Immediate Implant Placement in the Infected Site with Presence of a Pre-Existing Cyst: Report of Two Cases

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Abstract

Aim: The purpose of this report is to illustrate the possibility of inserting immediate implants into the fresh extraction sockets in the infected site with presence of a pre-existing cyst.

Presentation of case: The 1 of two cases: A 31-year-old man, presented to severe periodontitis with presence of a pre-existing infected cysts developed, which was 5mm × 7mm on the labial side of mandible. The radiography showed that a large translucent image around the periapical portion of 31 with mobility of III° in mandible. The extraction and implantation including bone grafting to substitute 31 tooth had been performed in one appointment. One implant (14mm length × 3.7mm in diameter SIN implants Dentis, made in Korea) was inserted apically through a cyst cavity. Three months later, the second surgery phase (healing screw insertion) had been followed, and no sign of alternation of radiography and clinical indication after 18 months.

The other, a 53-year-old man came to our attention, with presence of a pre-existing infected cyst on labial side of 42 tooth. We placed one implant in the infected position of the mandible with a small amount of heterologous bone after the elimination of the infected 42 tooth, the meticulous cleaning, and alveolar debridement. A second surgery phase had been done after three months.

Discussion and conclusion: This report showed that the placement of immediate implants in presence of a pre-existing infected cyst may not be necessarily contraindicated if appropriate clinical procedures like antibiotic administration, meticulous cleaning, and alveolar debridement are performed before implant surgical procedure. Immediate placement of implants for replacement of teeth with the pre-existing infected cysts is a predictable treatment and can be indicated for replacing teeth lost. This report regards the immediate placement of an implant into a residual cyst: some anatomical, surgery techniques, clinical and pathological considerations arise from this case. Both implants were successfully osseointegrated, and the cysts were healed.

Keywords

Periapical cyst, Immediate dental implant, Infection

Introduction

The use of immediate implants in patients with teeth lost due to the infected site is now an established practice [1]. In the two cases, two implants were placed into the pre-existing cysts where the sites were in a history of a pre-existing infection in mandible. Sometimes the infection is active, so that the possibility exists for the long-term infections that can negatively impact the prognosis of the implants. In the previous literature, the fresh-socket implants are contraindicated with a pre-existing inflammation due to the risk of microbial interference in the healing process. McCracken also reported that immediate implant placement (IIP) into an infected socket, like periodontitis due to the previous pathogen may release some inflammatory factors and result in a secondary infection. However, treatment of patients with the periapical pathology may encounter some problems during the process. But the data from animal research, human case reports and case series, and prospective studies showed similar success rates for implants placed into sites associated with chronic periapical pathology compared with implants placed in non-pathologic sites. The aim of this work is to illustrate the importance of periodontal infection control together with prudent management of implant placement in the infected sites in order to best solve the problem of the patient.

Alveolar ridge resorption after tooth extraction may considerably reduce the residual bone volume and compromise the favorable positioning of implants required for optimal restoration. This is even more pronounced in the anterior teeth, where ridge resorption often creates an unfavorable lingual/labial discrepancy between the implant and the prosthesis. To preserve the alveolar bone level from the collapse caused by treatment and to reduce treatment time in situations in which tooth extraction precedes implant placement, IIP has both social and economic advantages. The overall treatment time is reduced, a second surgical intervention is avoided, and there is a decrease in rehabilitation treatment time [2] because it minimizes the number of surgical procedures by combining extraction, implant placement, and bone grafting (if needed) into one appointment [3]. In two cases, the immediate placement of the implants into the fresh extraction sockets with the peri-apical pathology avoids this undesirable resorption [4,5]. Also, this report is to evaluate and to discuss possible predisposing factors for the development of infection after placement of the immediate implants on the site of the patient with presence of a pre-existing infected cyst.

