Retrospective comparison between immediate and delayed implant placement

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In daily practice dentists routinely face the challenge of making quick and often difficult decisions. The development of osseointegrated implants represents one of the most important breakthroughs in contemporary dental practice in the oral rehabilitation of partially or fully edentulous patients. Many studies support the immediate implant placement, but still there are not a lot of longterm clinical evidences.

Osseointegration or osteointegration refers to a direct bone-to-metal interface without interposition of non-bone tissue. This concept has been described by Branemark, as consisting of a highly differentiated tissue making "a direct structural and functional connection between ordered, living bone and the surface of a load-carrying implant".(1,2)

Osseointegration refers to a direct structural and functional connection between ordered, living bone and the surface of a load-carrying implant. Currently, an implant is considered as osseointegrated when there is no progressive relative movement between the implant and the bone with which it has direct contact. A direct bone contact as observed histologically may be indicative of the lack of a local or systemic biological response to that surface. It is therefore proposed that osseointegration is not the result of an advantageous biological tissue response but rather the lack of a negative tissue response.(3)

Architecture and microenvironment around the implant are crucial determining factors in the healing process. Placement of implants elicits a sequence of healing events, including necrosis and subsequent resorption of traumatized bone around the implant body, concomitant with new bone formation.(4) In an attempt to allow the bone to recover from surgical injury, thereby allowing implant placement into an environment more conducive to healing and development of osseointegration, delayed placement of implants was proposed.(5)

Tooth extractions requiring prosthetic replacement represent a major indication for dental implant placement. Immediate installation at the time of extraction offers potential advantages for both practitioners and patients. It allows a decrease in treatment time and may result in an increase in patient satisfaction.(6)

Aim:

The aim of the present study is to compare the implant success rate between immediate placement in the extraction socket and delayed placement in edentulous jaws.

Materials and methods:

The study was performed retrospective on patients, who received implant treatment at least 5 years prior to the examination date. The patients were observed and devided in two groups. The first group included 25 patients, who had received immediate implant placement in extraction socket with a simultaneous bone augmentation inside the empty pocket. The second group also included 25 patients who received delayed implant placement on edentulous areas.

All the patients from the groups were received preoperative cleaning of the teeth. The premedication was with antibiotics and vit.B complex. Before the surgery there were taken diagnostic impressions and cast models were prepared for comparison after. Also CBCT pictures and measurements on them were made, so the size of the implants to be determined.

For the first group ,the procedure included placing of local terminal anesthesia and extraction of the damaged tooth with elevators attempting to avoid trauma to the alveolus. The extraction socket was well cleaned by curretes , rinsed with saline and carefully observed for an adequate quantity of alveolar bone to allow immediate implant placement with primary stability. The osteotomy was initiated with pilot drill following the sequence of drills. In maxillary teeth the osteotomy site was initially on the palatal wall of the socket while in the mandibular teeth the interdental bone is used, so that the implant achieves its initial stability and the future prosthesis is in center buccolingually and mesiodistally.The implant with microtextured surface was placed in the socket following the protocol for hard or soft bone,according to the characteristics of the location. Around the implant and in the empty alveolus (in molars), was packed bone grafting material, which was allograft with excellent characteristics. There were used bone particules , which acts as an osteoconductive scaffold for new bone formation. The flap was closed with 5/0 PTFE sutures.

For the second group was done the same procedures, following the same protocol of placing implant, but in edentulous area, without adding of bone graft material.

For both treatment groups, implant placement and implant diameter choice were restoratively driven to maximize aesthetics and function.

Sutures were removed 1 week after the procedure. Patients were instructed to avoid chewing or trauma to the treated area for the first 6 weeks.

Post operatively, the implant sites of both groups were inspected clinically and radiologically after 6 months and after that once per year. Implant sites were checked for any visual signs of inflammation, perimplantitis, plaque accumulation, mobility, gingival margin location, attachment level, and gingival width. Crestal bone height was measured radiographically. OPG were checked for any signs of radiolucency around the implant. Most of the immediate implants showed excellent osseointegration.

The statuses of the soft tissues around the crowns over implants were examined- pockets depth were observed in six points, papillary bleeding index and plaque index.

The pocket depth was measured with periodontal probe ,marked on 1,2,3,5,7,8 and 9 mm with 4mm and 6mm missing. The pockets around the implants were measured in six points- medio-vestibular, vestibular, disto-vestibular, medio-palatal or lingual, lingual or palatal and disto-palatal or lingual.

The papillary bleeding index (PBI) permits both immediate evaluation of the patient's gingival condition and his motivation,based upon the actual bleeding tendency of the gingival papillae. A periodontal probe was inserted into the gingival sulcus at the base of the papilla on the mesial aspect, and then moved coronally to the papilla tip. This was repeated on the distal aspect of the papilla.

The plaque index was measured for classifying the debris around the surface of the crown over the implants. In this study was used the modified plaque index by Mombelli et al. (7) to establish the plaque accumulation around the oral implants.

After the prosthetic phase of the treatment during the control visits were taken second impressions of the implant sites for both groeps. The first diagnostic models and the models with the constructions over implants were scanned and compared digitally as the volume of the tissues was measured . On the digital image was measured the vestibular-lingual or vestibular-palatal size of the alveolar ridge, trying to have equal starting point. (pic.1) (pic.2)

Results:

In this study we observed 50 patients with 25 in each group. 35 of them were men and 15-women at the age between 25 and 60 years.

For the period of the study the implants of the patients from the both groups showed 100% survival rate. All observed indexes showed normal values, as seen on table 1:

Table 1: Average values of PBI, plaque index and pocket depth

Groups:	Group 1	Group 2
PBI	1	1
Plaqie index	1	0.75
Pocket depth	3.3	3

After the comparison of the scanned models of both groups, there were no significant differences between the vestibular-lingual or palatal width size in millimeters. In both groups after 5 years period there were bone loss but not more than 1 mm- table 2:

Table 2: Average values of vestibular-lingual/palatal size of the alveolar ridge

Groups:	Group 1	Group 2
V-l/p differences in width size of the ridge for 5 years	0.3mm	0.4mm

Discussion:

The clinical, anatomic, and radiologic characteristics of the socket immediately after tooth extraction are distinctly different from the socket environment after a period of healing. Implants placed immediately in fresh extraction sites engage precisely prepared bony walls only in their apex, while the coronal space is filled with bone material. Comparing immediate implant placement at the time of extraction with delayed implant placement, bone augmentation was more frequently needed at immediate implant placement. The lower frequency of bone augmentation in the delayed implant seems to provide an important argument for selection of this approach as bone augmentation increases both the cost and the complexity of the procedure.

On the other side immediate placement saves for the patient another surgical procedure and taking of medicines.

Conclusion:

The issues related to timing of implant placement are complicated by the lack of consensus on effective and established procedures and by the wide array of cofounders that have played a role in previous trials.(6) Very good results were achieved with the technique of immediate implant placement with applying of bone allograft around the implant ,as well as with the delayed implant placement. For the period of five years the implants, placed according to both techniques were with good stability and healthy periimplant soft and hard tissues, which shows no significant differences between them.

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