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SOCKET SHIELD TECHNIQUE FOR PRESERVING ALVEOLAR SOFT TISSUES DURING IMMEDIATE IMPLANT PLACEMENT

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Abstract. This article provides information on the use and importance of the socket shield technique in preserving alveolar soft tissues during implant placement. It discusses a new technique that allows aesthetic preservation of the original state of alveolar soft tissues during the installation of a dental implant.

Key words: implant, hard and soft tissues, alveolar socket, anodontia, crown loss, vestibular shield.

An immediate implant placement after tooth extraction is a fairly common and effective procedure. Although the success rate of implant placement both when using the algorithms of immediate and postponed installation is almost identical, however, according to the literature, when carrying out the loading procedure immediately after extraction, it is possible to preserve the hard and soft tissues of the alveolar socket buccal wall and prevent their progressive loss by at least 1 mm, especially thin gum biotype cases. Areas that are not of high aesthetic value can be prosthetically restored without taking into account the above factor, however, if we are talking about the upper jaw frontal aspect, then even saving 1 mm of tissue plays an important role. Of course, in conditions of a low smile line, thick gum biotype, single implant placement, it is much easier to hide a possible aesthetic defect, however, in patients with a high gingival smile, thin soft tissue biotype, multiple anodontia and increased aesthetic demands, the risk of failure due to aesthetic compromise is very high.

The vestibular shield formation technique can provide a much better treatment prognosis by supporting residual hard and soft tissues in particularly difficult clinical cases. The main point of this method is the root preparation, that is preserves the vestibular (facial) part, which is physiologically connected with the buccal wall socket. Thus, the periodontal ligament of the tooth in this area remains intact and the integrity of the connective fibers, vessels, root cementum, the site of attachment to the alveolar bone and vestibular socket wall structure is preserved. In this state, it is possible to prevent bone remodeling in post-extraction stage, leading to the vestibular wall soft and hard tissue loss.

This article presents a clinical case of direct implantation immediately after extraction using the vestibular shield preservation technique, as well as long-term results of treatment 1 year after the intervention.

Clinical case

A 52-year-old man asked for help for a upper left lateral incisor that could not be restored conservatively. Patient was a non-smoker and had no history of comorbidities. The tooth had previously been endodontically treated, but over the years there have been problems with the crown loss, fixed on the root inlay. The patient was personally interested not only in achieving high functional results of treatment, but also in the corresponding level of aesthetics. During the first visit, examined tooth had no ferrule area, which is why was a direct indication for the implant placement using socket shield technique (photo 1).

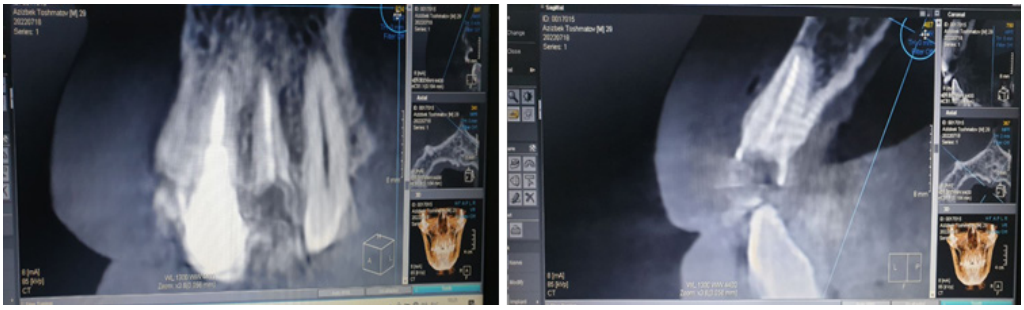
Photo 1. Tooth 22 with no ferrule area.

In this case, the following treatment options were proposed:

1. 3 unit ceramic bridge restoration after 1 month period of tooth extraction;
2. Restoring missing tooth by using maryland bridge after 1 month period of tooth extraction;
3. An immediate implant placement with subsequent crown fit.;

