



ISSN Print: 2394-7489
ISSN Online: 2394-7497
IJADS 2019; 5(2): 434-437
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www.oraljournal.com
Received: 15-02-2019
Accepted: 20-03-2019

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Diagnosis and clinical conditions for the placement of immediate implants in the posterior area: Literature review

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Abstract

Immediate implants provide advantages, starting with single-stage surgeries. Placement of post-extraction posterior implants is usually more challenging than anterior parts because of the difference between the size of the implant and the socket.

Objective: Review of the literature on the conditions for the placement of posterior implants of the stock, according to their condition in the morphology of the tooth, the morphology of the alveolus, as well as the importance of the geomancy of the implant and the volume in the tissue. **Materials and Methods:** A search was made in PubMed including original articles, pilot studies, case reports and literature review, where a search was made in articles about literature on the conditions for the placement of posterior immediate implants, according to their condition in the morphology of the tooth, morphology of the alveolus, as well as the importance of the geometry of the implant and the volume in the tissue. The search included the words "Post-extraction implants", "posterior implants" and "primary stability".

Results: The conditions for the placement of posterior post extraction implants to obtain primary stability are the root morphology: knowing the correct position of the roots. Alveolar morphology: since we depend on the interradicular septum for a good anchorage. Importance of implant geometry: consider the area of attachment between the surface of the implant biomaterial and the surrounding bone; an interface. And finally the volume of tissue: thanks to the presence of healthy tissue adhered to the soft tissue interface in implants will achieve a long-term success gives stability both in function and aesthetics.

Conclusion: After dental extraction is a safe option, even when implants are loaded immediately or late. Following the general conditions for its placement in multi-root teeth we can ensure a good anchorage and success in such treatment both surgical and aesthetic.

Keywords: Dental implants, primary stability, post-extraction implants

1. Introduction

Alveolar reabsorption is an inevitable phenomenon that occurs after the tooth extraction [1]. The loss that occurs after 6 months is 40% in alveolar height and approximately 70% in width, this continues at a rate of 0.25% to 0.5% per year². Implant placement is a one-step procedure which requires placing an implant at the time of healing of a tooth after it is removed [3].

Currently, several dental implant placement protocols are known according to the time of healing after a dental extraction, such as a delayed placement, when the receiving area is not optimal, placing 6 months of tooth extraction [4]; an early placement, when placing the implant for 6 to 8 weeks, providing adequate time for the alveolus to be covered with mucosa [5] and an immediate placement, are after an extraction, counting on a primary stability which has a high rate of survival [6, 7].

Immediate implants provide several advantages such as reducing the duration of treatment for the patient, since in general, in addition to reducing the need for regenerative treatment by preserving the physiological resorption that occurs after tooth extraction and improving aesthetic results [8, 9].

For decades the immediate placement protocol for uniradicular pieces has been considered [10], however, nowadays it is known that placement in posterior area is predictable with the help of diagnostic tools such as the use of cone beam and diagnostic waxing [11], in addition to

the clinical analysis and radiographic information detailing the anatomical structures, occlusion and biomechanics of each case in particular^[12].

Although it is intended to reduce surgical time and trauma by placing immediate implants in molars, it currently represents a challenge in seeking the ideal position of the implant without compromising primary stability due to the limited thickness of the interradicular septum¹³. For this reason, a thorough evaluation of bone quality and root angulation must be made, since a high percentage of distortion has been demonstrated at mesiodistal angles, compromising an accurate diagnosis^[14].

The aim of the present study is to conduct a literature review on the conditions for the placement of posterior implants, according to their condition in the morphology of the tooth, the morphology of the alveolus, as well as the importance of the geomancy of the implant and the volume in the tissue.

2. Materials and methods

A search was made in PubMed including original articles, pilot studies, case reports and literature review, where a search was made in articles about literature on the conditions for the placement of posterior immediate implants, according to their condition in the morphology of the tooth, morphology of the alveolus, as well as the importance of the geometry of the implant and the volume in the tissue. The search included the words "Post-extraction implants", "posterior implants" and "primary stability".

3. Results & Discussion

3.1 Conditions of Root-Tooth Morphology

It is very important to evaluate radiographically the tooth before extracting it. The dimensions between the first and second molars are very similar, which makes it difficult to prepare the implant due to the thinness of the interarticular septum, and a consideration in molars is the bifurcation of the ridge that exists between the buccal and lingual^[15]. In many cases, when there are multiradicular teeth like the first and second upper molars, they generally have 3 roots: mesial, distal and palatal, which offers an advantage of a wide interradicular septum that favors the site of preparation to place the implant, having a better bone coverage and fixation^[16].

