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Case report

One-year follow-up of immediately-placed implants with early radiographic signs of failure: report of two cases

Elçin Sağırkaya,[1]* Burak Bekçioğlu,[2] Murat Cavit Çehreli[3]

[1]Department of Prosthodontics, Faculty of Dentistry, Ordu University, Ordu, [2]Section of Oral and Maxillofacial Surgery, Oldcitydent Oral and Dental Health Hospital, Eskişehir, [3]Section of Prosthodontics, CosmORAL Oral and Dental Health Polyclinics, Ankara, Turkey

Abstract

Introduction: Peri-implant radiolucency is frequently interpreted as an indicator of failure. However few reports suggest that clinically-asymptomatic implants could have a good prognosis. The aim of this report was to present the lack of correlation between clinical and radiographic findings of asymptomatic immediately-placed implants in two subjects during the healing period and at one-year follow-up.

Case Report: In one patient, the maxillary right first premolar and first molar teeth supporting a fixed prosthesis were extracted and two implants were immediately-placed into fresh extraction sockets. Four mandibular incisors of the second patient were extracted and two implants were immediately-placed into sockets of mandibular lateral incisors. At three-month recall appointment, implants in both patients were stable and without any signs of compromised healing, although radiographic examination revealed peri-implant radiolucency resembling peri-implantitis and lack of osseointegration. As the implants were clinically stable, both patients received fixed prosthesis at 4 months of post-extraction healing. At one-year recall appointments, implants in both patients were functioning without any clinical complications related to peri-implant infection. Radiographic evaluation showed bone apposition to previous radiolucent sites suggesting osseointegration took part.

Conclusion: Immediately-placed implants, exhibiting radiolucency resembling peri-implantitis at early stages of healing, but also clinical signs of uneventful healing may have favorable clinical outcome.

Keywords: Dental prosthesis, implant-supported; osseointegration; tooth extraction

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*Corresponding author: Elçin Sağırkaya, Department of Prosthodontics, Faculty of Dentistry, Ordu University, 52100, Ordu, Turkey;
e-mail: elcin_eraydin@hotmail.com

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Introduction

Immediate-placement of oral implants into fresh extraction sockets coupled with or without immediate functional loading has been proposed as a treatment alternative for oral rehabilitation by means of implant-supported fixed prostheses.[1,2] Owing to the three-dimensional shape of the previously existing root, a site-specific bone defect remains upon immediate implant placement, extending apically more than a few millimeters in most cases.[3,4] As the bone defect becomes occupied with coagulum and granulation tissue and replaced by a provisional matrix in the early stages of healing, an uneventful bone healing phase can be completed.[5]

One of the factors leading to early implant failures is peri-implantitis, which is responsible for 10% of the failures.[6] Radiographic evaluation of implant sites suffering from peri-implantitis exhibit peri-implant radiolucency and bone loss. Clinical signs of severe inflammation, such as suppuration, swelling and/or fistula formation are detected at the implant site, and majority of the implants may be mobile. In addition, histologic observations of failed implants due to peri-implantitis in humans show that 60% of the lesions are occupied by inflammatory cells that infiltrate apically.[7] As peri-implantitis is characterized by lack of osseointegration, removal of the implant is frequently suggested not to jeopardize the treatment outcome. Nevertheless, conventionally-placed implants presenting clinical signs of uneventful healing, but radiographic signs resembling peri-implantitis and lack of osseointegration has been reported to demonstrate radiographic evidence of osseointegration in time. In a two-year clinical and radiological study on maxillary implant-supported overdentures, Smedberg *et*

al.[8] found that 4 of 191 implants showed total peri-implant radiolucency. Of these, one implant was lost, 2 remained, and one dissappeared during observation. Likewise, Akca and Iplikcioglu[9] observed complete healing of a previously-existing wide radiolucent zone around a mandibular implant in a one-year observation period. The purpose of the present clinical report was to present the one-year dramatic changes in radiographic findings of two patients who had immediately-placed implants to support fixed prosthesis.