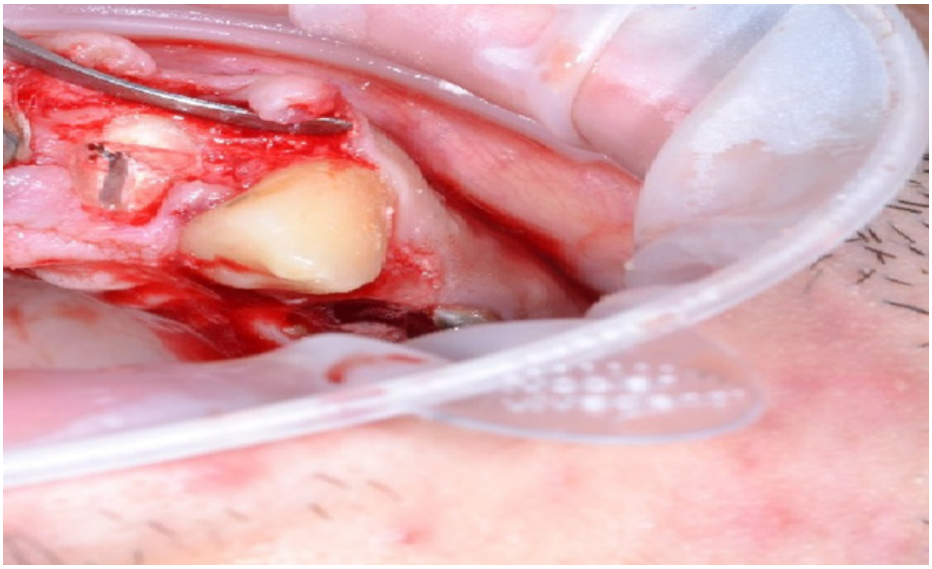
During the consultation with the patient, taking into account all possible costs, treatment duration and the future prognosis of each of the approaches, treatment algorithm with implant placement was chosen as the most suitable one. In order to exclude the risk of post-extraction resorption of the alveolar ridge, it was decided to use the technique of the vestibular shield formation with an immediate implant placement and provisional crown fitting. After the cone beam computed tomography (CBCT) procedure, sufficient amount of space was found for the root vestibular part segmentation and immediate implant placement of a 4 x 12 mm with the possibility of screw retained prosthetic construction. (photo 2).

Photo 2. Tooth 22 CBCT results (Pre-operative view)



After local anesthesia in the area tooth 22, the root was segmented in the mesiodistal direction along the longitudinal axis to the very apex using a long bur and a high-speed handpiece. As a result of this manipulation, the tooth was divided into the vestibular and palatal fragments, while the vestibular part was formed very carefully in order to maintain its complete integrity and connection with the buccal wall of the alveolar socket (photo 3).

Photo 3. The 22 tooth root separation in the mesiodistal direction.



Using a Coupland elevator, the palatal root segment was separated and removed from the socket, while trying not to jeopardize the integrity of the vestibular wall. The residual vestibular part of the root was shortened to a height of 1 mm above the alveolar ridge level, and the contours were slightly rounded by removing the residual tissues in the apical-coronal and mesiodistal directions with a round diamond handpiece bur (Dentis, South Korea). From the side of the palatal wall and in the area of the apex, curettage was performed to completely remove the residual or infected tissue, and the remaining vestibular wall was checked with a sharp probe for signs of pathological mobility, which could be provoked by damage to the vestibular root shield during previous manipulations.

As a result of performed procedures, we received the so-called vestibular shield, formed from the tooth root of the vestibular wall (photo 4). After osteotomy, an implant with a no mount (4 x 12 mm, TS III SA) was placed in place of tooth 22 using a surgical guide. The infrastructure was installed 2 mm below the level of the alveolar ridge and palatal to the preserved vestibular part of the root (photo 5).

Photo 4. Formed vestibular shield.

