



# Dental Implants in Patients with Gingival Oral Lichen Planus

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**Purpose:** With the popularity of implant therapy, clinicians need to know about treating the dental implant in patients with gingival involvement of oral lichen planus (OLP). The aim of this study is to evaluate the survival and success rates of dental implant and propose of clinical guidelines for implant treatment in OLP patient with gingival involvement.

**Methods:** A literature search was performed in PubMed/Medline, and Cochrane database. Papers in English language published between 1990 and 2019 were evaluated. The focused questions were following; 1) Dose gingival OLP affect the survival and success rates of dental implants? 2) The management of OLP patients with gingival involvement receiving dental implant.

**Results:** There was no study about the evaluation of dental implant only in gingival OLP patient. Five studies evaluating dental implants in OLP patients were included in this review. Implant survival rate was 100.0% in well-controlled OLP patients in all included studies. The use of topical/systemic corticosteroid in OLP patients was performed before and/or after implant placement in all included studies.

**Conclusions:** The implant survival and success rates in well-controlled OLP patients did not different from that of non-OLP healthy subjects. The gingival OLP is associated with higher rate of peri-implant mucositis. Adequate management of gingival OLP lesions before and after implant insertion is required to reduce inflammation and associated bone loss.

**Key Words:** Dental implants; Gingiva; Oral lichen planus

## INTRODUCTION

Desquamative gingivitis (DG) is not a specific disease but represents a gingival manifestation associated with several mucocutaneous diseases and systemic conditions. It is characterized with the presence of epithelial desquamation, erythema, erosion, and blistering of the marginal and attached gingiva. Mucous membrane pemphigoid (MMP), oral lichen planus (OLP), and pemphigus vulgaris (PV) are the most common cause of DG. These are immune-mediated diseases with chronic nature [1].

Dental implant is becoming a most widely used prosthetic rehabilitation after tooth loss. In the past, it has been

suggested that dental implants are not ideal for patients with OLP because of the altered epithelium to adhere to the titanium surface [2]. Many clinicians encounter with the patients who need dental implant under the mucocutaneous diseases. Not yet, there are no clear clinical guidelines for dental implant placement and management in patient with gingival mucocutaneous diseases. The purpose of this study is to evaluate the dental implant survival and success rates, and provide the guidelines for the implant placement and management in OLP patients with gingival involvement, the representative of mucocutaneous diseases.

## MATERIALS AND METHODS

### 1. Focused Questions

1) Dose gingival OLP affect the survival and success rates of dental implants?

2) What is the management of OLP patients with gingival involvement receiving dental implant?

### 2. Search Strategy

A search strategy based on the key word 'dental implant' and 'oral lichen planus', or 'dental implant' and 'mucocutaneous disease', or 'dental implant' and 'pemphigus', or 'dental implant' and 'pemphigoid', or 'dental implant' and 'desquamative gingivitis' were performed in PubMed/Medline, and Cochrane database. Papers in English language published between 1990 and 2019 were evaluated. Selected articles were obtained in full text and analyzed.

### 3. Data Extraction

The following data were recorded: author's name, study design, sample size, OLP type, evaluation parameters, implant survival rate, incidence of peri-implantitis/peri-implant mucositis, follow-up period, associated treatment, outcomes, and main conclusion.

## RESULTS

Electronic search yielded 44 articles, of which 24 articles were selected for full-text evaluation after screening the titles and abstracts. There was no study about the evaluation of dental implant only in gingival OLP subjects. We could not identify any randomized controlled trial publications. The clinical studies were case report or case series [3-5], cross-sectional study [6], retrospective [7,8] or prospective-controlled study [9,10].

Only four studies with controls [6,8-10] and one retrospective study [7] satisfying with the focused question were included in this review. The main features and conclusions of each study were summarized in Table 1 [6-10].

The use of topical/systemic corticosteroid was performed before and/or after implant placement in all included studies. In the prospective studies, acute and erosive state of OLP was treated with corticosteroid before implant insertion

[9,10]. In one study, of 55 inserted implants in active OLP phase, 73% (42 implants) of implants failed after early loading [7]. After controlling of acute OLP with corticosteroid, new inserted 42 implants were survived and functioned well for 3 years. Implant survival rate was 100% in well-controlled OLP patients in all included studies. Success rate of implant among OLP patients did not seem to be different from that of general population [6,8]. Authors agreed that the well-controlled OLP is not a risk factor for peri-implantitis and implant failure and the implant also does not influence the manifestation of OLP. OLP with gingival involvement was associated with a higher rate of peri-implant mucositis [9].

## DISCUSSION

### 1. Gingival OLP and Periodontal Conditions

OLP is a T-cell-mediated chronic inflammatory oral mucosal disease [11]. It affects most commonly the buccal mucosa, tongue, and gingiva [12]. The etiology of OLP is exactly unknown to date, but it is thought that intrinsic or extrinsic antigens trigger an inflammatory process, resulting in accumulation of T lymphocytes in the superficial lamina propria, liquefaction degeneration, and keratinocyte apoptosis of in the basal layer [13].

