

Main Considerations On The Implants In Previous Region: A Review

Review Article

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Abstract

The need for better aesthetic results in treatments involving osseointegrated implants led to the search for plans that allowed the use of better parameters with greater predictability of peri-implant esthetics. The previous planning, analysis of aesthetic factors, diagnostic waxing, surgical guide and tissue aspects are important steps for the best final result. Such situation not only the difficulty of installing the implant, but also the possibility of the clinician to obtain dental and gingival esthetics. Through the evolution of implant systems, graft materials and tissue manipulation techniques, success can be achieved.

Keywords: Peri-Implant Aesthetics; Aesthetics; Osseointegration; Planning.

Introduction

It was in the 1960s that Per-Ingvar Branemark and his groups marked the history of dentistry for the results obtained with their research in replacing lost natural teeth for the maintenance of aesthetics and function.

Direct contact between the bone and the implant is described by Branemark, Adell, Breine, Hansson, Lindstrom, Ohesson. In 1977, Branemark, Hansson, Adell, Breine, Lindstrom and Hallen conceptualized the term osseointegration as a direct, functional structural connection between the living bone and the surface of an implant submitted to a functional load [5-7, 14].

For patients called oral invalids with considerable loss of alveolar bone the main objective was to return the function, then it was observed that the function alone was not enough. The mechanical support was supplied, but the aesthetic components were compromised. The search for aesthetics has also led to an expansion of biological knowledge and prosthetic components [14].

Osseointegrated implants following various surgical and technical principles until the installation of implant-supported implants. The characteristics highlighted in this procedure are the meticu-

lousness of the surgeon and the micro-structural aspects of the titanium implant, which are essential factors for osseointegration [1, 5-8].

Osseointegrated implants enable prosthetic restorations in areas where no dental elements or residual roots are found. Restoration with implants, mainly in the anterior region of the maxilla, can be said that it is not an easy procedure, since bone resorption after extraction may compromise the final result. In this sense, the diagnosis and the treatment plan are critical factors in obtaining successful results [9, 18].

The planning may involve the management of soft tissues, bone grafting techniques, the most appropriate positioning of the implant and the use of different prosthetic components [25], also the preparation of the definitive prosthesis that favors and respects aesthetic and biomechanical principles.

Methods

Experimental and clinical studies were included (case reports, retrospective, prospective and randomized trials) with qualitative and/or quantitative analysis. Initially, the key words were determined by searching the DeCS tool (Descriptors in Health Sci-

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ences, BIREME base) and later verified and validated by MeSh system (Medical Subject Headings, the US National Library of Medicine) in order to achieve consistent search.

Mesh Terms

The words were included *peri-implant aesthetics*; *Aesthetics*; *Osseointegration* planning description for refinement was added during searches. And Google Scholar. It was stipulated deadline, and the related search covering all available literature on virtual libraries.

Series of Articles and Eligibility

A total of 57 articles were found involving temporomandibular dysfunction. Initially, it was held the exclusion existing title and duplications in accordance with the interest described this work. After this process, the summaries were evaluated and a new exclusion was held. A total of 37 articles were evaluated in full, and 26 were included and discussed in this study.

Literature Review

Protective Planning

The process of direct structural and functional connection between the living bone and the implant surface subjected to an occlusal load is defined as osseointegration [5-7]. Several factors were observed for the success of the procedure, such as minimization of damage to adjacent tissues due to thermal trauma, surgery and contamination [1].

It should be observed and attentive to all the necessary questions for the installation of implants referring to the surgical protocol following two stages. In the first stage, the implants are inserted in the bone, emphasizing that the control of the heat, below the 43°C with rotation until 2000 rotations per minute (rpm), during the installation of the implants, is important to not compromise the osseointegration. Thus, during milling, it is constantly infused with sterile physiological saline solution. This is because overheating leads to protein denaturation and subsequent bone necrosis. This procedure (phase I) requires that they be buried in bone and during the repair process, for a period of 4 to 6 months. The second stage (phase II) is characterized by the exposure of the implants, in which they are prepared to receive the loads derived from the prostheses placed on them. In this period, without any kind of load on them, it will allow them to osseointegrate effectively and without interferences [5].

Diagnostic

It is of great importance for the correct planning of oral recovery in edentulous patients the diagnostic waxing, since the actions applied at this moment refer in evaluating the dispositions, the form and the correct aesthetics of the teeth determined by the diagnostic waxing, following the principles like the harmony between the determinants of the mandibular movements and the occlusal morphology, so that it does not have deflective contact of the centric and eccentric movement. Thus, prevention of muscle dysfunctions and temporomandibular joint (TMJ) disorders can be ensured, resulting in better stability of the stomatognathic

system [2, 3, 20].