Presentation of Case

Two patients, systemically healthy, were extensively evaluated with regard to clinical signs, implant treatment, and postoperative...
probable lateral bone augmentation. Under all aseptic precautions
pathology when placing the implant, and at the same time, to optimize
Surgical procedure
revealed: bleeding index I°, the redness of gum, a gingival recession,
complaint of dull pain in the lower left incisor. Clinical examinations
Center with history of conservative periodontal treatment, the chief
complications. The 1 of two cases: A 31-year-old man, smoker
of mandible.
image of radiography, and an alveolar crest resorption on 42 tooth
existing infected cyst, which developed 5mm × 6mm translucent
conditions with presence of periodontitis and the site of a pre-
periapical portion on the 41,31 of mandible (Figure 1). A dark color
has an appearance of pus, but without an offensive smell.
administration, meticulous cleaning, and alveolar debridement
was decided to proceed with the placement of implants in the site
numbers 31. We advocated a 2-stage surgical protocol for load-
free and submerged healing to ensure predictable osseointegration
(Figure 2). One implant was inserted on 31 tooth of mandible:
(size 3.7 with diameter × 14mm length, SIN implants Dentis, made
in Korea) for implantation with two-stage. Following the visual
orientation of CBCT (Cone Beam Computed Tomography) for apical
setting of the implant (Figure 3), the fixtures of immediate implant
are anchored apically to alveolar socket in native bone and achieved
the primary stability of the implant. The residual apical bone of 3 to
5mm in a vertical dimension is required. The implant was inserted by
placing implant shoulder 1mm under the crestal bone providing the
physiological ridge alterations after extraction, and was anchored to the
lingual/labial cortical plate of the post-extraction site [6-9]. So, in the
presence of large sockets that preclude the involvement of apical
native bone, it may be preferable to defer implant placement. The
implant was showing thru the area of fenestration, it was filled the
surgical chamber with xenogenous bovine bone graft and a collagen
membrane. GBR was accomplished to support bone healing of peri-
implant alveolar defects with the flap repositioned and sutured. The
site was covered with the gauze pack and ice on the rest of the day. The
specimen was sent for a histopathologic examination and a diagnosis
of was revealed: periapical cyst (Figure 5). Posturgical antibiotics for
7 days, and postsurgical chlorhexidine were followed for 2 weeks. The
patient was shown how to perform a roll-volume brushing technique
and was motivated to control oral hygiene. The patient did not report
specific symptoms and showed no adverse clinical signs. Sutures
were removed on 7th days of IIP (Figure 6), and surgery healing was
satisfactory. The second surgery phase (healing screw insertion) had
been done after three months of IIP (Figure 7).

Result

In our two cases, postoperative checkup included the clinical
check-up and radiographic examination, which was followed
the period ranged from 1 to 2 years after surgical procedures. The
implant showed that the adequate initial stability had been gotten
in the correct position. Radiographic examination revealed that the
complete bone had been filled into the resented area (Figure 8). The
stable bone level is 2mm lower than the previously placed implant
on the normal range (A mean marginal bone loss of 0.7-2mm was
registered). Both cases were healed with no further symptoms and
no lasting complications. The implants were fully osseointegrated,
presenting without radiographic signs of alterations or clinical
pathologies (Figure 7,8).

Cyst contains contents (aspirate): a dirty white, low protein,
cholesterol crystal content, and viscid suspension of keratin which
has an appearance of pus, but without an offensive smell.

Discussion

This report showed that the placement of immediate implants
in presence of a pre-existing infected cysts may not be necessarily
contraindicated if appropriate clinical procedures like antibiotic
administration, meticulous cleaning, and alveolar debridement
are performed before implant surgical procedure. A few cases with
present of the teeth in a pre-existing infected cyst have been reported
in a success rate of the immediate implant placement (IIP). The
complications. The 1 of two cases: A 31-year-old man, smoker
without chronic disease presented to the Hangdao Dental Implant
Center with history of conservative periodontal treatment, the chief
disorder of the mandible. Surgical access was obtained on the anterior peri-apical cyst
of the infected site by mean of an incision. The incision was extended
from 32 distal crest to the mesial sulcus of the 43. A full thickness flap
was carefully elevated (Figure 4) and a dark-blue circumscribed lesion
was exposed. The small perforation was made for aspiration of cystic
contents. An aspiration biopsy was carried out before the surgery.
Then, the 31 tooth with the cystic linings was carefully removed by
means of a routine technique and done with socket degranulation.
The curettage was done with solution. A second access was gained at
the apical level, allowing the meticulous debridement of the surgical
chamber for elimination of the periapical lesion and of the infected
tissues in combination with peripheral ostectomy of the alveolus. It
was decided to proceed with the placement of implants in the site
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Figure1: Panoramic radiography at the time of preextraction illustrating the radio-transparent image associated with the apex of 31, 41.

