THE EUROPEAN SOCIETY OF MEDICINE
Medical Research Archives, Volume 12 Issue 8

CASE REPORT

Impact of gingival tissue type around Dental implants on implant health and longevity: A Case report on implants around mandibular overdenture

Ahmad Soolari DMD. MS[1]; Amin Soolari DDS, FAGD[2]; Nkem Obiechina DMD, MS[1]

1. Private practice
2. Periodontal resident at the University of Florida, Gaisville

OPEN ACCESS

PUBLISHED
31 August 2024

CITATION
Soolari, A., Soolari, A., et al., 2024. Impact of gingival tissue type around Dental implants on implant health and longevity: A Case report on implants around mandibular overdenture. Medical Research Archives, [online] 12(8).
https://doi.org/10.18103/mra.v12i8.5651

DOI
https://doi.org/10.18103/mra.v12i8.5651

ISSN
2375-1924

ABSTRACT

The type of gingival tissue around dental implants is extremely important for the health and longevity implants in the mouth. Gingival tissue around dental implants can be comprised of keratinized or non-keratinized mucosal tissue. The type of soft tissue present around implants can influence the health, plaque accumulation and inflammation around dental implants. A number of studies have found that there is a need to have a minimum amount of keratinized mucosa to maintain peri-implant health especially for patients with poor oral hygiene that are at greater risk of gingival inflammation others have not found the same correlation for patients with good oral hygiene practices. More recently, a number of studies have found less potential for inflammation in sites with keratinized mucosa compared to non-keratinized mucosal tissue. The goal therefore is that when non keratinized mucosal tissue is present to utilize a soft tissue grafts to be able to regain keratinized mucosa around the implant site. This is particularly important for implant supported overdentures where gingival augmentation can be able to improve oral hygiene, and help with resistance to trauma and abrasion from the removable prosthesis. This Case report is on utilization of a free gingival graft to increase keratinized mucosa, combined with a vestibuloplasty to increase vestibular height around implants supporting a mandibular overdenture prosthesis with the goal of improving the health and longevity of the implant supported overdenture.

Introduction:

Treatment outcomes for implant dentistry are generally positive, but implants are not trouble free. Implant complications are on the rise and the best course of treatment is to avoid the avoidable. The purpose of this report is to provide info on the impact of gingival tissue type to avoid negative outcomes. The quality tissue matter around dental implant supporting prosthesis. The gingival augmentation prior to delivery of prosthesis is crucial for a long-term stability of implant supported prosthesis.

The type of gingival tissue around teeth and implants plays a major role on their periodontal health. This is particularly important for dental implants because biologic soft tissue seal around dental implants is inferior compared to that of teeth. Implants lack a periodontal ligament, making the tissue around implants more permeable and less resistant to microbial attack.[1]

While collagen fibers attach to teeth in a perpendicular orientation, providing a seal against microbial attack, the fibers around implants orient parallel to the implant and do not directly attach the dental implant surface. As a result of this, the soft tissue seal around dental implants is not as effective in keeping implants free from microbial attack. The type of tissue that exists around dental implants is therefore important to maintaining the health of implants, and having keratinized mucosa is more desirable than nonkeratinized mucosal tissue.

There is usually no required amount of keratinized mucosa to maintain periodontal health in the presence of good oral hygiene, while patients who have poor oral hygiene can become prone to inflammation of the non-keratinized mucosal tissue and have increased potential for Mucositis or Peri-implantitis. The goal is that having at least 2 mm of keratinized mucosa as the peri-implant tissue around the restored dental implants for patients with poor oral hygiene can be able to reduce risk of implants for Mucositis and Periimplantitis.