Bassanta et al., [2] points out that the diagnostic waxing associated with integral planning is important to obtain correct oral rehabilitation and that this technique is also attributed to being a guide and, at the same time, serves to demonstrate to the patient the probable functional prognosis and aesthetic.

Dias et al., [12] point out the importance of diagnostic waxing for the leveling of the occlusal plane and not the use of dental prostheses with implantodontia. This procedure needs to be attuned to the work of surgeons and prosthodontists, since the condition of the alveolar ridge is essential.

This procedure is adopted by the prosthodontists because they can evaluate the case before any surgery for the positioning of osseointegrated implants or the placement of fixed prostheses in order to guarantee the ideal end result of the prosthesis [2, 3, 20].

According to Machado et al., [17] Diagnostic waxing is of paramount importance because it goes beyond the planning stage. And it is attested by the treatment phase, during which the over contour of the cervical regions should be avoided, so as to also prevent bacterial plaque buildup and facilitate access to hygiene.

For Conceição et al., [11] through the models it is possible to observe gingival details, positioning, inclinations, dental forms and teeth relations together and their antagonists.

Guide

The guides guide bone perforation by directing the implants into the surgical process. It is also used in aesthetic tests to find out what the facial aesthetics would or would be, either in the lip support or in a perspective of the final position of the teeth at the end of the treatment, so patients will be informed about the sizes of the teeth, which can be longer due to bone resorption, for example [1].

For the authors, in planning, one must take into account the prosthetic and occlusal principles of the prosthesis, according to the positioning and the angulation of the implant can suffer the influence of the bone structure, adjacent teeth, prosthesis type, prosthetic contour, direction of occlusal forces and retention of the prosthesis [2].

In order to achieve a good favorable esthetic result it is necessary that there is a dialogue between the surgeon and the prosthodontist. The final position of the guidewire determines the position of the implant, it is very helpful to make a guide that properly directs the perforations during the surgical procedure, which can be obtained through articulated study models [4].

However, it is of great importance to use a surgical guide that directs the position of the implant in the Vestibulo-lingual/palatal, mesio-distal and occlusal-apical directions. According to Touati; Guez; Saadoun [23, 24] is the crown that defines the selection and position of the implant.

Types Of Deployment

By evaluating the time elapsed between tooth extraction and implant placement, the following classification was established related to the healing phase of the recipient zone associated with the therapy [10, 19, 21].

Immediate implant or type 1: when the remaining bone is satisfactory to ensure the primary stability of the implant, which is placed in the same surgical session in which the dental extraction is done.

Implant placed early, secondary or type 2: when implanted after 4-8 weeks after extraction, time for soft tissues to heal, allowing adequate mucogingival coverage of the alveolus.

Implant placed late or type 3: when the bone of the alveolar crest is partially healed (between 3 to 6 months after extraction). This technique is used, for example, in cases where the recipient zone does not allow immediate or early implantation.

Mature implant or type 4: when implant placement takes place in the period of 6 to 9 months or more after dental extraction. Finding at this stage, bone completely healed and mature in the alveolus.

Interdental Papilla

The interdental papilla is defined as the extension of the prolonged gingival tissue beyond the region of the crown of the tooth. Its position around a tooth is determined by the level of the attached connective tissue and by the morphology of implanting the tooth to the bone. There are two different periodontal biotypes described according to the morphology of the interdental papilla and the bone architecture: the fine periodontium and the thick periodontium [1, 2].

The papilla around an implant has a pattern that can be modified by the periodontal insertion of the adjacent teeth. The interproximal papilla pattern is related to the distance between the base of the implant contact area and the bone crest. The natural aspect of the restoration depends on the contour of the soft oral tissue [2, 3].

Others authors showed on the importance of preserving soft tissues. According to them, if the distance between the point of contact and the ridge is 5 mm the formation of the papilla occurs in 98.0 % of cases. If it is more than 6 mm, the papilla will appear in 56% of the cases and with 7.0 mm 27.0 % or sometimes even absent [5-8].

When referring to the horizontal distance, it is based on its importance in peri-implant implantation due to its relation with adjacent teeth and its decrease, increasing the bone loss. In the distance between implants, the lateral dimension for loss of bone crest was evaluated. Also, it was observed that when the distance between 2 implants was equal to or less than 3mm, there was a higher level of resorption of the bone crest between them [8, 9].

