

ANTERIOR MAXILLARY IMMEDIATE IMPLANT AFTER EXTRACTION WITH CLOSE LOADING TEMPORARY CROWN

(PROSEDUR PEMASANGAN IMPLAN SEGERA PASCA PENCABUTAN GIGI ANTERIOR DISERTAI PEMASANGAN MAHKOTA SEMENTARA)

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ABSTRACT

Immediate implant placement after extraction is a dental implant treatment procedure reported in several case studies with satisfactory results for patients and less crestal bone loss around the implant. This case report describes the method of immediate implant placement after extraction. It directs temporary crown placement in a female patient with failed post-endodontic treatment restoration on the maxillary incisor. The procedure was performed under local anesthesia, preceded by tooth extraction and socket cleaning post-extraction, followed by the implant and bone grafting procedure, then finalized by provisionalization. The immediate implant procedure is a simple and time-saving technique. No second surgery is required, such as delayed implant procedure, but the operator's good analytical, diagnostic, and planning skills in its implementation.

Keywords: immediate implant; temporary crown

ABSTRAK

Implan segera pasca pencabutan merupakan salah satu prosedur perawatan implan gigi yang dilaporkan dalam beberapa studi kasus menunjukkan hasil memuaskan bagi pasien dan lebih sedikit terjadinya kehilangan tulang krestal di sekitar implan. Laporan kasus ini memaparkan prosedur pemasangan implan segera pasca pencabutan gigi anterior disertai pemasangan mahkota sementara pada pasien wanita dengan kegagalan restorasi pasca perawatan endodontik pada gigi insisif rahang atas, yang mengalami fraktur mahkota dengan restorasi mahkota pasak. Tindakan dilakukan dengan anestesi lokal, didahului pencabutan gigi dan pembersihan soket pasca pencabutan dilanjutkan prosedur pemasangan implan beserta bone grafting dan diakhiri dengan pemasangan mahkota gigi sementara. Prosedur pemasangan implan segera pasca pencabutan ini merupakan teknik sederhana dan menghemat waktu sehingga tidak dibutuhkan tindakan operasi kedua seperti prosedur implan tunda pasca pencabutan, namun dibutuhkan kemampuan analisa, diagnosa dan perencanaan yang baik oleh operator dalam pelaksanaannya.

Kata kunci: area estetik; implan segera; mahkota gigi sementara

INTRODUCTION

Implant placement immediately after a tooth extraction is one of the procedures carried to maintain the integrity and healing of the socket after tooth extraction, reduce treatment time and facilitate the procedure for making implanted dental crowns. It also increases patient satisfaction and can be well received by patients.^{1,2} Several studies suggest that post-extraction sockets without treatment tend to be significant dimensional changes. Vertical bone loss of 1.5-2 mm occurs in 40-50% of tooth extraction cases.³ Immediate

implant after tooth extraction shows less crestal bone loss around the implant than placement after waiting for bone healing in the socket area.⁴ Indications of the immediate implant are: tooth fracture due to trauma, failure of endodontic treatment, root fracture or extensive caries extending to the alveolar bone around the tooth, as well as persistent tooth extraction in adult patients.⁵

Several factors need to be considered in the immediate implant procedure, namely the various anatomic variations of the post-extraction socket, the

initial stability of the implant in the bone, and changes in the soft tissue surrounding the implant.^{2,6} The procedure cannot be performed in cases of active infection. The periapical tissue and periodontitis create soft tissue support to achieve initial implant stability.⁷

An immediate implant is an effective procedure for anterior tooth loss in terms of aesthetics. The significant hard and soft tissue changes that usually occur after tooth extraction can be minimized through immediate implants and temporary crowns. The report described the immediate implant procedure after central maxillary incisor extraction with temporary crown placement.

The process was applied to a female patient with failed maxillary incisor and endodontic treatment-no active periapical or periodontal tissues infection.

CASE REPORT

One week ago, a 47-year-old female patient came to the private dental clinic in Bandung, Indonesia, with a chief complaint of a broken prosthetic crown in the central maxillary. The tooth had been endodontic treated and restored using metal post and porcelain fused to metal as a final restoration installed two years ago. The patient did not have any medical contraindication for dental treatment and

smoking, a history of trauma, pain, and swelling. The oral hygiene was good. She wanted to remove and replace her maxillary incisor with a fixed prosthesis without compromising her appearance.

The results of the intraoral examination revealed cervical 11 fractured, metal post and PFM crown loose, negative percussion, negative pressure, no tooth mobility, and gingival abnormalities. The shape of the incisor was slightly triangular with sufficient interdental papilla volume and height. The interproximal gingival tissue is not swollen or edematous. Her gingival biotype appears thick enough without inflammation gingival, and the position of the labial gingival margin was moderate. The radiographic examination revealed a fracture of the cervical 11 to the base of the post-restoration. A horizontal bone loss was shown with no periapical lesion in 11 but apical lesion in 12 and 21. The result was associated with inadequate restoration and failed endodontic treatment. The examination showed by lack of hermetical obturation material inside the root canal. The osseous crest position concerning the gingival margins provides adequate gingival support. (Figure 1). Based on the results of subjective, objective, and supporting examinations, it was determined that the diagnosis was crown fracture of tooth 11. The treatment

plan included the installation of a tapered implant immediately after tooth extraction 11. The intelligent design has been shown to promote primary stability in a socket. The implant size was determined through clinical and radiographic examinations, which were 3.6 mm in diameter and 10 mm in length. An immediate provisional restoration without centric contacts is



attached to the implants. The prognosis for this case was good, judging from the width and density of the bone, and no lesion was found on apical 11.

