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Case Report

Immediate implant placement by using natural bovine bone substitute and acellular collagen matrix

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Abstract: Adequate bone and soft tissue volume is important to allow proper implants osseointegration, survival and esthetic result. The aim of this case report was to observe an immediate implant placement by using natural bovine bone substitute and acellular collagen matrix to gain better soft tissue result. Upon screw-retained provisional bridge removal after four months, a successful peri-implant soft tissue healing was observed. Then one year after final bridge, a stable soft and hard tissue situation, as well as sufficient implant stability, granules osteointegration into newly formed bone was recorded.

Keywords: Immediate implant placement, natural bovine bone, acellular collagen matrix

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Introduction

Efficiency and aesthetics with dental implants require sufficient soft and hard tissue volume [1]. Therefore, many treatment options have been suggested over the years [2]. Immediate implant placement attracts much attention because it shortens the treatment time [3]. Here a primary implant stability is crucial, however, the missing bone volume should be compensated by a bone grafting material [4]. Also, a sufficient soft tissue thickness is necessary for long-term success and stability [5]. Still, it remains a great challenge to achieve parallel success in new bone and soft tissue formation.

Natural bovine bone substitute and resorbable collagen membranes are the mostly used biomaterials for guided bone regeneration (GBR) [6], [7]. The GBR membranes sometimes lack sufficient thickness to increase the soft tissue volume. On the other hand, acellular collagen matrices (ACM) have sufficient thickness, improved handling, and longer lasting degradation time [8]. They also facilitate soft tissue regeneration by undergoing complete remodeling into patients own soft tissue [9].

The aim of this clinical case was to evaluate the effect of immediate implant placement by using natural bovine bone substitute and ACM instead of a GBR membrane, to gain better soft tissue result. The situation was assessed after 1 year of final bridge.

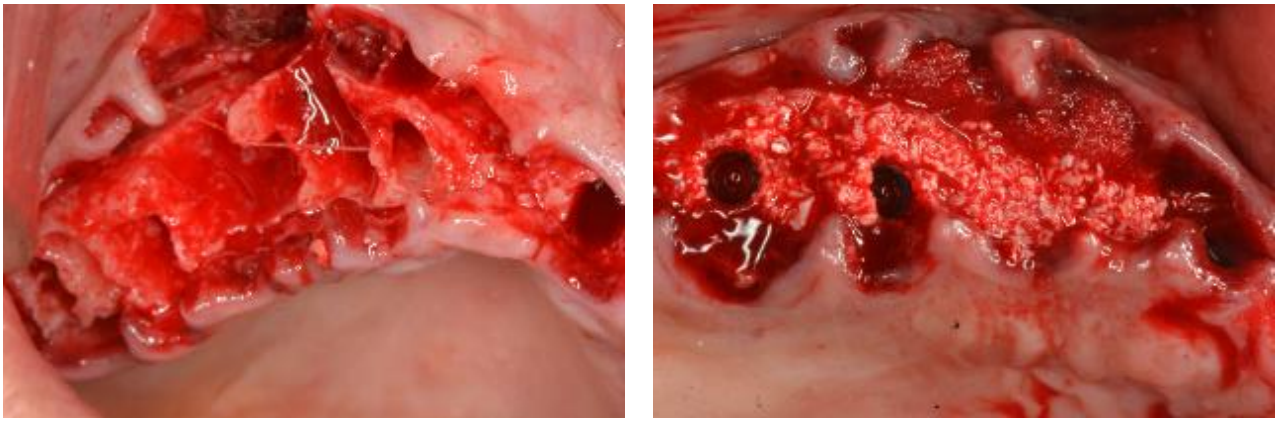
Materials and Methods

A 67-year-old female patient, nonsmoker, with controlled diabetes and hypertension, presented with moderate to severe periodontal disease and hopeless teeth. More specifically, there was a presence of abscesses and severe bone loss #14 #13 #12, also buccally vertical fracture #21 with deep pocket depth of 12 mm (Figure 1).

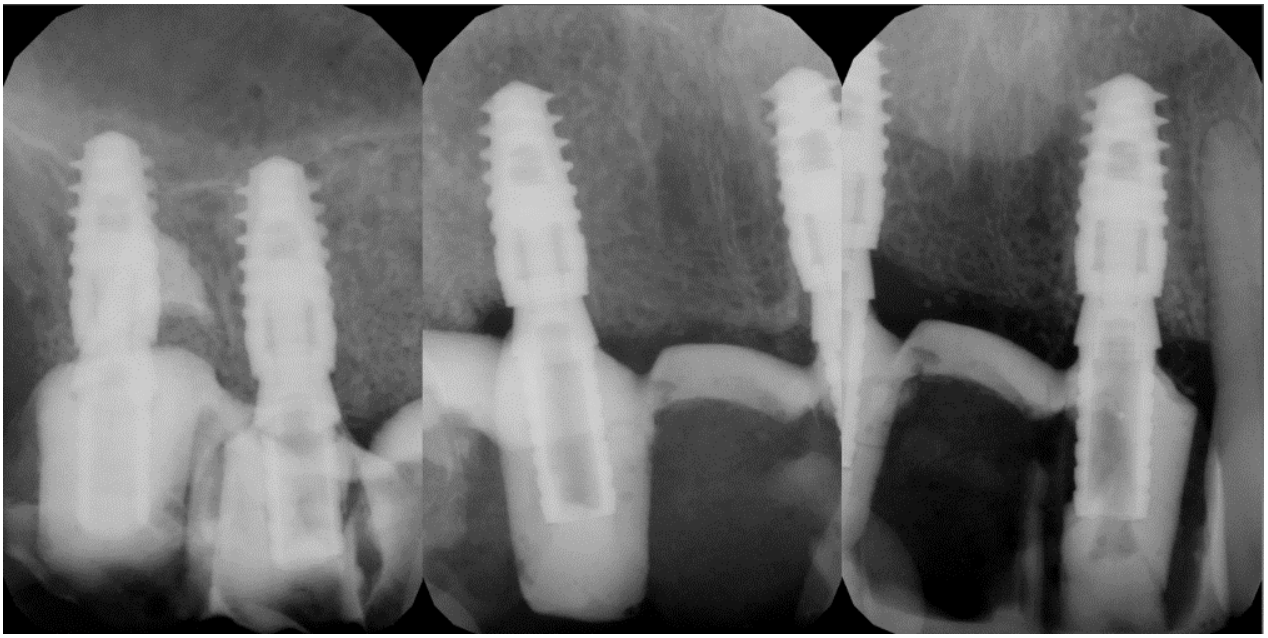
(a) (b) (c)