Instead of conventional abutments, it is suggested to modify the conventional sequence, placing the provisional restoration in the second surgical stage. By inducing the correct morphology of tissue formation, it is necessary that the shape and size of this restoration be managed by soft tissues that are dynamic and provide

a better regeneration potential [10]. Healed tissues with a guide achieve scarring of the papilla and early natural maturation.

Keratinized Tissue

The need to perform a free gingival graft should not be related to the amount of keratinized mucosa present around implants, but it is necessary to evaluate certain criteria such as the patient's age, oral hygiene practice and periodontal conditions [11]. Moreover, the mention that the keratinized mucosa present seems to be of little importance for peri-implant health, provided there is good oral hygiene that can be achieved and maintained [12].

Therefore was demonstrated that an inadequate range of keratinized mucosa and marginal soft tissue mobility had no significant influence on the health conditions of peri-implant tissues [13]. In the results obtained, the authors reported that the observations reported in experimental studies should be considered, showing that the peri-implant collagen fibers are oriented parallel to the surface of the implant and that this orientation may vary according to the type of mucosa. Therefore, the possible influence of mucosal quality on the apical progression of the lesion caused by plaque accumulation should not be ruled out [14].

Even others authors reported that the appearance of soft tissues is as important to the aesthetic termination of the treatment as to the appearance of the implant-supported restoration itself [15-18]. The mucogingival aspects, such as the health of the peri-implant tissues, the presence of the interproximal papilla, and the amount of buccal bone support are factors that must be in harmony with the hard and soft tissues of adjacent teeth [19].

Discussion

The main limitations for obtaining natural patterns in implant-supported restorations can be overcome with the association of techniques, depending on each clinical case, which must be correctly evaluated and studied, considering all their limitations. The desired goal is achieved and extremely esthetic results can be obtained, close to perfection [16]. Villaça; Barros; Novaes Junior [26] reports that immediate implants are indicated in cases of dental extraction due to endodontic problems, root fractures or extensive caries, in which the bone walls of the alveolus remain intact. This consideration is based on the importance of achieving good initial stability of the implant to obtain a good prognosis of the case. Such indications are explained by the impossibility of maintaining the dental element in the oral cavity, so that there is minimal inflammation/bone resorption and in cases where the aesthetic function and the patient's self-esteem should be maintained.

In relation to prosthetic planning, for the choice of pillar several factors should be considered, such as visibility of the region, for example, smile line, gingival biotype, color of neighboring teeth, patient's expectations [9, 22].

Despite the existence of several clinical resources to obtain aesthetics in rehabilitations with integrated bone implants, the professional must have clinical judgment to judge what is ideal, feasible or unviable in a treatment [13].

Dental implants require special evaluation and care. Rehabilitation should be considered by evaluating the regions of the bone crest around implants as well as the consequences related to soft tissue in order to achieve the aesthetic expectations of the patients. And the relationship between bone-implant has been favoring the primary stability and control of micromovements that are being achieved.

It is noticed that in previous implants it is necessary to observe some fundamental aspects in obtaining aesthetics and adequate functionality [3]. As much as its importance of these aspects is present in the restorations with implants in esthetic areas.

Thus, planning in the procedure should be a safe alternative to obtain satisfactory aesthetic results, since the failure of this step can lead to irreversible aesthetic and functional failures, generating to the patient, besides other inconveniences, a great discomfort and aesthetic discontent. Therefore, it is important to make a selection of the cases correctly, allowing bone and gingival tissues to be preserved, structures indispensable for the success of the treatment, as well as the selection of the implant, prosthetic component and the way of insertion of the implant according to the need of each case [4].

Conclusion

In the present study, it was observed that in order to achieve the success of the treatment with implants in the anterior region, it is necessary to relate the predictability of its osseointegration and its functional rehabilitation of mastication. The current concern of patients who undergo this type of treatment is directly linked to the aesthetics of the smile, defying modern dentistry.