Case Report

Case 1

A 47-yr-old female having pain in the right maxillary posterior region had a 12 mm-deep periodontal pocket at the distobuccal root of the first molar supporting a fixed partial prosthesis. The right maxillary first premolar supporting the same prosthesis had sensitivity upon palpation at the apical side of the tooth; swelling and suppuration was not evident. The radiographic examination revealed that both teeth had undergone endodontic therapy, a vertical bone defect and a chronic periapical radiolucency was present around the premolar, and a deep bone defect approaching the apex was present in the molar (Figure 1). Both teeth were extracted, sockets cleaned, and Æ 5×10 mm and Æ 4×15 mm implants (MK III TiUnite, NobelBiocare, Goteborg, Sweden) were immediately placed in sites of the molar and premolar, respectively. Then, primary closure of the surgical site was provided by reflecting a full-thickness flap sutured by 4-0 silk sutures and kept in place for 1 wk. The patient was prescribed antibiotics, analgesics, and 0.2% chlorhexidine gluconate postoperatively for 1 wk. At 3-month recall appointment, the molar implant was visible due to soft tissue recession, the implant was stable and without any signs of clinical complication. Likewise, the premolar implant site did not show any signs of peri-implantitis (*i.e.*, pain, suppuration, swelling, fistulization), although direct examination of the submerged implant was not possible. Radiographic examination showed radiolucent areas particularly distal to the premolar, which did not follow the configuration of a previously-existing tooth socket defect but rather resembled the radiographic view of peri-implantitis (Figure 2). At the second-stage surgery, it was observed that the collar of the premolar implant was surrounded by bone tissue, the implant was stable in place, and there was no sign of infection. Upon soft tissue healing (3 wk), a cement-retained fixed partial prosthesis was delivered to the patient. Prior to prosthesis delivery, the patient did not feel pain during torque-tightening of the abutments. At one-year recall appointment, the implants were stable in place and the

Figure 1. *Preoperative periapical view of the site. The chronic periapical radiolucency and bone loss around the premolar and the excessive loss of bone around the distobuccal root of the molar*

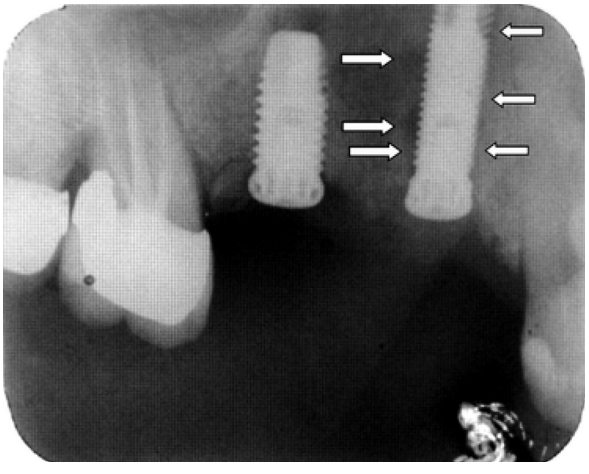

Figure 2. *Radiographic view of immediate implants at three-months post-surgery. Note bone apposition into the threads of the molar implant. The radiograph also shows a wide radiolucent zone around and a thin radiolucent area in the mesial aspect of the premolar implant (arrows)*

peri-implant soft tissue health (bleeding index and plaque index scores and probing depth) was within normal limits. Radiographic evaluation showed that the radiolucent zone at the distal part of the premolar implant was undetectable and apposition of skeletal tissue into the threads of the implant, suggesting osseointegration, was evident (Figure 3).

