become widely accepted and the available literature consistently cites high levels of success (ranging from 94-100% on average), immediate implants provide clinically recognizable benefits. Broadly speaking, these benefits include reduction of morbidity, reduction of alveolar bone resorption, preservation of gingival tissues, preservation of the papilla in the esthetic zone, and reduction of treatment cost and time. However, it is challenging to achieve esthetic results with anterior teeth having soft and hard tissue discrepancies.

This case report illustrates a therapeutic treatment modality consisting of atraumatic extraction followed by immediate implant placement and provisionalization with 24 months follow up.

Case presentation

In 2017, a healthy 25-year-old male reported for evaluation of a fractured upper right lateral incisor (Figure 1). Patient was in good systemic as well as periodontal health. On extra oral and intra oral examination, there was no abnormality detected. Clinical examination revealed fractured tooth w.r.t 12.

Figure 1: PRE-OP Picture

The patient was referred to the Department of Endodontics for further evaluation and development of a treatment plan.

On consultation with an endodontist, it was decided to extract the tooth and go for an immediate implant placement as the patient was very much concerned about esthetics.

Investigations

- Complete hemogram was performed to rule out any systemic problems
- CBCT of the area of interest was done
- IOPA of the area of interest was taken

A thorough clinical evaluation and a CBCT was recorded (Figure 2) and analyzed, after which the patient was posted for implant placement as he did not have any facial plate deformity. The patient was explained about the procedure and a consent form was duly signed by the patient.

Figure 2: Cone beam computed tomography (CBCT) was done to rule to facial bone deformities.

Surgical Procedure

The area of interest was anaesthetized with 1:80,000 lignocaine hydrochloride. With a no. 15 scalpel blade, the supracrestal fibers were dissected. This was followed by the use of a periotome to sever the periodontal ligament fibers from the alveolar bone so that the tooth becomes loose, thereby extracting the tooth atraumatically. The walls of the alveolar socket were found to be intact after extraction(Figure 3). The socket was degranulaed and curreted for any remnant of periapical lesion. Osteotomy was performed in a palatal position so as to not perforate the labial cortical bone, about 2mm apical to the apex(Figure 4). An implant of length 13mm and diameter 4.5mm

was placed and primary stability was achieved with a torque of 20Ncm/2 was achieved. Since the torque achieved was less, it was decided to go for delayed loading and a gingival former was placed (Figure 5).

Post –operative instructions were given.

Figure 3: Extraction of upper right lateral incisor was done as atraumatically as possible.

Figure 4: Osteotomy done in the deepest part of the socket with care not to perforate the labial cortical bone.

Figure 5: After Implant Placement

Post-operative instructions

Post-op instructions were given to the patient. Antibiotics (Cap Amoxicillin 200mg, thrice daily for 5 days) and analgesics (Tab Divon plus twice daily for two days) were prescribed.

Outcome and follow-up

After 5 months, an IOPA was taken to evaluate the implant and bone interface . The gingival former was removed revealing a good soft tissue contour. Impressions were taken for prosthetic rehabilitation using putty with light body for the maxillary arch and an alginate impression for the mandibular arch. The final ceramic crown was cemented after 1 week. After 1 year, radiographic and clinical follow up demonstrated successful result, meeting aesthetic and functional requirements (Figure 6 and 7).

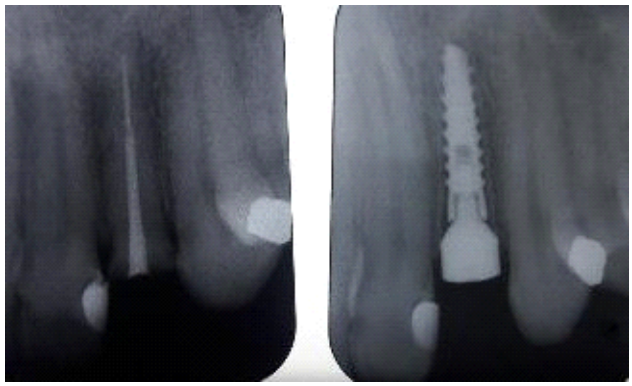

Figure 6: Pre-treatment and Post-treatment IOPAR

Figure 7: After complete rehabilitation

Discussion

Atraumatic extraction is the mandatory requirement when placing an immediate implant. The best healing conditions is achieved by attempting it atraumatically.[1] Despite all the efforts, extracting a tooth results in severing the collagen fibers and blood vessels to the periodontal ligament causing trauma to the bundle bone. Therefore, one more important surgical consideration is flap elevation or without flap

elevation. Covani et al affirmed that flap elevation may cause alveolar bone resorption in the exposed area, whereas a flapless technique reduces patient discomfort, alterations in alveolar crest dimensional alterations, and better soft tissue quality around implant.[2]This also reduces post-surgical trauma, and by preserving the vascular supply integrity, as the periosteum is maintained.[3] The stages of alveolar healing are initiated as soon as the tooth is extracted.[4] It has been postulated that there is a horizontal resorption of bone dimension that amounts to 56% immediately after extraction.[5,6]

Also, when an implant is inserted immediately after an extraction, there is a void created between the buccal wall and the implant. Some authors suggest the filling of this void with a biomaterial in order to maintain hard tissue contour.[7] The clinician also has to consider that soft tissue will also go through the process of remodeling following implant placement.[8]

Immediate implants require a complicated and precise soft tissue management.

The maxillary anterior region poses the highest amount of aesthetic challenges in implant dentistry as any tooth loss in the region leads to bone resorption and collapse of gingival architecture leaving inadequate bone for implant placement.

Many authorsdemonstrated that using single immediate implants with instant provisionalization, can help optimize esthetics. It was concluded that this can limit the amount of midfacial soft tissue loss, being this area the most critical in aesthetic implant dentistry.[9,10] Nevertheless, if the primary stability is not achieved, or the patient's case does not fit the ideal requirements for immediate provisionalization, this should not be done, and therefore, a different type of treatment should be considered. [11]However, immediate implant placement and provisionalization has been a viable option for replacing failing maxillary anterior teeth as it preserves the vertical existing osseous and gingival architecture.

Conclusion

Based on the outcomes of the present report, it can be concluded that immediate implant placement may be a viable treatment option for cases requiring earliest restoration of teeth to be extracted. However, this approach is considered highly technique sensitive and requires expert dental implant team for its execution. Careful selection of cases, proper treatment plan and follow-up of surgical and prosthetic protocols are the keys to success.

Patient's perspective

Patient was very satisfied with the esthetic and functional outcome after the prosthesis on the implant.

Acknowledgements: None

Conflict of Interest: The authors declare no conflict of interest.

Ethics Statement: The procedure has been assessed by the Institute Ethical committee, MCODS, Mangalore and is in accordance with the Declaration of Helsinki.

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