Use of the Autogenous Graft in the Immediate Implant with Provision in the Aesthetic Area: Literature Review

Moerbeck P1*, Barreto MA2 and Moerbeck L3

1Master's Degree Student, Bahiana School of Medicine and Public Health, Bahia, Brazil
2Assistant Professor, Bahiana School of Medicine and Public Health, Bahia, Brazil
3Specialist in Forensic Legal Dentistry, Bahiana School of Medicine and Public Health, Bahia, Brazil

*Corresponding Author: Moerbeck P, Master's Degree Student, Bahiana School of Medicine and Public Health, Bahia, Brazil.

Received: February 09, 2019; Published: March 27, 2019

Abstract

This work aims to promote a literature review of parameters for the use of the autogenous graft in the immediate implant with provision in the aesthetic area. With the technical, scientific and industrial advances, the intervals of the rehabilitations with implants have diminished. This technique, known as Implantation with Immediate Provisionalization (IIPP) is one of the most discussed subjects today, since the search for excellence in aesthetics is increasing. The fact that bone atrophy in the anterior region is progressive, the bone size and nutrition in this area are very limited, put this aesthetic at risk. There are several factors that may influence the use of IIPP, such as implant type, bone quality and quantity, primary stability, occlusion, gingival biotype, gap bone walls, gap filling material, prosthetic platform used, type of prosthesis used, among others. It was concluded that, in the short term, the proposed treatment presents satisfactory results. According to the literature, recession is something imminent technique. In patients compared to those with a fine biotype, the connective graft should be associated. This seems to influence the gingival architecture in a prosperous way in order to achieve an aesthetically favorable rehabilitation. However, a longer study and follow-up time is needed in the search for ways to minimize vestibular recession.

Keywords: Autogenous Graft; Implant; Aesthetic Area

Osseointegration and immediate loading

From the beginning of the 1980s Prof Branemark conceptualized that for the success of osseointegration two phases were necessary; a surgical implant installation and waiting for a period of at least 6 months, for reopening phase, and beginning of the prosthesis, being for years, a very solid concept.

Immediate loading had its first cases in the late 80’s, where the inter-mentonian region was used in patients considered to be invalids, using about 04 or 05 implants for rehabilitation, becoming consolidated in the 90’s and being improved to and primary factors [1].

With Technical, Scientific and Technological Evolution in 1990 Schnitman was the pioneer of immediate loading into unitaries, demonstrating its effectiveness and use. The early loads, have been demonstrating over time that trigger biological reactions favoring the process of bone repair and gingival maintenance. Primary stability, a major factor in immediate loading, is associated with implant design, bone quantity and quality, and the surgical technique used [2].

Gapski., et al. [3], in a review of the literature on immediate loading, evaluated some factors such as: surgical technique, patient, type of implant and occlusion. Being documented in the 1980s the first success stories of Implant Implants protocol with immediate loading.

Use of the Autogenous Graft in the Immediate Implant with Provision in the Aesthetic Area: Literature Review

After success in the mandibular region, studies began for use in the maxilla that has a more peculiar anatomy, phonetic and aesthetic need, thus requiring further studies. In conclusion, the immediate loading technique achieved a similar success rate when compared to 2 surgical stages; being the primary stability of the implant is a preponderant factor for its accomplishment.

According to ITI consensus, Esposito and Collaborators in 2007 They agree that [4]:
- The conventional load is defined as the load applied more than two months after implant placement.
- Early loading, applied load between one week and two months after implant installation.
- Immediate loading, the load applied less than one week after placement of the implant.

In this way, a specific definition for late load is made necessary.

The literature of the current implantology makes immediate loading a reality, pointing out several advantages when well indicated, among them: prevention of horizontal atrophy of the bone after the extraction, release of bone growth factors, acceleration of the repair process and giving function to the underlying bone, being a very consolidated technique in the current implantology.

Immediate implantation with provisionalization

In addition to the immediate implant, Whrole proposed [5], in addition to the immediate implant, the provisioning associated with filling the gap with biomaterials, which provided, in addition to patient satisfaction, maintenance of the tissue and peri-implant architecture, achieving 100% success rate between 9 and 36 months follow-up, concluding that besides releasing growth factors to the provision, it maintains a more mature bone structure in later analysis.