In case the roots body, they guide the milling right to the center of the interradicular septum, for that it is important that the roots have an adequate structure and in minimum bone that covers 2/3 of the root as it is essential because at that point the interradicular septum is wider and easier to hook the middle part of the alveolus to place the implant platform at a suitable height that will provide a transition zone for the restoration^[17].

Otherwise the unfavorable position of the roots, the fusion of them and ankylosis would be a contraindication to use the roots as a guide to milling. The width of the tooth at the cement-enamel junction, the length of the root, the length of the trunk, and the degree of divergence of the roots are all elements that will determine the morphology of the receptacle and, consequently, the positioning and stability of the implant^[16].

The use of the interradicular technique in lower molars as guide for the milling and placement of the immediate implant is a technique that has the advantage of placing the implant exactly in the center of the alveolar bone, to maintain the edges of the bone and reduce the reabsorption of the bone, having a great advantage for the final prosthetic rehabilitation

[11].

The problem in surgeries is the area occupied by multiradicular roots, since we must mill in an ideal position without impairing primary stability. It is very important to know the correct position of the root, to be able to program and verify what our surgical act will be, since we depend on an interradicular septum for our correct placement of post extraction implants.

3.2 Conditions of the Alveolar Morphology

The advantage of placing a post-extraction implant is the prevention of bone resorption^[18]. After the extraction, the bone begins to reshape, amounts of bone remodeling occur, and the edentula crest of the alveolar process undergoes three-dimensional modifications^[19]. In the maxillary and mandibular area, the immediate implants involve several clinical challenges, which are related to the site specific to the anatomical aspect, comparing the length of the alveolus with the reduction of the bone becomes apical¹³. The healing after extraction, has a reduction in diameter varies between 2.6 and 4.6mm^[20].

The placement of immediate implant requires an adequate amount and quality of bone, in cases of poor volume in the bone. The technique for preservation is designed to minimize horizontal and vertical alterations in post extraction sites^[6, 21]. According to studies report that the use of bovine bone and porcine collagen membrane considerably increases the resorption of horizontal bone compared with only the extraction of the tooth^[13]. A new classification about the extraction in molar, describes the sites of the alveolus with stability for its prompt stability: A) right in the septum which allows the implant to move, without leaving spaces between the implant and the socket, B) enough bone in the septum to stabilize, but not completely for the implant, which leaves spaces between one or more implant surfaces and the socket, C) alveolus that does not have enough bone in the septum which requires that the implant be hooked in the periphery of the alveolus^[11].

The advantage of placement post-extraction implants is to avoid the bone loss in the alveolus, trying to be the least invasive around it. The alveolus will be our total guide for the placement of the implant guiding us in different anatomical points and with only correct manipulation to the milling. The placement of a post-extraction implant of multiradicular teeth is never an easy task, since there is always a difference between the size of the implant and the socket.

3.3 Geometric importance of the Implant

Active bone remodeling caused by surgical damage removes pre-existing bone tissue and forms new bone tissue adjacent to the implant during post-implantation recovery. Factors including implant materials and bone growth agents can alter the quality and quantity of regenerated bone tissue at the implant interface^[8]. The more apical location of the voltage peak suggests that the conical implant-abutment interface is a solution to the problem^[16]. It is suggested that the design of the implant gives better result with a cortical thickness of 2.8 mm also give the best result with a cortical thickness of 1 mm (the stresses being much greater) surface of potential contact. The degree of the surface roughness significantly influences the expression of the osteoblast gene^[22]. The success of the implants depends on establishing and maintaining a direct structural and functional link between the surface of the implant load and the bone environment^[23]. Techniques such as sandblasting and acid etching or anodic oxidation have

been used to roughen the surface and implants treated with these methods have increased affinity to bone, improving osseointegration^[24].

The restorative dimensions and the adequate bone are fundamental to replace a uniradicular tooth post-extraction, because there is harmony between the restorative dimensions such as the crown and the existing bone dimensions, the alveolus should be kept in mind to select the correct geometry of the implant in terms of size and diameter.

We must consider that the bone resorption will be carried out in which we at the moment that remove bone tissue new tissue will form around the implant. The geometry of the implant must be taken thoroughly to obtain a correct interface between the new generation of bone and implant⁷.