Keratinized mucosa contains both lamina propria which is fibrous connective tissue that has fibroblasts and ortho-keratinized squamous epithelium which are adherent to the periosteum, this is able to reduce chances of bacterial invasion.[2] Studies have shown that having keratinized mucosa is important to preventing plaque build up and inflammation.[3] Mancini and colleagues reviewed impact of keratinized mucosa on implant health parameters over a 10 year period after implant loading and assessed 74 patients with 148 implants and found that preservation of buccal keratinized mucosa resulted in reduced signs of Mucositis after 10 years such as bleeding on probing and gingival indices.[3] Rocuzzo and colleagues found similar findings in a 10 year study on 98 patients and found that there was a difference in levels of inflammation as measured by Gingival index(GI) and bleeding on probing(BOP), plaque accumulation, gingival recession, and biologic complications, less bone less and less discomfort on brushing for sites with 2 mm or more of keratinized tissue compared to sites with less than 2 mm of keratinized tissue.[4]

Studies have shown that the presence of keratinized tissue can be able to enhance brushing comfort around dental implants, reduce inflammation and improve stability of marginal bone over time.[3,5,6] To increase keratinized tissue around dental implants, a number of procedures are utilized including apically positioned flaps, pedicle grafts, free gingival and Connective tissue grafts.[7,8] Elkhaweldi and colleagues in looking at different surgical techniques for increasing keratinized mucosa for implant supported overdentures, recommend apically positioned flaps and pedicle grafts only in situations where there is inadequate amounts of keratinized tissue to support implants and at least 0.5mm of keratinized tissue present and free gingival and connective tissue grafts in instances where there is no keratinized tissue around implants.[7]

Patients with implant supported overdentures who have with inadequate keratinized can present with discomfort when performing oral hygiene since the absence of keratinized tissue is associated with higher levels of plaque accumulation, gingival inflammation, bleeding on probing and mucosal recession.[9]Additionally, when there is a shortened vestibule, this increases the effects of plaque accumulation, with more enhanced chance of increasing inflammation at the site. It can also result in the restriction of the Mentalis muscle and impinging of the buccal flange of a denture. 10 The goal for patients with implant supported overdentures is to ensure that there is adequate keratinized tissue present around overdenture implants that will support overdenture prosthesis to allow for overall implant health, success and maintenance. Use of free gingival grafts are recommended to increase keratinized tissue due to the ability for free gingival grafts to be able to maximally increase width and thickness of keratinized tissue compared to apically positioned flaps or soft tissue allografts.[9]

Case Report:

A fifty three year old male patient presented with complaint of discomfort from two of his anterior mandibular implants that were supporting his overdenture prosthesis involving implants #22 and #27, a total of 4 implants were placed in positions of #20, #22, #27 and #29. The clinical assessment of the area showed that there was a lack of vestibular depth and inadequate keratinized tissue surrounding implants #22 and #27. The goal was to perform a free gingival graft for implants #22 and #27 to increase keratinized tissue around the implants which would reduce discomfort around them. Implants replacing #20 and #29 had adequate keratinized tissue and were both uncovered using crestal incisions. Following administration of local anesthesia, a crestal incision was made for the posterior implants a full thickness flap was elevated, a facial incision was made for the anterior implants with a full thickness flap designed to retain as much keratinized tissue as possible was left on the alveolar ridge, additionally, the flap was released past the mucogingival junction to perform the vestibuloplasty and to allow greater mobility to maximize amount of keratinized tissue from the procedure. The goal was to combine both a vestibuloplasty and free gingival graft to both increase the height of vestibule as well as increase keratinized mucosa around the implants. Two thick free gingival grafts were harvested from his palate and secured to the recipient site, the flap closed with PTFE sutures. The patient was given prescriptions for Chlorhexidine, Motrin 600mg for pain and a week of Clindamycin as an antibiotic.