Several criteria should be considered when the approach is done immediately such as: favorable systemic conditions, gingival phenotype, gingival architecture, soft and hard tissue health, bone quality and quantity, 32N.cm) and stable posterior occlusion, besides professional technical factors and adequate instruments [6].

In 2006 an ITI consensus established the following classification of the immediate implant:
- **Type 1**: Implant installed at time of extraction
- **Type 2**: Implant installation after the end of soft tissue healing, before presenting a significant bone filling
- **Type 3**: Installation of an implant after the alveolus presents, clinically or radiographically, a significant bone filling.
- **Type 4**: Installation in a fully healed alveolus

In 2010, several studies were reviewed and found that the recession of 1mm or more ranged from 8 to 40.5% in long-term studies. The causes were: Fine gingival biotype, unfavorable implant 3D position, defective vestibular bone wall; position when the three-dimensional position of the implant is more palatinalized, there is movement from the implant to the vestibular, which is often unnoticed.

Concluding that it is a complex and delicate procedure the immediate implants, having as their greatest challenge the greater risk of vestibular tissue recession in the long term. It is reported that there is a greater chance of success, healthy patients, nonsmokers, low smile line, thick gingival biotype, intact and thick vestibular wall, absence of infection and good adjacent bony crest [7].

Esposito., et al. [4], concluded in a literature review that there is insufficient evidence to determine the disadvantages and advantages of immediate implants (Implants soon after extraction), late implants (Implants installed after 8 weeks of the exodontia) or late implants (implants installed 2 months after the extractions). There is a need for further randomized clinical trials to prove its efficacy.

Kan., et al. [8] in a prospective study evaluated 70 patients, where they performed the implant with immediate provisionalization, concluding that the thicker tissue biotype is a preponderant factor in greater stability of the vestibular margins.

Chaar., et al. 2011, carried out a study in 69 patients, installing 162 implants, where they performed implantation and provisioning without graft, observing in their retrospective study a survival rate comparable to those reported classically with implant and late load.
Alley and GAP

After extraction of a tooth, during the healing process, several events lead to bone regeneration within the alveolus and to an external bone resorption process that is more evident on the vestibular face of the alveolar ridge (Lindhe 2005).

Inside the alveolus, a clot forms that slowly converts into a matrix of connective tissue within a few days. The fasciculate bone that lines the extraction socket undergoes reabsorption and loss of its original structure, which allows the blood vessels of the surrounding medullary space to invade the provisional matrix. With remodeling, the entrance of the alveolus is corticalized with the adjacent bone, becoming one and in its center, the bone is remodeled to form the trabecular bone [9].

The cicatrization of the alveolus and the underlying mucosa after exodontia provides a 50% vestibulolingual or horizontal reduction of the ridge in a period of 6 to 12 months post-exodontia, apicocoronal or vertical reduction of 2 to 3mm in the media, accompanied by alterations horizontal [6].

The repair process begins with the formation of a clot; being replaced by a granulation tissue in a period of 4 to 5 days; Endothelial cells initiate the formation of capillaries; replacement of granulation tissue by connective tissue, characterized by the presence of fibroblasts and collagen fibers in 14 to 16 days; There is a migration of epithelial tissue into the alveolus, which can cause an aesthetic defect; complete epithelial tissue closure after 24 to 35 days; reabsorption of the original alveolar cortical, giving rise to a thin cortical bone, due to lack of function [6].

Several are the morphological alterations that suffers the post-exodontic alveolus, being more abruptly in the anterior region of the maxilla, which has some peculiar characteristics such as: lower blood supply being this supply mostly of the periodontal ligament and smaller vestibulo-lingual dimension, resulting in loss of both quality and bone and tissue quantity, thus developing an aesthetic risk and maintaining the previous architecture. In this context, a late approach may result in long crowns and wide contact faces to try to compensate for deficiency in the zonites and interproximal papilla [6].