3.4 Tissue volume

When carrying out the dental extraction, the volume of tissue is marked alterations^[3]. Volumetric alteration exists as a consequence of the mucoperiosteal elevation on the stability and the nutritional status of the underlying bone^[25]. The sites increased with subepithelial connective tissue (SCTG) at the time of implant placement, they have better esthetics and thicker peri-implant tissues^[14]. When SCTG is used with placement and provision of implants in the esthetic zone, it significantly improves the maintenance of the facial gingival level^[26].

It is of great importance to know that platelet aggregates play a biological role as binding agents between the different components of a bone or gingival graft and act as a protective gel for the site of operation, similar to the autologous fibrin glues used in the past, where fibrinogen was activated by the action of calcium and thrombin^[27]. In case of loss of both bone and tissue, guided bone regeneration (GBR) as an option to obtain better results in post-extraction implants. The presence of healthy tissue adhering to the soft tissue interface in implants with long-term success gives stability both in function and aesthetics. The thicker periodontium is less prone to recession, due to the thickness of the cortical bone as well as the thickness of the surrounding gingiva^[14].

It is important to consider that in the moment we perform the extraction followed by the placement of the implant the objective should be the regeneration of the bone and to treat a complete preservation of the crest, as well as the preservation of the volume of the tissue as this will improve certain conditions of the tissues to play with the aesthetics and function of the implant.

4. Conclusions

The immediate implants in posterior teeth have some challenges to face compared to post-extraction implants of uniradicular or anterior teeth. After tooth extraction is a safe option, even when the implants are loaded immediately or late. We must consider the factors of the patient that define the success of an immediate implant placement includes analyzing the position of the root, to be able to program and verify how our surgical act will be; the alveolus that will be our total guide for the implant placement; the correct interface between the geometry of the implant and the volume of the tissue to be able to count on the adequate conditions for its aesthetics and function of the implant.

5. Acknowledgments

Acknowledgments to CONACYT for the scholarship granted.

6. References

1. Stimmelmayer M, Güth JF, Iglhaut G, Beuer F. Preservation of the ridge and sealing of the socket with a combination epithelialised and subepithelial connective tissue graft for management of defects in the buccal bone before insertion of implants: a case series. *Br J Oral Maxillofac. Surg.* 2012; 50:550-55
2. Soni R, Singh A, Vivek R, Baranwal HC, Chaturvedi TP, Srivastava A. Immediate implant placement in mandibular anterior region with dehiscence. *Journal of Dental Implants.* 2013; 3(2):177-80.
3. Zuffetti F, Capelli M, Del Fabro M, Testori T. Post-extraction implant placement into infected versus non-infected sites: A multicenter retrospective clinical study. *Clin Implant Dent Relat Res.* 2017; 134(2):293-300.
4. Rokn AR, Keshtkar A, Monzavi A, Hashemi K, Bitaraf T. Comparing Short Dental Implants to Standard Dental Implants: Protocol for a Systematic Review *JMIR Res Protoc.* 2018; 7(1):e16.
5. Rodrigo D, Vignoletti F. Controversias en implantología: implantes post-extracción. *Periodoncia y oseointegración.* 2009; 9(2):107-20.
6. Atieh MA, Payne AG, Duncan WJ, de Silva RK, Cullinan MP. Immediate placement or immediate restoration/loading of single implants for molar tooth replacement: A systematic review and meta-analysis. *Int J Oral Maxillofac Implants* 2010; 25(3):401-415.
7. Barone A, Toti P, Quaranta A, Derchi G, Covani U. The clinical outcomes of immediate versus delayed restoration procedures on immediate implants: A comparative cohort study for single-tooth replacement. *Clin Implant Dent Relat Res.* 2015; 17(2):1114-1126.
8. Peñarrocha-Oltra D, Leandro C, Maestre-Ferrín L, Peñarrocha-Diogo M, Peñarrocha-Diogo M. Comparison of Immediate and Delayed Implants in the Maxillary Molar Region: A Retrospective Study of 123 Implants. *Int J Oral Maxillofac Implants.* 2012; 27:604-610.
9. Abdallah SD, Tran G, Abughanam M, Laurenti D, Zuanazzi MA, Mezour Y *et al.* Biomaterial surface proteomic signature determines interaction with epithelial cells. *Acta Biomater.* 2017; 54(4):150-163.
10. Schwartz-Arad D, Gulayev N, Chaushu G. Immediate versus nonimmediate implantation for full-arch fixed reconstruction following extraction of all residual teeth: A retrospective comparative study. *J Periodontol.* 2000; 18(7):488-501.
11. Haddad E, Lauritano D, Carinci F. Interradicular Septun as guide for pilot drill in postextractive implantology: a Technical note. *The Journal of Contemporary Dental Practice,* January 2015; 16(1):81-84.
12. Horowitz R, Holtzclaw D, Rosen PS. A review on alveolar ridge preservation following tooth extraction. *J Evid Based Dent Pract.* 2012; 12(3):149-160.
13. Abdallah SD, Tran G, Abughanam M, Laurenti D, Zuanazzi MA, Mezour Y *et al.* Biomaterial surface proteomic signature determines interaction with epithelial cells. *Acta Biomater.* 2017; 54(4):150-163.
14. Schwartz-Arad D, Gulayev N, Chaushu G. Immediate versus nonimmediate implantation for full-arch fixed reconstruction following extraction of all residual teeth: A retrospective comparative study. *J Periodontol.* 2000; 18(7):488-501.
15. Haddad E, Lauritano D, Carinci F. Interradicular Septun as guide for pilot drill in postextractive implantology: a Technical note. *The Journal of Contemporary Dental*

