CASE REPORT

Alveolar bone preservation by using highly porous bioabsorbable device before implantation: A case report

İmplant öncesi yüksek poröziteli rezorbe olabilen aygıt kullanımı ile alveolar kemiği koruma: Bir olgu sunumu

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SUMMARY

The most important issue for implantation is maintaining height and width of alveolar bone after extraction. Forty to 60 percentage of the bone resorbs in 2 years after dental extraction. The new technologies are about to be developed to protect the bone level by obtaining alveolar socket preservation. In this case, we used Alvelac TM to maintain the original height and width of the socket with minimal bone loss and normal bone structure by blocking the collapsing of alveolar socket walls. Highly porous bioabsorbable device (AlvelacTM) is a porous, osteoconductive, biocompatible and biodegradable synthetic scaffold synthesized from poly lactic-co-glycolic acid (PLGA) with polyvinyl alcohol and produced by using 3D printing technology. The device provides bone healing, decreases the need for bone augmentation and resorbs in 2 to 6 months. In addition, future dental procedures such as dental implants can be successfully performed. Accordingly patients need no additional surgery such as bone grafting for inadequate bone configuration after dental extractions.

Key Words: Alvelac, alveolar socket presentation, dental implant surgery.

ÖZET

İmplant tedavisinde en önemli ve güncel konu alveolar kemik yüksekliği ve genişliğini diş çekimi sonrasında korumaktır. Diş çekimini takiben 2 yılda %40-60 oranında kemik kaybı gözlenmektedir. Günümüzde alveolar soketin korunarak yeterli kemik seviyesinin sağlanabilmesi için yeni teknolojiler geliştirilmektedir. Bu vakada alveol kemiğinin çekim sonrasında yüksekliğini ve genişliğini minimum kemik kaybı ve normal kemik yapısı ile korumak için, alveolar soket duvarlarının rezorpsiyonunu önleyen yüksek poröziteli rezorbe olabilen aygıt (Alvelac) kullanıldı. Alvelac poröz, osteokondüktif, biyouyumlu ve rezorbe olabilen bir sentetik iskelet yapıdır. 3D yazıcı teknolojisi kullanılarak Polilaktik-ko-glikolik asit (PLGA) ve Polivinil alkolden elde edilmiştir. Aygıt ile kemik iyileşmesi ve ogmentasyon ihtiyacının azalması sağlanarak büyük bir avantaj elde edilir. Daha sonra 2-6 aylık süre içerisinde aygıt rezorbe olur. Bunun yanında implant tedavisi gibi dental işlemlerin yapılmasında kemik kaybını önleyerek yardımcı olmaktadır. Böylelikle hastalarda greft uygulaması gibi ikinci bir cerrahi operasyon gereksinimi ortadan kaldırılarak çekim sonrası kemik rezorpsiyonun engellenmesi hedeflenmektedir.

Anahtar Kelimeler: Alvelac, alveolar soketin korunması, dental implant cerrahisi.

INTRODUCTION

Today, if there are no any contraindications, implant surgery is the most effective treatment for patients' prosthetic needs. The most important criteria before the implant surgery are the sufficient alveolar bone height and width. After the extractions, bone-healing process begins to take place immediately. Since the alveolar bone no longer responds to stresses applied in this area, it begins to resorb (1). In relation to lack of the stimulating effect of the teeth roots, the alveolar ridge volume decreases in height and width. Bone height loss can be up to 1.5 mm in 3 months and decreasing in the width of alveolar ridge can be as much as %40-60 in 1-3 years. The new technologies are about to be developed to protect the desired bone level after tooth extraction for the implant surgery (1,2).

After tooth extraction, blood fills the alveolar socket and forms the clot as a beginning of healing process. The blood clot formation continues with the organization of granulation tissue in one week and finally osteogenesis starts. During this healing period, bone loses its height and width (1,3,4). Socket preservation techniques are being developed to prevent this loss. The highly porous bioabsorbable device is made of PLGA (polyactic co-glycolic-acid) with polyvinyl alcohol and material that obtains mechanical support to hold the blood clot at the crest level (1,4,5). Alvelac provides minimal bone loss and maintains healthy bone structure with its osteoconductive and biocompatible features that makes it valid option before the implant surgery. In this case, it was reported the preservation of alveolar bone level after tooth extraction by using Alvelac.