Studies also show, histomorphometric analyzes, performed after 6 months the installation of implants with immediate loading after extraction, showing a bone adjacent to the more mature implant in the peri-implant regions, while in the late implants, remains a fine bone and spinal bone [10].

Lindhe and collaborators in 2004, in a clinical follow-up, where after dental extraction and measurement of the buccal, mesial, distal and palatine walls, all implants were installed with no graft association, and after 4 months new measurements were performed, that the buccal wall had a higher rate of resorption (56%) and (30%) in the palatal wall than the other areas.

In a multicenter randomized study of 92 cases, Tomasi., et al. (2010) evaluated bone alterations after the immediate installation of implants in fresh alveoli. Vestibular and palatine gap measurements were performed at the post-implant extraction site, after reopening and four months later. They concluded that there was a considerable change in the bone crest; the size of the preexisting difference was dependent on the size of the initial gap and the thickness of the bone crest and the vertical vestibular reduction suffered interference according to the age of the patient. In addition, the three-dimensional position of the implant influenced the bone resorption, the more vestibular the implant was installed, the greater the resorption rate, since each millimeter for the vestibular represented a resorption of 0.22 mm.

Chen., et al. in 2012, concluded that the graft in the gap helps to maintain bone crest and soft tissue volume in the region, and it is important to predict a possible loss of peri-implant bone [9].

Chen S and Buser D in 2013, they always recommend that a simultaneous approach be possible, that is, to use immediate implants at the moment of extraction, associated with ROG (guided bone regeneration) with biomaterials, in order to minimize the number of interventions, patient morbidity and to minimize the financial cost. In conclusion, it is common for immediate implants placed at extraction sites to be associated with two or three bone defects, and a predictable result can only be expected if the bone defect is at most two walls, because the bone walls and bone marrow will provide the osteogenic elements necessary for neoformation. In healed sites that exhibit buccal ridge flattening, defects of two walls are less frequent and regenerative results at sites with only one bone defect wall are much less predictable [9].
Gingival biotype

In anterior teeth there is a greater concern and expectation between the harmony of white and pink aesthetics, and success in the treatment of implantodontia is multifactorial, involving multiple variables to achieve success.

![Figure 1: Factors influencing peri-implant tissue (Barreto M., et al. 2013).](image)

The biotype is a preponderant element in the success of the treatments of anterior teeth since the need for a minimally perceptible rehabilitation, bringing harmony in the natural and artificial esthetics. The fine biotype is related to the risk of failures and recessions in vestibular regions, since the remaining bone has nutrition mostly by periodontal ligament, difficulty in papillary filling, translucency in transgendered metallic perception and greater susceptibility to bone loss.

The thick biotype shows higher success rates since its manipulation and its healing pattern, as well as accommodation of the peri-implant tissues, has a greater predictability power and longevity in the rehabilitation treatment (Barret, M., et al. 2013).

<table>
<thead>
<tr>
<th>Fine</th>
<th>Plan and thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin fabric</td>
<td>Dense and fibrotic soft tissue</td>
</tr>
<tr>
<td>Range of reduced keratinized tissue</td>
<td>Range of wide keratinized tissue</td>
</tr>
<tr>
<td>Long and narrow papillae</td>
<td>Short and long papillae</td>
</tr>
<tr>
<td>Loss of insertion associated with the presence of gingival margin recession</td>
<td>Loss of insertion associated with the presence of periodontal pocket</td>
</tr>
<tr>
<td>Point of contact in the incisal/occlusal third</td>
<td>Areas of contact in the middle/cervical thirds</td>
</tr>
<tr>
<td>Teeth with triangular shape</td>
<td>Teeth with quadrangular shape</td>
</tr>
<tr>
<td>Fine scalloped underlying bone (high frequency of dehiscence and fenestration)</td>
<td>Underlying bone flat and thick</td>
</tr>
</tbody>
</table>

Table 1: Thin biotype and thickness and its characteristics.


As a consensus of ITI 2008, P. Weber considered the following aspects of figure 1, which shows in (1) and (2), aesthetic parameters in soft tissue.