Gingiva is one of the most frequently affected site in OLP patients. The prevalence of gingival involvement of OLP was 38.4%-48% [14,15]. Gingival OLP is characterized by atrophy, erythema, ulceration, whitish plaque-like lesion and desquamation of attached and marginal gingiva. We usually called this gingival lesion as desquamative gingivitis. Patients with gingival OLP, expressed as DG, have trouble doing oral hygiene practices and accumulation of dental plaque [16]. Gingival OLP is usually misdiagnosed as plaque-induced periodontal diseases and combined with plaque-induced gingivitis or periodontal diseases.

There were several studies which compared the periodontal conditions between gingival OLP and healthy controls. In a Ramón-Fluxiá's study [17], the plaque and calculus indices are significantly higher in the gingival OLP subjects than non-gingival OLP subjects. But the periodontal disease index was not significantly different between the groups [17]. In other study, plaque index, bleeding on probing (BOP),

**Table 1.** The main features and conclusions of included studies

Author (year)/study type	OLP patients	OLP type	Evaluation parameters	Follow-up	Treatment of OLP patients before and after implant insertion	Outcomes/main conclusions
López-Jornet et al. (2014) [6] Cross-sectional study	I: 16 OLP implant (GOLP 5) II: 16 OLP (GOLP 6) III: 16 control implant	Reticular Erosive	PD BOP Mobility Pain (VAS) PIM PI	I: 42 M II: unavail able III: 48 M	Before: unavailable After: topical CS	PIM 17.86% in OLP/PIM 18% in control PI 25% in OLP/PI 16% in control  Implant survival rate did not differ from that of general population. Implants do not influence manifestations of OLP. OLP is not a risk factor for PI. Implant survival rate 100% PIM 45% MBL was 0.26 mm
Aboushelib and Elsafi (2017) [7] Retrospective study	23 OLP	Reticular Erosive (active)	MBL Biopsy PIM	36 M	Before: oral CS and soft laser irradiation After: oral CS	Active OLP should be managed with oral CS and soft laser irradiation before insertion of dental implants. No implant failure. No PD of >3 mm. No mobility
Czerninski et al. (2013) [8] Retrospective study	14 OLP (GOLP 6) 15 control	Reticular Erosive	PD BOP Mobility PIM Pain (VAS)	12-24 M	Before: unavailable After: topical CS	Implant success of rate in OLP patients was not different from that of general population. Implant placement dose not influence the disease manifestations. Implant survival rate 100% in both group. BOP: 46.8% in OLP, 47.4% in control PIM 44.6% in all implants/PIM 66.6% in OLP PI 10.7% in all implants/PI 27.7% in OLP
Hernández et al. (2012) [9] Prospective-controlled study	18 OLP (GOLP 11) 18 control	Reticular Erosive	BOP MBL PIM PI	52-53 M	Before: oral/topical CS After: topical CS	OLP is not a risk factor in the genesis of implant failure. GOLP was associated with a higher rate of PIM. Implant survival rate 100% in 3 groups. MBL 0.80 mm in healthy MBL 0.76 mm in controlled OLP MBL 2.53 mm in non-controlled OLP
Khamis et al. (2019) [10] Prospective controlled study	I: 17 control II: 20 controlled OLP III: 22 non-controlled OLP	Reticular Erosive (active)	MBL Biopsy	48 M	Before: oral CS in OLP patients After: oral low-dose CS (4 mg/2 days) in group II	OLP should be controlled with a low dose of CS and standard oral hygiene measures.

OLP, oral lichen planus; GOLP, gingival oral lichen planus; PD, probing depth; BOP, bleeding on probing; VAS, visual analog scale; MBL, marginal bone loss; PIM, peri-implant mucositis; PI, peri-implantitis; M, month; CS, corticosteroid.

and clinical attachment level were worse in gingival OLP than healthy controls [16]. There were studies to compare the DG-positive sites and DG-negative sites in OLP or MMP patients. Russo et al. [18] revealed that probing depth (PD), clinical attachment loss, full mouth plaque score, and full mouth bleeding score were not significantly different between the DG-positive sites and DG-negative sites. The other study of them [19], total bacterial load showed no difference between DG-positive and DG-negative sites. Gingival OLP per se may not be able to cause periodontal disease, but more gingival inflammation [16,17]. It seems that the critical factor to determine periodontal status in one patient is the host's character such as ability of oral hygiene and disease severity and duration.

## 2. Gingival OLP and Dental Implant

Dental implants are widely used to replace missing teeth and offer a success rate of about 83% after 15 years [20]. Healthy peri-implant mucosal condition is critical for the epithelium to adhere and seal implantation site. It has been postulated that gingival OLP may directly alter the nature of the barrier, affecting the long-term success of the implants [21]. To date, oral mucocutaneous diseases such as gingival OLP, MMP, and PV are not absolute contraindications for implant insertion.

Previous studies about dental implants and OLP are limited to comparison between OLP groups and healthy controls [6-10].