References

- [1]. Adell R, Lekholm U, Rockler BR, Brånemark PI. A 15-year study of osseointegrated implants in the treatment of the edentulous jaw. *Int J Oral Surg.* 1981 Dec;10(6):387-416. PubMed PMID: 6809663.
- [2]. Bassanta AD. The importance of diagnostic closure in oral rehabilitation. *Rev Bras Odontol.* 1992; 49 (6): 10-5.
- [3]. Bassanta AD, Bortoli Júnior ND. Diagnostic waxing in osseointegrated threaded implants: case report. *Ambito odontol.* 1996; 5 (29): 5-10.
- [4]. Bottino MA, Itinoche MK, Buso L, Faria R. Esthetic with implants in the anterior region. *Implant News.* 2006 Nov; 3 (6): 560-8.
- [5]. Branemark PI. Osseointegration and its experimental background. *J Prosthet Dent.* 1983 Sep;50(3):399-410. PubMed PMID: 6352924.
- [6]. Brånemark PI, Breine U, et al. Intra-osseous anchorage of dental prostheses: I. Experimental studies. *Scand J Plast Reconstr Surg.* 1969;3(2):81-100. PubMed PMID: 4924041.
- [7]. Brånemark PI, Hansson BO, et al. Osseointegrated implants in the treatment of edentulous jaw: experience from a 10-year period. *Scand J Plast Reconstr Surg Suppl.* 1977;16:1-132. PubMed PMID: 356184.
- [8]. Buchs AU, Hahn J, Vassos DM. Interim clinical study report: a threaded, hydroxylapatite-coated implant-five-year post-restoration safety and efficacy. *J Oral Implantol.* 1995;21(4):266-74. PubMed PMID: 8699518.
- [9]. Carvalho PE, Ciotti DL, Silva RC, Joly JC. Implantation and immediate timing in aesthetic areas, without opening of the flap, using implants of reduced diameter. *Implant News.* 2008;5(3):255-60.
- [10]. Clementini M, Morlupi A, Agrestini C, Barlattani A. Immediate versus delayed positioning of dental implants in guided bone regeneration or only graft regenerated areas: a systematic review. *Int J Oral Maxillofac Surg.* 2013 May;42(5):643-50. PubMed PMID: 23481543.
- [11]. Conceição EN. Aesthetic restorations: composites, ceramics and implants. Artmed Editora; 2009.
- [12]. Dias PV, Bassanta AD, Silva AR. Examination of the patient, diagnosis and prognosis related to osseointegrated implants and diagnostic waxing. *J. Health Sci. Inst.* 1993; 11 (1): 27-31.
- [13]. Elerati EL, Assis MD, Costa SC. Solutions in ceramic gingiva in the aesthetic correction of unitary implants poorly positioned in the anterior region. *Implant News.* 2012; 9 (1): 95-100.
- [14]. Soares M. Aesthetic optimization with implants in anterior maxillary region [Access: 16 Jul 2013].
- [15]. Jung R. Preservation of the alveolus for early positioning of the implant. In: *Treatment concepts for post-extraction alveoli. Scientific studies: clinical cases.*
- [16]. Lopes FA, Oshiro A, Araujo CD, Araujo MA, Tomasi C, Betiol E. Aesthetics in previous unit implants: achieving good results. *Implant News.* 2005: 49-54.
- [17]. Machado MA, Bassanta AD, Silva AR. Diagnostic waxing for an anatomical contour. *Rev Paul Odontol.* 1994; 16 (3): 26-8.
- [18]. Meurer S. Installation of implant in an area of esthetic importance. *Monograph of specialization in Implantology.* Florianópolis: Funorte/ Soebrás, 2009.
- [19]. Muhamad AH, Azzaldeen A, Aspasia SA, Nikos K. Implants into fresh extraction site: A literature review, case immediate placement report. *J Dent Implants.* 2013 Jul 1;3(2):160.
- [20]. Shirata OK, Bassanta AD, Silva AR. The influence of the determinants of occlusion on diagnostic waxing. *Odonto (São Bernardo do Campo).* 1999; 7 (16): 46-50.
- [21]. Soydan SS, Cubuk S, Oguz Y, Uckan S. Are success and survival rates of early implant placement higher than immediate implant placement?. *Int J Oral Maxillofac Surg.* 2013 Apr 1;42(4):511-5.
- [22]. Thomé G, Bernardes SR, Castro CG, et al. Immediate installation of implants in the aesthetic region of the maxilla after dental extraction. *Journal ILAPEO.* 2011 Sep;5(3):105-110.
- [23]. Guez G. Immediate implantation with provisionalization: From literature to clinical implications. *Pract Proced Aesthet Dent.* 2002;14(9):699-707.
- [24]. Touati B, Guez G, Saadoun A. Aesthetic soft tissue integration and optimized emergence profile: provisionalization and customized impression coping. *Pract Periodontics Aesthet Dent.* 1999 Apr;11(3):305-14. PubMed PMID: 10379291.
- [25]. Tunchel S, Fraguas EH, Blay A. Aesthetic considerations in implantology. *Periodontology and implantology: aesthetic solutions and clinical resources.* New Odessa: Napoleon; 2010. Chapter 7.
- [26]. Villaça JH, Novaes Junior AB. Acellular dermal matrix in guided bone regeneration of treated areas with immediate implant. *Implant News.* 2006; 3 (2): 175-81.