Figure 1. Panoramic radiographs before treatment.

The patient was given amoxicillin 500 mg one hour before surgery and locally anesthetized on the same day. Tooth 11 was extracted with a minimally invasive technique to avoid damage to the extraction socket that uses a flat instrument (Periotome) directed apically into the sulcus to sever the periodontal ligament and slightly expand the adjacent periodontal tissues. The socket was prepared to receive the implant by removing the sulcular

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epithelium (Figure 2).

After extraction, a full thickness midcrestal flap using blade #15C was reflected for the implant placement. The ETIII 3.5 SA Implant System Hiossen[®] was set at a drilling speed of 800-1000 rpm/20NCm with saline irrigation (Figure 3). The drilling technique is carried out with an inclination to the palatal wall of the socket. The implant was placed with a handpiece driver implant at 40 RPM/20 NCm (Figure 4). After the implant was in place and initial stability was obtained, a bovine Osstem[®] A-Oss xenograft was



applied to the labial wall for bone integrity (Figure 5).

Figure 2. Tooth socket 11 after extraction and flap opening.



Figure 3. Implant drilling speed at 800-1.000 RPM.



Figure 4. Implant placement with a handpiece driver implant at 40 RPM/20NCm.



Figure 5. The addition of bone graft material after achieving primary implant stability with a minimum torque of 35NCm.

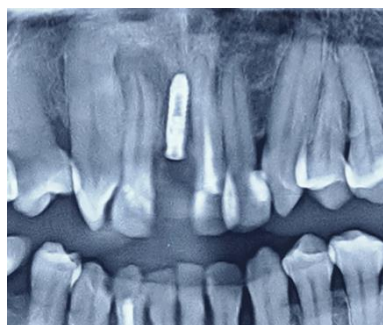


Figure 6. Implant placement radiographs.
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Temporary abutment (Straight Temporary Titanium Abutment Osstem® TS on the implant locked to 20 NCm, and the mesial and distal suture was interrupted as performed.

The acrylic resin crown fabricated was adjusted to the size of the tooth crown 11 without occlusal contacts (Figure 8). The temporary crown was cemented using a Filtek Z350 XT flowable (3M ESPE, Seefeld, Germany). Amoxicillin 500 mg every 8 hours for three days, and ibuprofen 600 mg every 6-8 hours for a maximum of 5 days. 0.12% chlorhexidine gluconate mouthwash twice a day for two weeks was prescribed for postoperative medication. Postoperative control and suture removal were scheduled after ten days post-implant placement. The patient was instructed to rinse with warm salt water after each meal. Instructions such as brushing without traumatizing the implant area, consuming a soft diet, avoiding physical activities that could irritate the operating area, and maintaining good oral hygiene were advised postsurgical instructions.

After the surgical with minimally invasive techniques performed, this patient received an implant-supported maxillary incisor with better esthetic results and minimal treatment discomfort. (Figure 9).



Figure 7. Temporary crown placement considering the contour of the gingival margin during healing and osseointegration.

No complaint and complication were noted during the postsurgical healing period. The implant side had favorably healed by three months; a definitive full ceramic zirconia crown was cemented onto it. The patient was also satisfied with the esthetic outcome (Figure 10).



Figure 8. A palatal aspect of the temporary crown.



Figure 9. The incisal surface of the temporary crown was slightly in contact with the antagonist.



Figure 10. Three months after implant surgery, replacing the temporary crown with a zirconia crown.

DISCUSSION

Implant placement procedure after a tooth extraction is one of the implant management methods that aims to obtain good primary implant stability. Maintain the healing process without significant hard and soft tissue changes and produce more efficient time in the next prosthetic stage. Because the implant is placed at the time of extraction, the bone to implant healing begins immediately with extraction site healing. Decision-making in the management of the immediate post-extraction implant procedure is based on several things, the type of post-extraction socket, the condition of the surrounding soft tissue, the position of the implant, the use of bone grafts, and the use of temporary crowns.¹ In this case, socket post-extraction had no labial bone loss, which an implant can be placed, no soft tissue deficiencies,

and a temporary crown can set on the same day.

Several factors that must be considered in this procedure include diagnosis, treatment plan, radiographic evaluation, and prognosis of the implant and surrounding tissue. According to Kan JY et al. (2011) and Tarnow DP et al. (1992), bone morphology, periodontal tissue, the height of the alveolar crest and interproximal bone, smile line, and morphology of gum tissue are considered at the beginning of treatment, especially in the aesthetic area.¹⁰ Bhola et al. (2015) recommended an immediate implant placement procedure based on the gingival biotype that a thick gingival biotype can be implanted immediately after extraction with a temporary crown.¹¹ The Patient, in this case, had a broad enough gingival biotype for immediate implant placement and temporary crown based on these recommendations. Several studies suggest that radiographic evaluation should consider bone availability, bone shape, quality and quantity, and bone thickness and height.¹² In this case, the bone quality was good, with a bone crest thickness of more than 4mm and a bone height of more than 10mm.