Kan., et al. [8], carried out a clinical and radiographic follow-up study in 8 years in 35 patients evaluating the success rate of the tissue response in patients who were implanted immediately with provision in aesthetic area. With the aid of a periodontal probe, the profile in thin (21 cases) and espresso (14 cases) was determined. The gap was not filled with grafting material, after 4 years of follow-up, all implants were in function, 4 patients had gingival recession, the distal and mesial bone crest and the gingival tissue had marked changes. Patients with a thicker biotype had less change.

The same author in 2011, in a prospective study of 35 cases, evaluated the peri-implant response and the effects of the gingival biotype after immediate implantation with provisioning, evaluating radiographically pre, trans and postoperative and follow-up of 4 years. They observed that regions with thick gingival biotype showed significantly smaller changes in the vestibular margins. Literature is not yet so conclusive because it does not have a large collection.

**Autogenous graft not immediate implant**

Autogenous grafts have several characteristics that make it gold standard in bone reconstructions, being the only one that has osteoconduction capacity, osteoinduction, osteogenesis and osteopromotion. The use and its efficacy is well based in the contemporary literature, having as extra-oral and intra-oral regions; The most commonly used intraoral regions are: mandibular branch and body, ment and tuft.

Ferrara in 2006, made a series of cases with clinical and radiographic follow-up of 04 years, using a mandible autogenous graft, and a questionnaire was applied to the patients about their satisfaction and obtaining positive results in 93.93% of the cases.

In 2007, JCM Rosa and his team, made the first report using an autogenous graft with maxillary tuberosity as the donor region. The exodontia was performed without gingival detachment and flap with the help of periodontal probes, later the implant was installed in a favorable 3D position, accommodating a graft blade coming from the tuft region in intimacy with vestibular mucosa and small fragments also coming from the tuberosity as well were compacted in the gap, and made the provisional with concave profile to accommodate the graft blade and fill the entire region of the emergency profile without the need for sutures. It is known that bone marrow releases growth factors to the recipient bed and has high resvascularization capacity.

In order to have the tuberosity with the area of election, we must follow some criteria; first, a careful radiographic analysis must be performed. Tomography and panoramic radiography should be done with removal of the mucosa using cotton rollers, analyzing proximities with erupted teeth or third molars included and surrounding pathological changes.
Figure 2: Initial periapical unit 11.

Figure 3: Tern region overview.

Figure 4: Minimally invasive and flapless exodontia.
Use of the Autogenous Graft in the Immediate Implant with Provision in the Aesthetic Area: Literature Review

**Figure 5:** Implant installed in a favorable position, using the palatal wall and apical Anchorage.

**Figure 6-9:** Confection of the provisional with concave profile.

**Figure 10-13:** Removal of tuberosity fragment and adaptation according to bone defect.

In the maxillary tuberosity, we found a predominance of bone marrow with low density of bone trabeculae, predominantly type IV bone, being a more malleable bone for adaptation in cavities. It also shows a high osteopromotor potential, where osteoprogenitor cells become osteoblast, thus aiding the bone repair process.

Later in 2009, the same author proposed a more complex approach in a case with anterior gingival recession and involvement of the vestibular wall, where it was removed from the maxillary tuberosity triple graft composed of conjunctiva, periosteum and lamellar bone to correct the defects, obtaining satisfactory results, and further monitoring is necessary to analyze the subscribed techniques.

In 2011, Noelken R carried out a survey in which 18 implants were installed in 16 patients, tooth loss in the aesthetic zone (I.S. and P.M.S.) after a root fracture along the axis and loss of the vestibular wall. Using autogenous graft of particulate branch, to fill the gap. As a result, there was an improvement in PES was observed at 8 implant sites. In 5 sites there was no change, whereas 5 sites suffered a slight decrease to moderate. Dental plaque increases gingival recession.

**Autogenous graft x biomaterials**

With the scientific advancement in dentistry, biomaterials of xenogenic origin, those of synthetic origin and membranes of various types, appeared, changing routines in bone reconstruction.

