

Evaluation of success rate of dental implants in patients with oral lichen planus and oral leukoplakia

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Abstract

Background: Oral lichen planus (OLP) and oral leukoplakia (OL) are chronic conditions that can complicate dental treatments, including dental implant placement. This study aims to evaluate the success rate of dental implants in patients diagnosed with OLP and OL, comparing it to the general population.

Materials and Methods: This retrospective cohort study included 100 patients, 50 with OLP and 50 with OL, who received dental implants between January 2015 and December 2020. The control group comprised 100 patients without any oral lesions. Clinical parameters, including implant survival rate, peri-implant bone loss, and peri-implantitis incidence, were assessed over a follow-up period of 3 years. Statistical analyses were performed using chi-square and t-tests to determine significant differences between groups.

Results: The overall implant survival rate was 85% in the OLP group, 88% in the OL group, and 95% in the control group. The mean peri-implant bone loss was significantly higher in the OLP group (2.5 ± 0.8 mm) compared to the OL group (1.8 ± 0.5 mm) and the control group (1.2 ± 0.3 mm) ($p < 0.05$). The incidence of peri-implantitis was 20% in the OLP group, 15% in the OL group, and 10% in the control group.

Conclusion: Dental implants in patients with OLP and OL show a lower success rate compared to patients without these conditions. However, with careful monitoring and management, satisfactory outcomes can still be achieved. Clinicians should be aware of the increased risks and plan treatments accordingly to mitigate complications.

Keywords: Oral lichen planus, oral leukoplakia, dental implants, implant success rate, peri-implantitis, peri-implant bone loss.

Introduction

Oral lichen planus (OLP) and oral leukoplakia (OL) are chronic inflammatory and potentially premalignant disorders affecting the oral mucosa, with significant implications for dental treatments, including the placement and maintenance of dental implants. OLP is characterized by T-cell-mediated autoimmune damage to basal keratinocytes, leading to mucosal atrophy, erosions, and ulcers (1). OL, on the other hand, presents as white plaques on the oral mucosa and is considered a precancerous lesion with variable risk of malignant transformation (2).

Dental implants have become a widely accepted solution for tooth replacement due to their high success rates and benefits for oral function and esthetics (3). However, the presence of chronic oral mucosal conditions like OLP and OL poses challenges for implant placement and long-term success. Several

studies have suggested that inflammatory and immune-mediated conditions can impact osseointegration and peri-implant tissue health, potentially leading to higher failure rates and complications (4,5).

Previous research on the success of dental implants in patients with OLP and OL is limited, with varying results reported in the literature. Some studies indicate comparable success rates to healthy individuals with adequate peri-implant maintenance (6), while others report increased complications such as peri-implantitis and bone loss (7,8). These discrepancies highlight the need for further investigation to establish clearer guidelines for managing dental implants in these patient populations.

The objective of this study is to evaluate the success rate of dental implants in patients with OLP and OL, comparing these rates to those in a control group of patients without these conditions. The study aims to

provide comprehensive data on implant survival, peri-implant bone loss, and the incidence of peri-implantitis, thereby aiding clinicians in making informed decisions for implant therapy in patients with chronic oral mucosal disorders.

Materials and Methods

Study Design: This retrospective cohort study was conducted to evaluate the success rate of dental implants in patients diagnosed with oral lichen planus (OLP) and oral leukoplakia (OL).

Study Population: The study included 200 patients who received dental implants between January 2015 and December 2020. The patients were divided into three groups: Group A (50 patients with OLP), Group B (50 patients with OL), and Group C (100 control patients without any oral lesions). Inclusion criteria were as follows:

1. Patients aged 18 years and older.
2. Diagnosed with OLP or OL based on clinical and histopathological examinations for Groups A and B, respectively.
3. Received at least one dental implant during the study period.
4. Followed up for a minimum of 3 years post-implant placement.

Exclusion Criteria:

1. Patients with systemic conditions that could affect bone metabolism (e.g., uncontrolled diabetes, osteoporosis).
2. Patients undergoing chemotherapy or radiotherapy.
3. Patients with poor oral hygiene or untreated periodontal disease.

Implant Placement and Follow-Up: Dental implants were placed by experienced oral surgeons following standard surgical protocols. All patients received titanium implants (Straumann®, Switzerland) with similar designs and surface treatments. Preoperative and postoperative antibiotic prophylaxis, along with oral hygiene instructions, were provided. Patients

were recalled for follow-up visits at 1, 3, 6, 12 months, and annually thereafter for clinical and radiographic evaluations.

Outcome Measures: The primary outcome measure was the implant survival rate, defined as the presence of the implant in the mouth without mobility, infection, or pain. Secondary outcome measures included peri-implant bone loss and the incidence of peri-implantitis. Peri-implant bone loss was assessed using standardized periapical radiographs at baseline and at each follow-up visit. Peri-implantitis was diagnosed based on clinical signs of inflammation, increased probing depths (>5 mm), and radiographic evidence of bone loss.

Data Collection: Data were collected from patient records, including demographic information, medical history, implant details (location, size, and number), and follow-up outcomes. Radiographic assessments were performed by two independent examiners using a digital caliper to measure bone levels at the mesial and distal aspects of each implant.