Figure 1. (a) Abscess #12; (b) Severe bone loss #14 #13 #12; (c) Vertical fracture #21.

Therefore, the treatment plan consisted of teeth extraction #16 #14 #13 #12 #21 and strategic extraction #15 (Figure 2). The atraumatic flapless extractions were performed under local anesthesia (Septanest 1/100,000 epinephrine) by using peristomes. Consequently, immediate implant placement #16 #15 #12 #21 (4.5/10 ContacTI®/VEGA, KLOCKNER, Madrid, Spain) and provisional bridge was performed from #16 to #21. Then the buccal gaps were filled with natural bovine bone substitute (cerabone®; botiss biomaterials GmbH, Zossen, Germany) and covered by acellular collagen matrix (mucoderm®; botiss biomaterials GmbH, Zossen, Germany), followed by interrupted suturing. Post op medications were: Augmentin 1g 2 times/day, Solpadeine every 8 hrs, Paroex 0.12% 3 times /day for 2 weeks.



(a) (b)



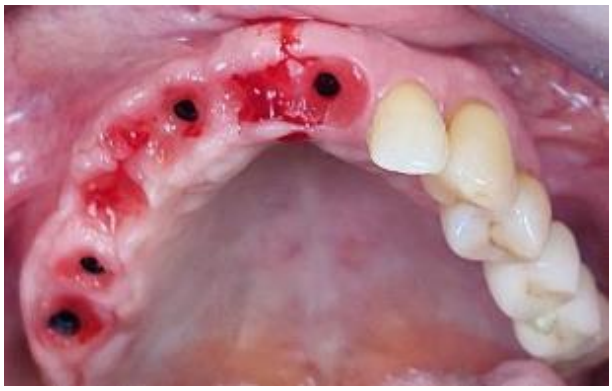
(c)

Figure 2. (a) Teeth extraction; (b) GBR with natural bovine bone substitute and acellular collagen matrix; (c) Peri-apical radiograph after immediate implant placement and GBR, with provisional bridge #16 #15, #12, #21.

Results

The screw-retained provisional bridge was removed after 4 months, and successful peri-implant soft tissue healing was observed (Figure 3). Sufficient implant stability, granules osteointegration into newly formed bone, as well as stable soft and hard tissue situation was recorded after 1 year of final bridge (Figure 4).

(a)



(b)

Figure 3. (a) Screw-retained provisional bridge after 4 months; (b) Peri-implant soft tissue healing after removal of the bridge.

Figure 4. (a, b) After 1 year of final bridge #16 and stability of soft tissue #21; (c) stability of hard tissue #16 #15 #14 #13 #12.

Discussion

This case report confirms successful immediate implant placement by using natural bovine bone substitute and acellular collagen matrix instead of a GBR membrane. Sufficient implant stability, granules osteointegration into newly formed bone, as well as stable soft and hard tissue situation was recorded after 1 year of final bridge.

Bone grafting materials are frequently used to compensate missing bone volume [10]. The hydrophilicity, viscoelastic, and physicochemical properties variations in bovine bone substitutes can show effect on their long-term results [6]. However, it is well accepted that bovine grafting materials provide long-term stability at the grafting site by supporting osteointegration of a newly formed bone within the scaffold rather that remodeling into new bone [6], [11]. GBR is a regular procedure where barrier membranes are used to eliminate the soft tissue infiltration within the grafting material [12]. The process of soft tissue infiltration into the grafted area is parallel to biodegradation of the barrier collagen membranes and can be related to the collagen origin [13]. On the other hand, the longer-lasting compact collagen structure of ACM allows blood vessels penetration within the matrix [14], [15]. Such regenerative mechanism is important for long-lasting soft tissue regeneration [16], [17].

For that reason, we performed and immediate implants placement by using bovine bone substitute and acellular collagen matrix instead of a GBR membrane. At 4 months follow-up we observed successful peri-implant soft tissue healing (Figure

3). Then 1 year after final bridge, a sufficient implant stability, granules osteointegration into newly formed bone, as well as stable soft and hard tissue situation was recorded (Figure 4).

Conclusions

In this case report we achieved successful immediate implants placement by using bovine bone substitute and acellular collagen matrix instead of a GBR membrane. One year later satisfactory implant stability, granules osteointegration into newly formed bone, as well as stable soft and hard tissue situation was observed. To verify these results, more patients should be treated with the same method and biomaterials.

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Board review and informed consent statement: The local authorities allow publication of such cases after a written informed consent is given by the patients.

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