Figure 1

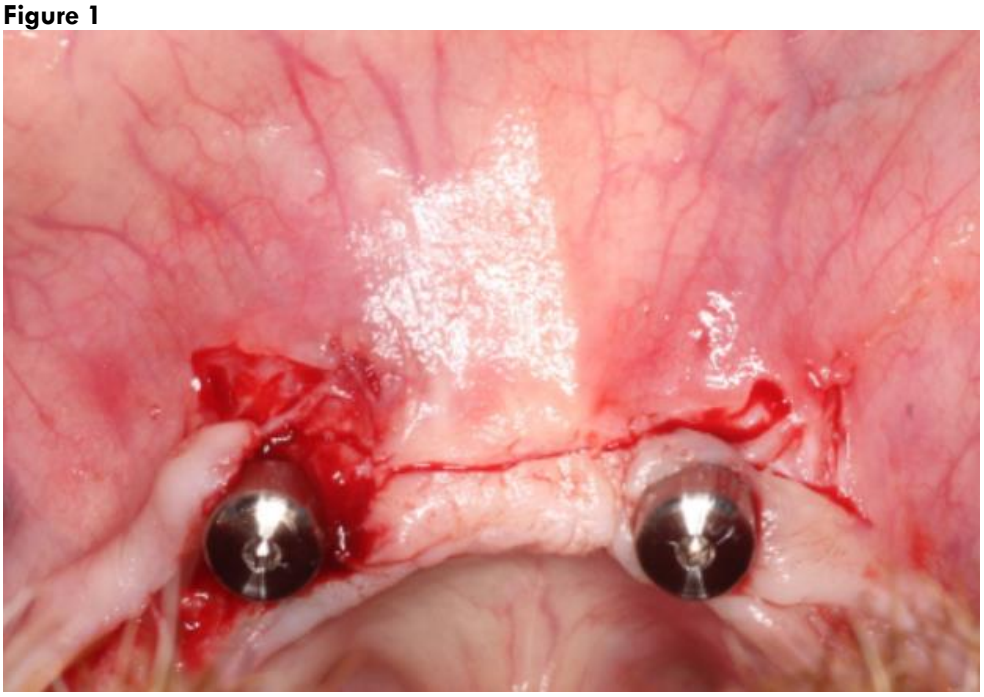

Figure 1: Gingival graft, incision and flap started in recipient site

Figure 2

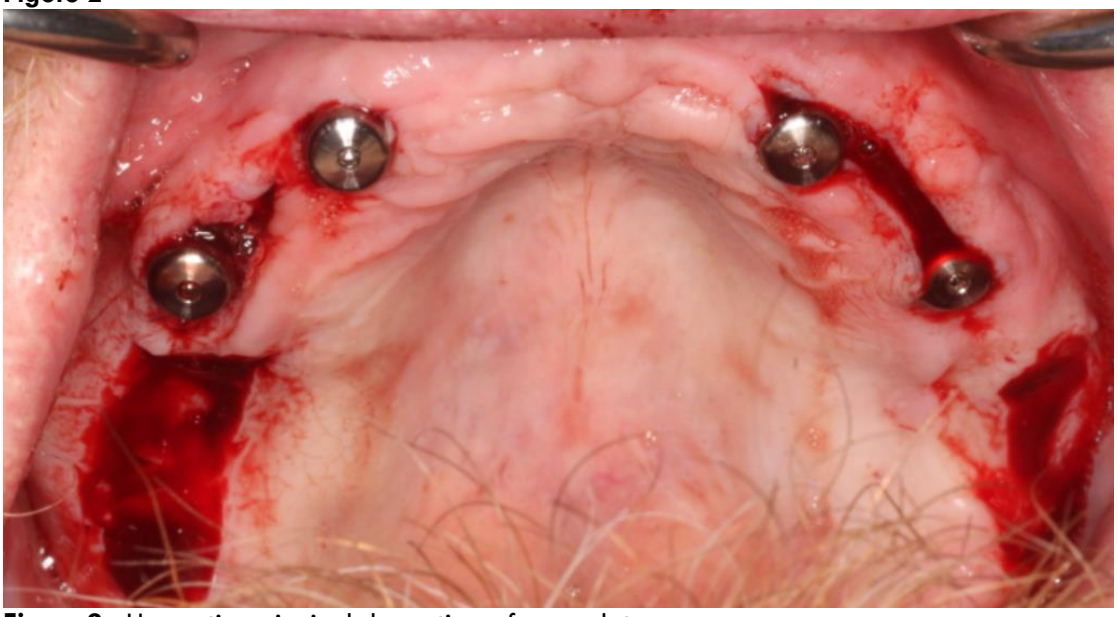

Figure 2: Harvesting gingival donor tissue from palate

Figure 3

Figure 3: Gingival grafts in place in the recipient site

Figure 4

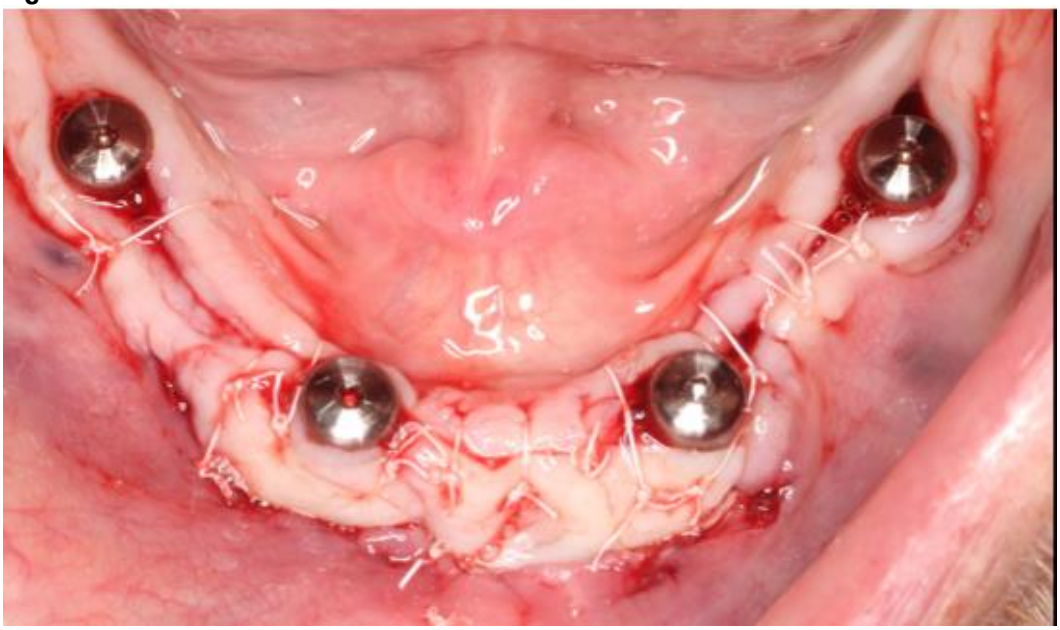

Figure 4: Tissue graft sutured around healing abutment following vestibuloplasty

Figure 5

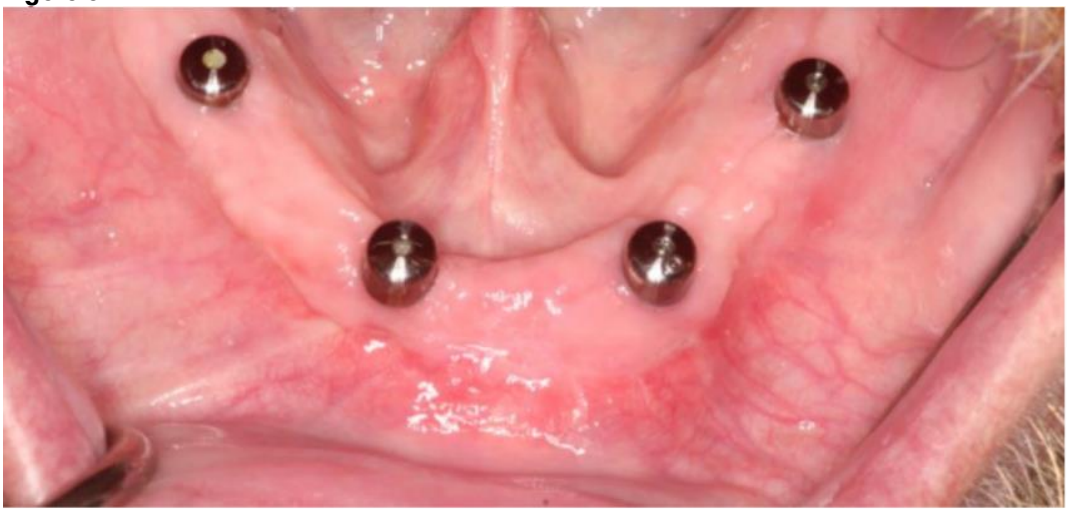

Figure 5: Gingival graft healing result

Figure 6

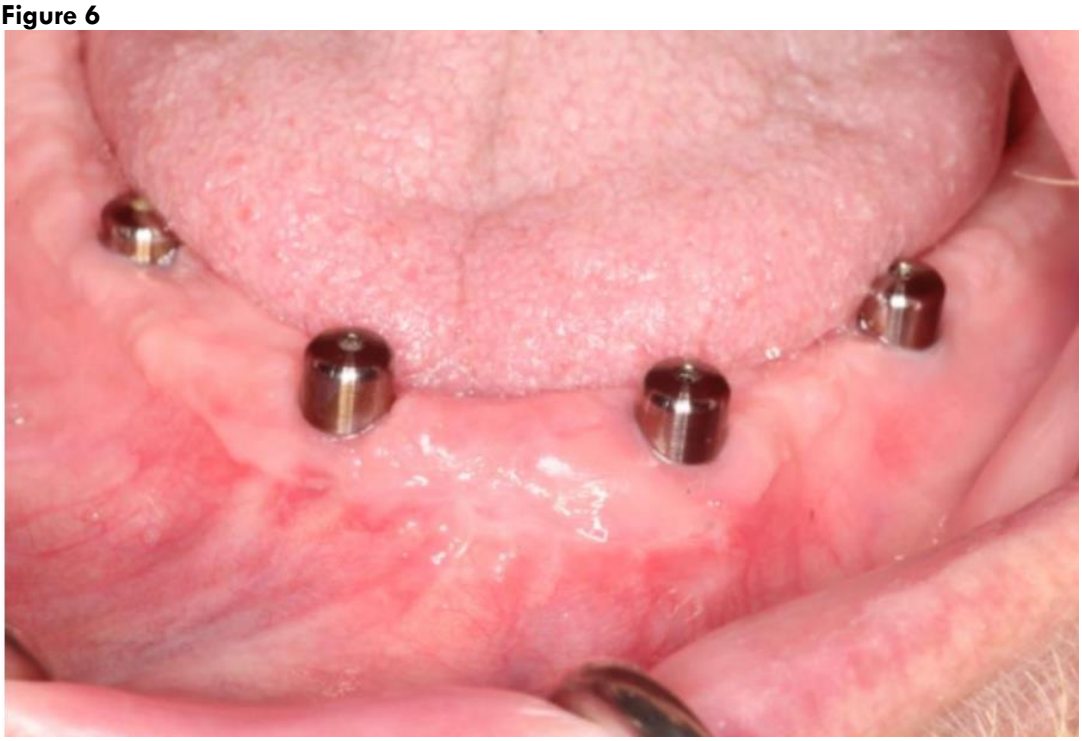

Figure 6: Gingival healing showing impact of keratinized tissue and depth of vestibule

Figure 7

Figure 7: Healing of donor site and abundant of keratinized tissues supporting implants in maxilla

Discussion:

Our patient was presented with shallow vestibule and inadequate keratinized gingiva supporting his lower anterior implants. The patient complained of "very uncomfortable condition" and wished to be treated with a permanent solution to his problem. Daniel Thoma, etc, (2018) recommends soft tissue grafting procedures for gaining keratinized mucosa leading to improvement of bleeding indices and significantly less marginal bone loss[11]. Peri-implant inflammations suggest potential risks affecting both hard and soft tissue (Ralf Smeets 2014)[12]. To resolve the patient's chief complaint, connective tissue grafting was done to facilitate home care, resist trauma and abrasion from removable prosthesis and to support implant stability. Mucosa is easily traumatized and difficult to maintain when located adjacent to either implants or natural teeth. Therefore, without treatment this site would be unstable and poorly suited to implant supported prosthesis. Our treatment supported by literature (Roccuzzo M, 2016), which corrected the mucogingival defect and provided tough, healthy keratinized tissue that will be strong enough to support implant, resist toothbrush trauma, and avoid gingival recession.