CASE REPORT

52-year-old female patient presented to Istanbul University, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery with complaint of progressive decay in right mandibular first molar. Intraoral and radiographic examination (Fig. 1) revealed that extraction of tooth #46 was indicated. Alvelac™ (3,5∗4mm x 3,6∗5mm) was inserted into the empty socket after extraction (Fig. 2), and primary wound closure was obtained with sutures in the operation site. The patient was examined clinically and radiographically in terms of infection and process of healing postoperatively (Fig. 3) and 3 months after extraction (Fig. 4). The radiographic examination was done by panoramic radiograph. Successful healing of soft tissue and bone tissue was observed.

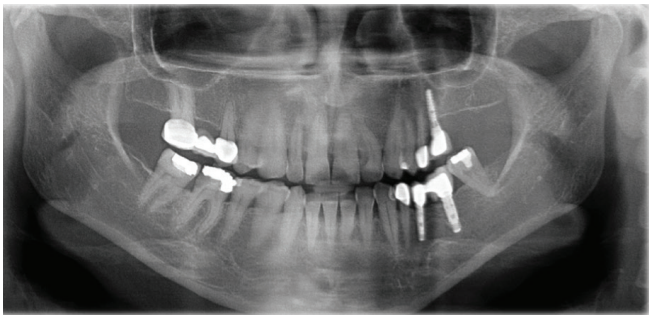

Fig 1. *Preoperative panoramic radiograph*

Fig 2. *Insertion of Alvelac™ (3,5∗4mm x 3,6∗5mm)*

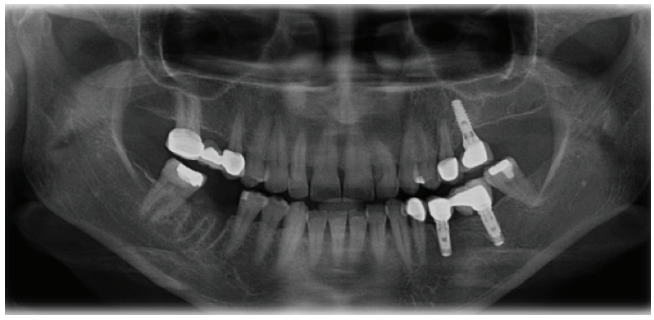

Fig 3. *Postoperative panoramic radiograph*

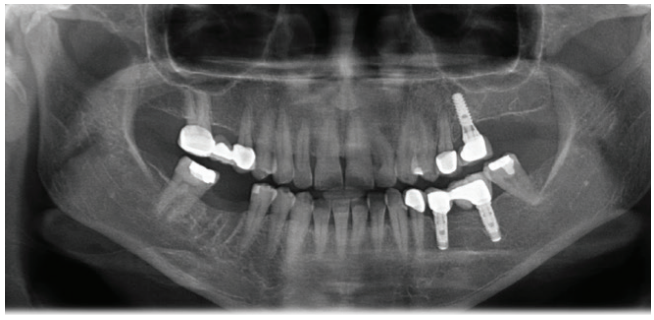

Fig 4. *Panoramic radiograph after 3 months*

DISCUSSION

Socket preservation is a developing concept for protecting the bone from resorption. It is a practical and noninvasive alternative for bone augmentation techniques. Highly porous bioabsorbable device (AlvelacTM) has this important advantage by decreasing the need for bone augmentation before implant surgery. Defects that were treated with this device had an improved bone height and width preservation compared with empty defects while follow-up controls (1,6). AlvelacTM can easily be applied to the socket with variable sizes. Placement can be vertical, horizontal or diagonal at crest level. It maintains the protection of bone volume and increases the patients' chance to be indicated for dental implant surgery.

CONCLUSION

Considering the rapid increase of dental implant surgery as a treatment of option, socket preservation is an important issue to maintain the sufficient bone volume (1,7). Highly porous bioabsorbable device (AlvelacTM) is an excellent choice for preservation of the socket by blocking the collapsing of alveolar socket walls. More studies need to be done for this concept.

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