Case 2

A 55-yr-old female who had mandibular four incisors splinted due to advanced periodontal breakdown had frequent debonding of the composite resin. The clinical examination showed that soft tissue recession was present up to half length of the roots and the teeth had excessive mobility. Radiographic examination revealed that the central incisors received endodon-

Figure 3. *One-year radiographic view of implants after prosthesis delivery. Note the full recovery of the previously existing radiolucent areas suggesting osseointegration*

Figure 4. *Preoperative sectional view of the site in a panoromic radiograph*

tic therapy and the teeth had 40-50% horizontal bone loss (Figure 4). The incisors were extracted, two implants (Æ 3.75×15 mm; MKIII TiUnite) were immediately placed in sites of lateral incisors, and an immediate removable denture was delivered to the patient. Likewise, primary closure of the surgical site was provided by full-thickness flaps sutured and kept in place for 1 wk. This patient was also prescribed antibiotics, analgesics, and 0.2% chlorhexidine gluconate postoperatively for 1 wk. At three months of healing, the cover screws of the implants were exposed allowing direct examination of the implants, which were stable. In addition, both sites did not show any signs of pocket formation and peri-implantitis. Radiographic examination, however, showed wide radiolucent areas around both implants, which exceeded the previously-existing roots (Figure 5). As the implants were asymptomatic, a cement-retained 4-unit fixed partial prosthesis was delivered to the patient. The patient did not feel pain during torque-tightening of the abutments. The implants were stable in place and the peri-implant soft tissue health was within normal limits at the one-year recall appointment (bleeding index and plaque index scores and probing depth). Moreover, radiographic evaluation revealed healing of the wide radiolucent areas suggesting osseointegration of the implant (Figure 6).

Discussion

The use of periapical radiographs is frequently limited to single tooth implant restorations in the treatment-planning phase, and imaging of the complete areas of interest may offer advantages in follow-up and trouble-shooting.[11] A clinically stable implant is invariably associated with radiographic view of intimate bone contact with the implant surface.

Although the implants in our subjects were placed in fresh extraction sockets, this clinical report provides similar radiographic evidence. Besides being clinically asymptomatic, an important sign of the implants in the present report and that reported by Akca & Iplikcioglu[9] was that all patients were females and they did not feel pain during torque-tightening of the abutments or the attachment. Yet, there is no proof on why females have experienced such radiographic lesions, as the very little pool of subjects does not allow comparative evaluation. The absence of pain during torque-tightening implies that the bone-implant interface was not severely affected during the initial healing phase. Another common finding was that the radiolucent area was wide, resembled a stress field in a loaded implant, and did not appear like a thin radiolucent line found in failed implants having an approximate width of periodontal ligament.[10] The reason behind the wide radiolucent areas around such implants, and the mechanism leading to time-dependent skeletal tissue apposition into implant threads and full recovery is unknown. Nevertheless, it is tempting to speculate that variations in site-specific density and structure (and particularly strength) of trabecular bone could con-

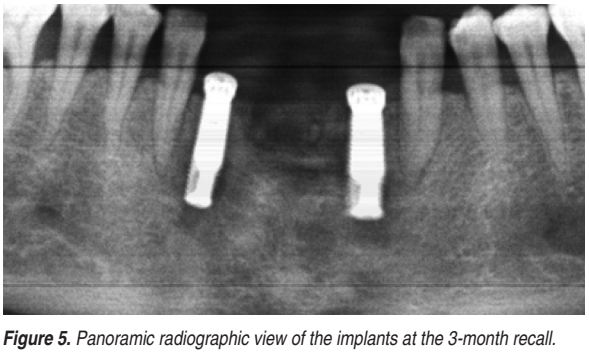

Figure 5. *Panoramic radiographic view of the implants at the 3-month recall. The wide radiolucent areas around both implants exceeded the shape and the apical level of the previously existing roots*