Implants that are not surrounded by keratinized tissue are more prone to plaque accumulation and recession, even in patients exercising sufficient oral hygiene and committed to three-month recalls. In addition, ridge deformity is expected following removal of posterior teeth, this in turn, leads to reduced vestibular height and lack of KT, thus gingival grafting beneficial to facilitate proper oral hygiene procedures (Mario Roccuzzo, 2015).

The type of tissue around dental implant supported overdentures plays a key role on the health and longevity of dental implants. The presence of keratinized tissue is able to provide a better seal against mechanical irritation from the overdenture as well as reduce plaque accumulation supporting dental implants compared non-keratinized mucosa. When non keratinized mucosa is present, the ability to accumulate plaque is further enhanced when there is a short vestibule present which can encourage plaque accumulation and impede oral hygiene measures, so a combination of the vestibuloplasty procedure and free gingival or connective tissue grafts are indicated to be able to simultaneously increase soft tissue width and height, and deepen the vestibule. The combination of both procedures is essential to reducing plaque accumulation and to help maintain the health of implants supporting Overdenture prosthesis.

References:

1. Sun TC, Chang TK. Soft tissue management around dental implants in esthetic zone- The current concepts and normal techniques. Journal of Dental Sciences 2024. ISSN 1991-7902. https://doi.org/10.1016;jdjds.2024.03.003.
2. Araujo MG and Lindhe J. Periimplant health. Journal of Periodontology 2018(June);45(Suppl.1):S230-236.
3. Mancini L, Straus FJ, Lun HG, Lorenzo T, Suy RE, Naenn N, and Thoma DS. Impact of keratinized mucosa on implant health parameters: A 10 year retrospective study. Clinical Implants and Restorative Dent Rel Res. 2024;1-10.
4. Rucozzo M, Grasso G, Dalmasso P. Keratinized mucosa around implants in partially edentulous posterior mandible: 10 year results of a prospective study. Clinical Ora Implant Research 2019;30(5): 491-496.
5. Souza AB, Tormena M, Matarazzo F and Araujo MG. The influence of Periimplant keratinized mucosa on brushing discomfort and Periimplant tissue health. Clinical Oral Implant Research 2016 June; 27(6):650-655.
6. Perussola J, Souza AB, Montarazzo F, Oliveira RP, Araujo M. Influence of keratinized mucosa on stabilityof periimplant tissues and brushing discomfort-A four year follow up study. Clinical Oral Implant Research 2018 Dec;29(12): 1177-1185.
7. Elkhaweldi A, Soler CR, Cayyarga R, Suzuki T, Kaufman Z. Various techniques to increase keratinized tissue for Implant supported Overdentures. Int Journal of Dentistry 2015; 2015. Article ID: 104903. 7 pages.
8. Kassab MM. Soft tissue grafting to improve Implant esthetics, clinical, cosmetic and investigational Dentistry 2010; 2:101-107.
9. Saltz AE. Impact of Keratinized mucosa in Dental Implant Treatment. Decisions in Dentistry 2020; 6(8):40-44.
10. Cilli JE, and Finn R. Split thickness graft, vestibuloplasty and mandibular endosseous implant supported overdenture. J of Oral Maxillofacial Surgery 2009;67:381-386
11. Thoma DS, Naenni N, Figuero E, Hammerie C HF, Schwar F, Jung RE, Sanz-Sanchez I, Effects of soft tissue augmentation procedures on peri-implant health or disease: A systematic review and meta-analysis. Clin Oral Implants Res. 2018 Mar:29 Suppl 15:32-49
12. Smeets Ralf, Henningsen A, Jung Ole, Heiland M, Hammacher C, Stein J M. Definition, etiology, prevention and treatment of peri-implantitis--a review, 2014 Sep 3:10:34
13. Roccuzzo M, Grasso G, Delmasso P. Keratinized mucosa around implants in partially edentulous posterior mandible: 10-year results of a prospective comparative study. Clin Oral Implants Res. 2016 Apr;27(4):491-6