One of the more challenging aspects of immediate implant placement is positioning the implant with sufficient

primary stability in the extraction socket. Alveolar architecture concerning the angle of the implant to be inserted; presence or absence of a bony depression apical was to the extracted tooth.

The main disadvantage of placing the implant immediately on the changing alveolar bone from the extraction socket can cause progressive recession of the labial gingival margin over the implant restoration. Therefore, when placing implants directly with the one-stage surgical approach in the aesthetic zone, a prudent strategy is to increase the quality and quantity of the labial gingival tissue, which appears to be essential for the stability of the labial gingival margin involving immediate implants. One of the most effective ways to keep the implant socket from collapsing and improve the biotype of the labial gingiva is to simultaneously fill the labial cavity with particulate bone and supplement the labial gingival tissue with soft tissue.^{13,14} According to Willson TG Jr et al. (1998), in this case, there was a gap of more than 1.5mm on the labial wall. The opening was filled with a bovine Osstem® A-Oss xenograft. Bone augmentation aims to maintain bone contour and reduce excessive bone resorption to maintain the shape of the tissue around the implant.

Failures of immediate implant placement can be caused by excessive load and over-tightening of the implant, overheating bone due to the drilling procedure, unsterile implants, and poor bone quality.¹⁵ In this case, the quality of the bone was reasonable based on available bone width, available bone length, bone angulation, and bone density. No lesion was found on tooth 11, and there were apical lesions on teeth 12 and 21, which had been planned for endodontic treatment. During the surgical procedure, the maximum drilling speed was 1000 rpm/20NCm with saline irrigation and placement with handpiece driver implant 40 RPM/20 NCm to prevent bone heat as implant failure can be avoided.

The choice of a fabricated crown as a temporary crown is considered based on the condition of the soft tissue thickness. In this case, the patient's soft tissue was included in the thick gingival biotype category following the research recommendations conducted by Bholá et al. (2015).¹¹ This method has a better psychological impact on patients, providing a level of aesthetic satisfaction, especially in the case of anterior teeth, by avoiding toothless conditions while waiting for the osseointegration process. Immediate placement of an implant into the extraction socket in one stage approach and immediate

temporary crown was the best way to manage and support the hard and soft tissue (papilla and marginal gingiva) following extraction.¹³

The placement of dental implants with a full-thickness flap has a risk of contamination from bacteria, while inserting the implant would cause implant failure. In this case, the patient was prescribed amoxicillin 500 mg for one hour before surgery and three days after surgery because infection risk on the procedure was moderate to high, including extraction, socket preservation, and immediate implant placement with soft tissue reflection and bone grafting around the implant. A literature review examined that the effect of antibiotic use on dental implants had shown success rates of 92% when no antibiotics were used, 96% when prophylactic antibiotics were used, and 97% when postoperative antibiotics were used.¹⁶ Abu-Ta'a (2008) conducted a meta-analysis of four randomized controlled trials suggested that 1 g of amoxicillin given an hour before implant placement and 500 mg 4 times a day for two days postoperatively significantly decreased early implant failure.^{17,18}

Immediate Implantation and fabricated temporary crown were combined with bone graft in the socket after extraction of incisors. In this case, the result is similar to the issue of Long Chen wherein the 18

months follow-up examination reported stable and healthy peri-implant soft tissue, and integration between the bone and implant was confirmed by periapical radiography. Patients are also satisfied with the aesthetic results. Immediate implant placement into the new extraction socket can offer advantages. It appears to be a safe and predictable method for patients.¹⁹

Many studies investigated the success rate of an immediately placed single implant in the socket of the anterior maxillary. Parhiz (2017) studied 27 implants placed immediately in the extraction socket with facial defects and added bone augmentation. After six months post-surgery, there was no suppuration and no thread exposure observed among patients. The survival rate at six months follow-up was 96,3%.²⁰ In addition, many studies compare the success rate of immediate implants in fresh sockets and conventional implants. They demonstrated quick implant placement techniques were effective procedures as delayed implant placement.^{21,22} Cosyn, J et al., (2019) had different results from their systematic review and meta-analysis research. A higher risk for early implant loss than delayed implant placement is found in immediate implant placement. A direct implant placement had insufficiency osseointegration, although the aesthetic

outcomes were similar.^{23,24}

CONCLUSION

Implant placement immediately after tooth extraction, in this case, is a simple procedure that can be done in one visit and has a success rate in maintaining the tissue surrounding the implant. Accuracy is needed in determining the diagnosis, treatment plan, radiographic evaluation, and prognosis of patient care. Operators must have the ability to handle implant surgery and soft tissue management to get successful implant treatment results.

CONFLICT OF INTEREST

The authors reported no potential conflict of interest

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