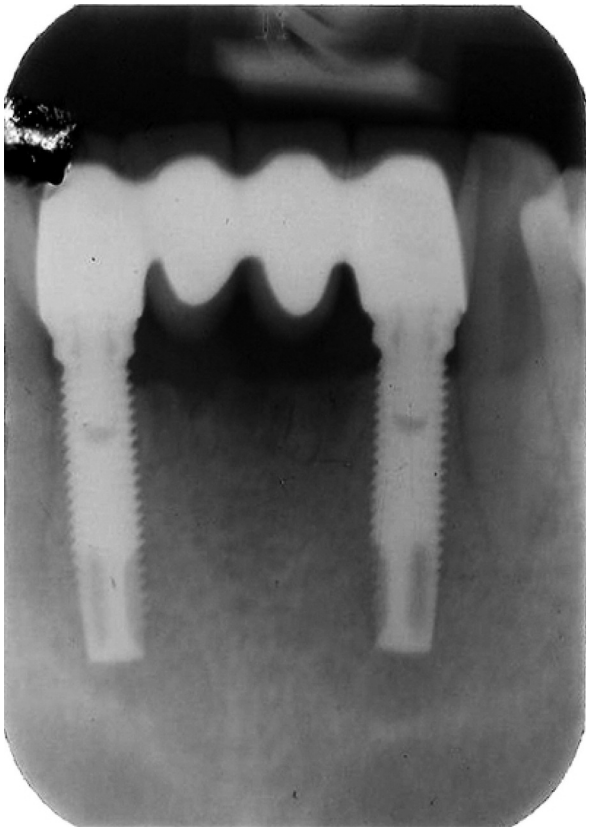

Figure 6. *Periapical view indicating healing of the wide radiolucent zone around implants at one year of function*

tribute to this outcome. An implant placed in dense bone leads to more initial bone-implant contact decreasing local tissue strains. Conversely a self-tapping implant inserted in a relatively weak trabecular bone with the same insertion torque will definitely lead to more stress/strain in the skeletal tissue and probably microcracks in the trabeculae in a wider zone. Consequently, the trabecular bone undergoing a repair process in the vicinity of the implant might lead to a zone of radiolucency, which originates from stress, not infection. If this is true, it is clear that modelling/remodelling capacity of bone can heal such radiolucent areas.

Conclusion

Asymptomatic immediately-placed implants exhibiting periimplantitis-like radiolucency in the early stages of healing may experience full recovery and osseointegration in time.

Conflict of interest disclosure: The authors declare no conflict of interest related to this study.

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Erken radyolojik başarısızlık bulguları gösteren hemen-yerleştirilmiş implantların bir yıllık izlemi: iki olgu bildirimi

Özet

Tanıtım: İmplant çevresindeki radyolusent alanlar, sıklıkla bir başarısızlık göstergesi olarak yorumlanmaktadır. Buna rağmen, çok az sayıda rapor klinik olarak semptomsuz implantların iyi bir prognoza sahip olabileceğini ileri sürmektedir. Bu raporun amacı, iyileşme döneminde ve bir yıllık kontrolde, iki hastada hemen yerleştirilen implantların klinik ve radyolojik bulguları arasındaki uyuşmazlığı sunmaktır.

Olgu Bildirimi: İlk hastada, sabit protezin dayanakları olan üst çene sağ birinci küçük azı ve birinci büyük azı dişleri çekildikten sonra aynı seans iki adet implant çekim soketlerine hemen yerleştirildi. İkinci hastanın dört adet alt keser dişi çekildi ve aynı seans iki adet implant alt lateral dişlerin çekim soketlerine hemen yerleştirildi. Üç ay sonraki kontrol randevusunda yapılan radyografik muayenede, peri-im-

plantitis ve osseointegrasyonda yetersizliği andıran peri-implant radyolusensi saptanmış olmasına rağmen, her iki hastada da implantlar stabildi ve iyileşmeyi riske atacak herhangi bir işaret yoktu. İmplantlar klinik olarak stabil olduğu için, hastaların sabit protezleri 4. ayda teslim edildi. Birinci yıl kontrol randevusunda, hastalardaki implantların peri-implant enfeksiyonu ile ilişkili herhangi bir klinik komplikasyon olmadan işlev gördüğü saptandı. Radyografik değerlendirme, önceden osseointegrasyonun şüpheli olduğunu düşündüren radyolusent alanlara kemik appozisyonu olduğunu gösterdi.

Sonuç: İyileşmenin erken aşamalarında peri-implantitise benzeyen radyolusensi izlenmesine rağmen, sorunsuz iyileşmenin klinik belirtilerini sergileyen hemen yerleştirilmiş implantlar olumlu klinik sonuç verebilirler.

Anahtar Kelimeler: Diş çekimi; diş protezi, implant destekli; kemikle bütünleşim