There was a well-designed prospective-controlled study. Hernández et al. [9] conducted a study to evaluate the implant survival rate in OLP patients. Fifty-six implants in 18 OLP patients (gingival OLP, 11 patients) were evaluated for a mean follow-up period of 53 months. OLP patients showing acute erosive/ulcerative phase were treated with topical/systemic corticosteroid before implant insertion. All implants were placed in remission period of OLP. The OLP patients did not show any signs of delayed wound healing after surgical procedure. The implant survival rate was 100.0% for the OLP patients. Peri-implant mucositis (BOP, PD  $\geq 4$  mm and no bone loss) was 66.6% and peri-implantitis (BOP or pus, bone loss  $\geq 3$  threads) [22] was 27.7% of the OLP patients. Both of them were not significantly different between OLP group and controls. It is difficult to draw

clear conclusion because of lack of previous study including homogeneous gingival OLP subjects. Though, in the Hernández's study, the presence of gingival involvement was associated with a higher rate of peri-implant mucositis. Gingival OLP would have possibility to accelerate the long-term progression to peri-implantitis. They concluded that the presence of OLP is not associated with a higher prevalence of implant failure, peri-implant mucositis, peri-implantitis or immediate postsurgical complications, but patient with gingival OLP should be carefully followed-up. As previously described, the relation between gingival OLP and dental implant is similar to that of gingival OLP and periodontal conditions.

Aboushelib and Elsafi [7] evaluated the implant and active OLP. In active OLP phase, high degree of inflammatory cell infiltration and cell-mediated immune reaction are present. Of 55 inserted implants in active OLP phase, 73% of implants failed after early loading. It appeared to be a direct correlation between the accumulation of immune cells at the gingival tissue interface and normal wound healing around dental implants. The authors recommended that implant insertion should be done in remission period of OLP and oral corticosteroid therapy and soft tissue laser are administered in advance.

Khamis et al. [10] also evaluated the long-term prognosis of dental implant in active OLP patients. They evaluated the marginal bone loss (MBL) of dental implants in active OLP patients for 4 years. There was no significant difference in MBL between healthy and controlled OLP patients who taking low-dose (4 mg/48 hours) of corticosteroids. But, uncontrolled OLP patients showed increased MBL which reached 2.53 mm after 4 years. The authors suggested that OLP patients receiving dental implants should be controlled on a low-dose of corticosteroids to prevent MBL and to maintain remission period. However, the use of long-term systemic corticosteroid should be performed with caution due to side effects. Adequate management of gingival OLP lesions before and after implant insertion is the most important factor in reducing inflammation and associated bone loss.

In active erosive-atrophic gingival OLP lesion in denture-bearing area, the use of denture triggers pain and erosion due to mechanical tissue irritation. In this case, it is better

for the patient to receive an implant-supported overdenture to improve stability of denture and reduce soreness [5].

### 3. Keratinized Mucosa Around Implant

The presence of keratinized mucosa around teeth is important factor to maintain periodontal health. More than 2 mm width of keratinized mucosal had been needed to maintain periodontal health [23]. But, from several studies, the current consensus is that provided with adequate oral hygiene, periodontal stability could be maintained even without adequate keratinized mucosa [24-26]. The presence of keratinized mucosa around implant is also significant to decrease peri-implant inflammation. Many studies tried to provide scientific evidences for this topic. Reduced keratinized mucosa width around dental implants is a risk factor for peri-implant mucositis [27]. The presence of at least 1-2 mm wide keratinized mucosa might be beneficial in decreasing plaque accumulation, tissue inflammation, mucosal recession, and attachment loss [25]. If the gingival OLP patients have not adequate keratinized mucosa at the site of implantation, free gingival graft is required.

### 4. Plaque Control and Gingival OLP

Most of OLP patients come to see a doctor for pain. Pain affects the ability of patient's oral hygiene practices. Impaired oral hygiene results in plaque accumulation and increases prevalence of gingivitis. This will possibly lead to periodontal disease and clinical attachment loss in the long-term aspects.

Active plaque control affects the progression of OLP. Studies [28-30] reported that the plaque control improved the painful symptoms and clinical features of gingival OLP. Likewise, active plaque control and regular follow-up program should be important procedures in the management of gingival OLP with dental implant.

### 5. Proposal of Clinical Management

Based on the foregoing, following guidelines for dental implant treatment in OLP patients with gingival involvement are suggested.

1) Implant insertion should be done in remission period of OLP. If necessary, systemic corticosteroid therapy is administered in advance.

2) Minimally traumatic surgical procedures are should be considered.

3) The presence of adequate (at least 1-2 mm) keratinized mucosa around implant is important to maintain peri-implant mucosal health.

4) In the early retention phase, topical/systemic corticosteroid therapy should be required to prevent the recurrence of active OLP and MBL.

5) Active plaque control is essential in gingival OLP patients to prevent peri-implant mucositis.

## CONCLUSION

Clinician should be familiar with the clinical aspects of gingival OLP because of the high rate of gingival involvement in OLP. The implant survival and success rates in well-controlled OLP patients did not different from that of non-OLP healthy subjects. The presence of OLP is not associated with a higher prevalence of implant failure or immediate postsurgical complications, but the gingival OLP is associated with higher rate of peri-implant mucositis. For the long-term healthy state of implant, active plaque control and frequent follow-up is required.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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