Photo 5. 4 x 12 mm, TS III SA implant placement in the area of tooth 22

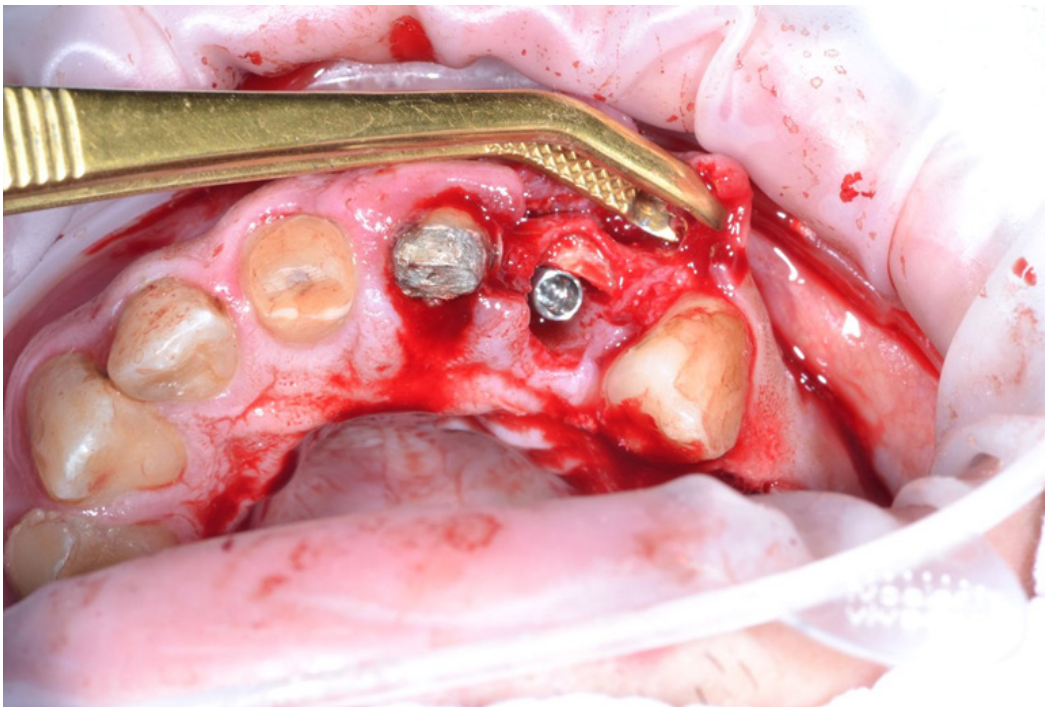
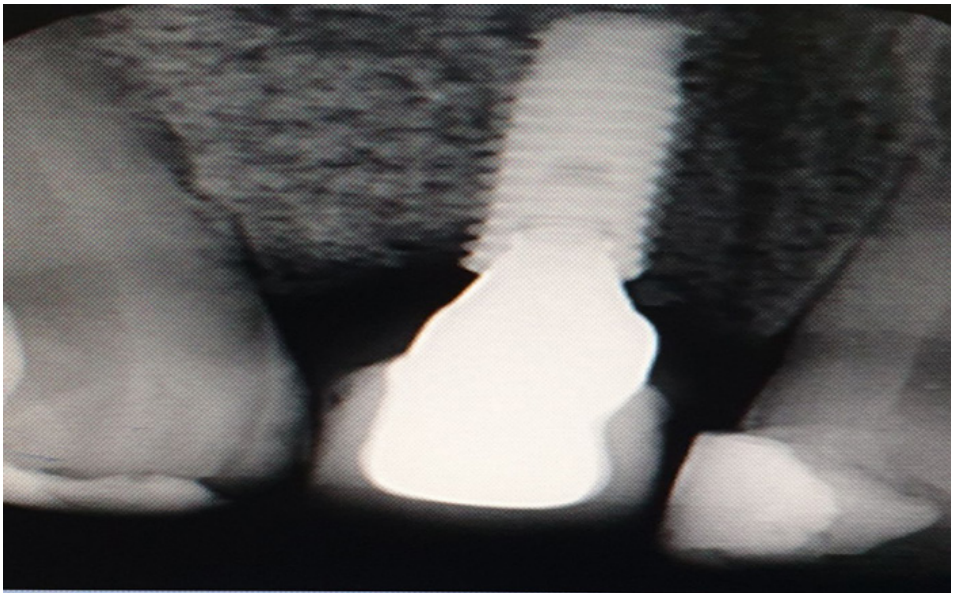


**Photo 6. View 3 months after the intervention.
The beginning of the recovery phase of treatment.
Alveolar ridge tissue preservation**

Photo 7. Soft tissues vestibular and palatal view with a fixed crown

Patient was satisfied with both treatment aesthetic outcomes and successful functional criteria achievement of the new design. Follow up appointment after 1 year, it was found that the soft tissue contour in the area of the installed crown was similar to the soft tissue profile of the adjacent central incisor, there were no signs of even minimal loss of soft tissues. Using a periapical radiograph, it was possible to assess the sufficient level of bone tissue in the area of contact with tooth 21, as well as the ratio of the vestibular shield and the implant surface (photo 8).

Photo 8. Implant and crown in place of tooth 22 on a periapical radiograph



Conclusion. In recent decades, the concepts of therapy in dental implantology have been constantly developed. Classical delayed implantation is still considered the gold standard. However, this method has certain limitations. On the one hand, a longer duration of treatment burdens the patient, on the other hand, there is an increased risk of local bone and soft tissue atrophy during several months of healing, which often requires additional surgery to increase bone volume.

Immediate aesthetic implantation is currently a current treatment concept and offers many benefits. Minimized treatment time and fewer surgical interventions lead to increased patient comfort. However, a significant disadvantage is the partially unpredictable processes of resorption of hard tissues and inflammation of soft tissues in the vestibular region. A new approach in root socket shield technique is the prevention of these resorption processes. Leaving the vestibular fragment of the tooth in this area prevents bone loss by preserving the periodontal fibrous apparatus. The first published clinical results are very promising, but prospective studies with a sufficient number of cases and follow-up periods have not been conducted. In addition, there is a limited range of indications, since the initial clinical situation often does not allow leaving a root fragment in the alveolar socket of the tooth. The high success rates published to date have come from specialized centers and cannot simply be transferred to routine clinical practice.

However, in almost all of the studies above, for the vestibular shield technique forming , each time was something different from the original one that we described in this article. Kan & Rungcharassaeng's modified proximal shielding approach involves the use of a xenograft for facial soft tissue augmentation. Also in their report, they described the methodology for segmenting root tissues into medial and distal parts in order to preserve papillae. Cherel & Etienne described a similar method for preserving the soft tissues of the interdental papillae. But their study also compared the effectiveness of modifying the technique using a graft and an enamel matrix protein to restore missing tissue volume.

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