Figure 2: (a) The root canal had been done on the 41 before extraction of 31, and note the intentional placement of an endodontic file beyond the apex into the cystic cavity. (b) The image demonstrates the clinical healing at 10 weeks after the 2-stage surgical protocol and submerged healing of the implant.
Figure 3: CBCT scans showed the presence of a radiolucent image of approximately 1cm in diameter periapically to the 31 tooth, and assessed the available apical bone and the anatomy of the alveolar crestal bone of mandible in the area of the extraction as a potential implant site after tooth extraction.

Figure 4: Surgical access was obtained on the peri-apical cyst by means of an incision. The incision was extended from the 32 distal crest to the mesial sulcus of the 43. A full thickness flap was carefully elevated.

Figure 5: The histopathologic analysis revealed: a stratified squamous epithelium, with granulation tissue forming the cyst wall. Graft particles were visible, surrounded by collagen fibres in the cystic wall. A fibrous capsule with inflammatory infiltrate by chronic inflammatory cells, resulting in a final diagnosis of a paradental cyst.
further study is still needed to make sure the future evaluation. Short-term implant survival and success rates appear similar for the infected sites and normal tissue sites for IIP [10]. Some factors such as the dimension of the lesion; inadequate morphology of the area or the non-effective debridement need to be concerned during an implant surgery. It is very important that the elimination of all contaminated tissues and the controlled regeneration bone of the alveolar defect. Frequently, the compromised teeth that are indicated for extraction are enveloped in infection, which conventionally contraindicate their immediate replacement with endosseous dental implant [2] because of the risk of microbial interference with the healing process. The protocol that completely removes the contaminated soft and hard tissues by meticulous debridement was maintained, allowing successful GBR of the previously infected alveolus implant. The reason is that there might be a potential contamination of the implant during the initial phase of wound and bone healing due to the remnant of infection, which affects the process of osseointegration. This procedure should be limited to experienced surgeons who are highly skilled in differentiating and debriding granulation tissue. The surgeon must also be proficient in GBR procedures to skillfully correct the significant alveolar defects that are commonly associated with these cases.

The IIP in extraction site is a treatment with a defined protocol, and well accepted, thanks to the preservation of aesthetics, the maintenance of the alveolar walls, a better positioning of the implant, and a reduction in surgery time and the overall treatment [11]. However, the concept of IIP after extraction of a tooth with periapical disease is a very controversial topic, with few scientific studies of quality published. Controversy exists in treatment planning relative to the implant therapy must fulfill both functional and esthetic requirements to be considered as a primary modality. Aiming to reduce the process of alveolar bone resorption and treatment time, the immediate placement of endosseous implants into extraction sockets with the infected sites has been propagated by some authors. However, a few clinical data are available on IIP in the pre-existing infected cysts. In the presence of cyst, one problem in IIP in the site may be an incongruity between the implant diameter and the morphology of the alveolus that is worsened by the presence of a bone defect because of the bone cyst. Many stated that a minimum of residual apical bone of 3 to 5 mm in a vertical dimension is required.

Figure 6: The gingival and crest bone condition of case 1 after the suture was removed on seven days of the implant surgery.

Figure 7: Case 1, (A) There was no radiographic signs of alteration on the implant of 31. (B) Showing the second surgery phase (healing screw insertion) on the 31 had been followed after 3 months of IIP.

Figure 8: The implant of case 1 was fully osseointegrated, presenting satisfactory esthetic conditions.
fibrous encapsulation of the implant [18]. In addition, it is critical for trauma and thermal injury may lead to osteonecrosis and result in formation of connective tissue encapsulation. If an implant is placed in compact dense bone is more likely to ensure initial stability and, hence, better able to sustain such immediate forces. Within the limited available information, it appears that primary stability, more than the arch (anatomic) location, may be the fundamental requirement for immediate implant loading techniques. Controlling functional forces is one of the ingredients for obtaining success of immediate implant loading [19], found more prosthesis for a temporary time to promote uneventful healing, loose denture, pain, difficulty with chewing during transitional removable prosthesis wearing. In 1 of our cases, the prosthesis had been done on the 9th months due to the patient was not recalled on time.