- Practice, January 2015; 16(1):81-84.
16. Horowitz R, Holtzclaw D, Rosen PS. A review on alveolar ridge preservation following tooth extraction. *J Evid Based Dent Pract.* 2012; 12(3):149-160.
 17. Cardaropoli D, Tamagnone L, Roffredo A, Gaveglione L. Relationship between the buccal bone plate thickness the healing of postextraction sockets with/without ridge preservation. *Int J Periodontics Restorative Dent* 2014; 34(8):211-217.
 18. Esposito M, Maghhaireh H, Grusovin MG *et al.* Soft tissue management for dental implants: what are the most effective techniques? A Cochrane systematic review. *Eur J Oral Implantol.* 2012; 5(3):221-38
 19. Idle MR, Monaghan AM, Lamin SM *et al.* N-butyl-2-cyanoacrylate (NBCA) tissue adhesive as a haemostatic agent in a venous malformation of the mandible. *Br J Oral Maxillofac Surg.* 2013; 51(6):565-7.
 20. Rodriguez M, Claudia B. Anatomically Guided Implant Side preparation Technique at Molar Sites. *Implant Dentistry.* 2009; 68(6):915-923.
 21. Garber D. The esthetic dental implant: Letting the restoration be the guide. *J Am Dent Assoc.* 1995; 126(2):319-325.
 22. Barone A, Toti P, Quaranta A, Derchi G, Covani U. The clinical outcomes of immediate versus delayed restoration procedures on immediate implants: A comparative cohort study for single-tooth replacement. *Clin Implant Dent Relat Res.* 2015; 17(2):1114-1126.
 23. Yousef H, Khaimov M, Weiner S. A Clinical investigation of the Rescue internal implant. *Compend Contin Educ Dent.* 2012; 80(9):244-52.
 24. Vignoletti F, Matesanz P, Rodrigo D, Figuero E, Martin C, Sanz M. Surgical protocols for ridge preservation after tooth extraction. A systemic review. *Clin Oral Implants Res.* 2012; 23(5):22-38.
 25. Tan WL, Wong TL, Wong MC, Lang NP. A systemic review of post-extraction alveolar hard and soft tissue dimensional changes in humans. A systematic review. *Clin Oral Implants Res.* 2011; 22(5):779-788.
 26. Shwartz-Arad D, Grossman Y, Chaushu G. The clinical effectiveness of implants placed immediately into fresh extraction sites of molar teeth. *J Periodontol* 2000; 71(1):839-844.
 27. Brånemark PI, Zarb GA, Albrektsson T eds. *Tissue-Integrated Prostheses: Osseointegration in Clinical Dentistry.* Quintessence Publ. 1985; 74(10):1520-33.
 28. Wagenberg B, Froum SJ. A retrospective study of 1925 consecutively placed immediate implants from 1988 to 2004. *Int J Oral Maxillofac Implants* 2006; 21(3):71-80.
 29. Mckee IW, Glover KE, Williamson PC, Lam EW, Heo G, Major PW. The effect of vertical and horizontal head positioning in panoramic radiography on mesiodistal tooth angulations. *Angle Orthod.* 2001; 34(4):360-370.
 30. Wyatt DL, Farman AG, Orbell GM, Silveira AM, Scarfe WC. Accuracy of dimensional and angular measurements from panoramic and lateral oblique radiographs. *Dentomaxillofac Radiol.* 1995; 69(3):383-91.
 31. Choukroun J, Corso MD. Tissue response to platelet-rich fibrin: clinical evidences. Part 1: socket extractions. *Implant Dentistry Today* 2017; 71(2):299-307.