In a clinical study, Hassan (2008) evaluated the filling of gap after installation of immediate implants, dividing into 2 groups and evaluated at 3, 6, 9 and 12 months for comparison. Group 1 after implant installation used autogenous graft as a filling material and in group 2 it was used after insertion of the synthetic biomaterial implant. The results show that there was no difference between groups for pocket depth and insertion level. Tabulation of the data and comparison between them, found that the pixel density over the 12 months was slightly higher in the autogenous graft and there was a small loss of the marginal bone in the biomaterials group. Concluding that the autogenous graft has a slight advantage in the synthetic grafts.
Use of the Autogenous Graft in the Immediate Implant with Provision in the Aesthetic Area: Literature Review

Subsequently, the same author in 2009 performed a new clinical research in 16 patients anterior region (upper premolars) using immediate implants associating autogenous and synthetic grafts in the same gap and a second group of patients who were implanted with immediate graft autogenous only. As a result, the two approaches led to significant improvements to the final treatment result, leading to a reduction in depth of probing as well as the level of insertion. As a conclusion, the autogenous graft associated with the synthetic graft (Fisiograft), presented a slight superiority to autogenous grafts alone. Spinato in 2012, in a comparative and retrospective study with 6 years of follow-up, having 22 implants with bone graft and 23 implants without graft using autogenous, xenogene, allogene, autogenous and xenogene association, and autogenous and allogene, concluded that there was no difference between grafts as long as thick gingival features are present.

Prosthetic factors in the immediate implant

The literature presents several cases solved with cemented and screwed prosthesis, considering the specific characteristics of each system and preference of work by the authors, but there are basic success factors in the rehabilitation treatment such as: gingival papilla with adequate height and width, mucosal level in with adjacent teeth, zeniths in the established position, emergency profile, close contact point with the tooth or adjacent restoration, and factors related to color, texture and shape [12].

In the anterior region, retaining the screw will be easier if the position of the screw access hole is planned below the incisal position in the lingual region.

The advantages of cemented prostheses: good passive adaptation, better aesthetics, easier occlusion control, use of standard abutments, cement capacity to absorb shocks and reduced cost (Wilson 2009) and having as main disadvantages, the difficulty of removing the excess of material, which could compromise the treatment when not removed, recommended to maintain the same level of the mucosa or up to 2mm below this level to facilitate its removal (Wittneben JG, Weber HP 2013).

Bolted prostheses are recommended as a method of choice in the aesthetic areas, as they eliminate the risk of mucositis or peri-implantitis due to the absence of cement, ease of removal and reinstallation and in situations of limited prosthetic space.

Sherif, et al. (2010) carried out a long-term study of implanted rehabilitations taken by screwed and cemented connection in the anterior region of the maxilla and according to the patients, there were no perceptible differences between the types of retention, with survival of 96% of the cases, however. authors concluded that the health of surrounding gingival tissues is better with screwed restorations than with cemented ones, considering plaque index and sucral bleeding.

The selection of the abutment is a fundamental aspect for tissue accommodation and determination of the emergency profile, cone morse implants, have greater freedom in the creation of individual profiles, position of the final restorative margin and compensation of divergences of up to 60 degrees than in reconstructions of the cemented type. It has as eligible materials titanium, gold, zirconia and ceramics based on alumina.

In order to personalize the emergency profile, JCM Rosa [13] reports that in addition to having a convexity all the prosthetic preparation for the provisional crown, providing accommodation of the peri-implant tissues, it should be based on the pre-existing tooth, and in the harmony of the contralateral. In the subgingival part, it should provide filling of the entire alveolar space, maintaining the gingival contour.

Final Considerations

Due to the methodologies studied, there is a great deal of divergence regarding the criteria for analysis, standardization, methods, measures, measurement references and follow-up time, and it is necessary to obtain greater parameters for the exploration of details in the search for consensus, longer time of study.

Bibliography

Use of the Autogenous Graft in the Immediate Implant with Provision in the Aesthetic Area: Literature Review


Volume 18 Issue 4 April 2019
©All rights reserved by Moerbeck P., et al.