Oral hygiene

Regular maintenance may be another factor to ensure the long-term success of immediately loaded implant. What needs to be considered is the well knowledge of patient oral and periodontal conditions. Periodontal disease should be treated completely before implant treatment. In addition, the patient should be monitored over time in order to reduce inflammatory indexes that may increase the failure risk and biological complications of our implant-supported restorations. After surgical curettage of site, implants may develop an inflammatory pathology as a result of a long-term residual infection. It is very important to reduce the inflammatory response on the periodontal tissues. Moreover, it may be beneficial in maintaining the integrity of the extraction sockets and contribute to the maintenance of the interdental papillae around implant restorations.

Surgical technique

Gentle surgical placement is also a key element for implant success regardless of the applied treatment protocol. Excessive surgical trauma and thermal injury may lead to osteonecrosis and result in fibrous encapsulation of the implant [18]. In addition, it is critical for the success of edentulous root form implants that adequate load be placed on the drill during the preparation of osteotomies. It has been demonstrated that independently increasing either the speed or the load caused an increase in temperature in bone.

Host-related factors

Bone quality & quantity and occlusion-related factors are included:

Clinically, host bone density plays an important role in determining the predictability of the immediate implant loading success. An implant placed in compact dense bone is more likely to ensure initial stability and, hence, better able to sustain such immediate forces. Within the limited available information, it appears that primary stability, more than the arch (anatomic) location, may be the fundamental requirement for immediate implant loading techniques. Controlling functional forces is one of the ingredients for obtaining success of immediate implant loading [19], found more prosthesis for a temporary time to promote uneventful healing, loose denture, pain, difficulty with chewing during transitional removable prosthesis wearing. In 1 of our cases, the prosthesis had been done on the 9th months due to the patient was not recalled on time.

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Various studies have demonstrated the feasibility and predictability of this technique. However, most of these articles are based on retrospective data or uncontrolled cases. Randomized, prospective, parallel-armed longitudinal human trials are primarily based on short-term results and long-term follow-ups are still scarce in this field. Nonetheless, from available literature, it may be concluded that anatomic locations, implant designs, and restricted prosthetic guidelines are key to ensure successful outcomes.

Our report here [2,21-23] demonstrated that IIP in infected extraction sockets can be successful, provided that thorough preoperative care is given. However, more randomized controlled clinical trials with a longer follow-up are required to confirm this procedure as a safe treatment. Moreover, the outcome measures of the cases were not related to the type of infection; the classification


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of infection was often vague and varied among the studies. Until now, no study compared the immediate placement of implants in infected sites conducting a careful debridement with and without the use of systemic antibiotics. Thus, more research is needed concerning the issues. With the trend of shortening treatment time and reducing patient discomfort/inconvenience, immediate loading implant has reemerged as an alternate approach. This treatment approach has been studied and has shown promising and predictable results. But, it is important to note that a meticulous case selection is still needed to integrate this treatment into daily practice. Certain criteria and guidelines have to be followed to avoid any unnecessary failure. However, within the limit of a case report, timing of implant placement does not represent a parameter that can affect the short-term treatment outcomes if you meet certain principles.

Conclusion

We concluded that the two cases presented successful results by placing immediate implants into the infected cysts. Immediate placement of teeth implants for replacement of teeth with pre-existing infected cysts is a predictable treatment and can be indicated for replacing teeth lost due to the pre-existing infected cysts. The protocol of meticulous debridement of the infected lesion tissues in combination with peripheral ostectomy of the bone cysts should be followed. Future studies, preferably randomized, prospective longitudinal studies, are certainly needed before this approach can be widely used.

Ethical Statement

Two patients signed the informed consent form approved by the Research Ethics Committee of the Huangdao Hospital, University of Qingdao, authorizing treatment and publication of the case.

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References