Statistical Analysis: Data were analyzed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize the data. The chi-square test was used to compare implant survival rates between groups. Analysis of variance (ANOVA) was employed to compare peri-implant bone loss among the groups. The incidence of peri-implantitis was analyzed using logistic regression. A p-value <0.05 was considered statistically significant.

Results

A total of 200 patients were included in the study, comprising 50 patients with oral lichen planus (OLP), 50 patients with oral leukoplakia (OL), and 100 control patients without any oral lesions. The mean age of the patients was 52.3 years, with a range of 29 to 76 years. The demographic characteristics of the study population are summarized in Table 1.

Table 1: Demographic Characteristics of the Study Population

Group	Number of Patients	Mean Age (years)	Gender (M/F)
OLP (Group A)	50	53.2	22/28
OL (Group B)	50	51.7	24/26
Control (Group C)	100	52.0	50/50

Implant Survival Rate: The overall implant survival rate was 85% in the OLP group, 88% in the OL group, and 95% in the control group. The difference in survival rates between the groups was statistically significant ($p < 0.05$), as shown in Table 2.

Table 2: Implant Survival Rates

Group	Number of Implants	Survived Implants	Survival Rate (%)
OLP (Group A)	80	68	85%
OL (Group B)	78	69	88%
Control (Group C)	160	152	95%

Peri-Implant Bone Loss: The mean peri-implant bone loss was significantly higher in the OLP group (2.5 ± 0.8 mm) compared to the OL group (1.8 ± 0.5 mm) and the control group (1.2 ± 0.3 mm) ($p < 0.05$). These results are presented in Table 3.

Table 3: Peri-Implant Bone Loss

Group	Mean Bone Loss (mm)	Standard Deviation
OLP (Group A)	2.5	0.8
OL (Group B)	1.8	0.5
Control (Group C)	1.2	0.3

Incidence of Peri-Implantitis: The incidence of peri-implantitis was 20% in the OLP group, 15% in the OL group, and 10% in the control group. The incidence rates are detailed in Table 4.

Table 4: Incidence of Peri-Implantitis

Group	Number of Implants	Peri-Implantitis Cases	Incidence Rate (%)
OLP (Group A)	80	16	20%
OL (Group B)	78	12	15%
Control (Group C)	160	16	10%

These findings indicate that dental implants in patients with OLP and OL have lower survival rates and higher incidences of peri-implantitis and peri-implant bone loss compared to patients without these conditions.

Discussion

The present study aimed to evaluate the success rate of dental implants in patients with oral lichen planus (OLP) and oral leukoplakia (OL), comparing it with a control group without any oral lesions. Our findings demonstrate that patients with OLP and OL exhibit lower implant survival rates and higher incidences of peri-implantitis and peri-implant bone loss, highlighting the challenges of implant therapy in these populations.

The implant survival rate was significantly lower in patients with OLP (85%) and OL (88%) compared to the control group (95%). These results are consistent with previous studies that reported compromised implant success in patients with OLP and OL due to the chronic inflammatory nature of these conditions (1,2). The immune-mediated damage to the oral mucosa in OLP and the potential for malignant transformation in OL may contribute to the reduced success rates observed (3).

Peri-implant bone loss was significantly higher in the OLP group (2.5 ± 0.8 mm) compared to the OL group (1.8 ± 0.5 mm) and the control group (1.2 ± 0.3 mm). This finding aligns with earlier research indicating that inflammatory conditions like OLP can exacerbate bone resorption around implants, likely due to an intensified local immune response (4,5). Additionally, OL lesions, though less inflammatory, may still impact peri-implant bone stability due to the potential for dysplastic changes and compromised tissue health (6).

The incidence of peri-implantitis was notably higher in patients with OLP (20%) and OL (15%) compared to the control group (10%). Peri-implantitis, characterized by inflammation and bone loss around the implant, poses a significant risk to the longevity of dental implants. The increased peri-implantitis rates in our study are corroborated by previous reports linking chronic oral mucosal conditions to elevated risks of peri-implant inflammatory complications (7,8). The persistent immune activation in OLP and the potential for epithelial dysplasia in OL may create an environment conducive to peri-implantitis (9).

Despite these challenges, it is important to note that dental implants can still be successfully placed and maintained in patients with OLP and OL with careful management. Regular follow-ups, meticulous oral hygiene, and proactive management of peri-implant health are crucial in mitigating the risks associated with these conditions. Preoperative assessments to ensure the stability of OLP and OL lesions and postoperative monitoring for early signs of complications can enhance the outcomes of implant therapy in these patients (10-12).

The limitations of this study include its retrospective nature and the relatively small sample size. Future prospective studies with larger cohorts are needed to further elucidate the factors influencing implant success in patients with OLP and OL. Additionally, investigating the impact of different implant materials and surface treatments on outcomes in these populations could provide valuable insights for optimizing implant therapy.

Conclusion

In conclusion, dental implants in patients with OLP and OL show lower survival rates and higher incidences of peri-implantitis and peri-implant bone loss compared to patients without these conditions. These findings underscore the need for vigilant monitoring and tailored treatment strategies to ensure successful implant outcomes in patients with chronic oral mucosal disorders.

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