

# Malignant Transformation and Long-term Outcome of Oral and Laryngeal Leukoplakia

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## Abstract

This article explores key components of quality-ensured environments in translational cancer research and their significance in driving meaningful advancements. Establishing a robust research governance framework is essential to promote quality in translational cancer research. Research governance encompasses policies, procedures and ethical guidelines that govern the conduct of research. This framework ensures compliance with regulatory requirements, protects patient rights and welfare and upholds the highest ethical standards. Implementing a strong governance structure sets the foundation for research excellence and fosters trust among stakeholders. Adopting standardized protocols and procedures is crucial for maintaining research quality. Consistent methodologies and practices enable comparability of results across studies and institutions. Standardization encompasses aspects such as sample collection, processing, storage, data analysis and reporting.

**Keywords:** Cancer • Translational cancer • Stakeholders

## Introduction

Oral and laryngeal leukoplakia is a common pre-cancerous condition characterized by white or gray patches that develop on the mucous membranes of the oral cavity and larynx. While most cases of leukoplakia are benign, a subset of lesions has the potential to undergo malignant transformation and progress into oral or laryngeal cancer. Understanding the factors contributing to malignant transformation and the long-term outcomes of these lesions is crucial for early detection, accurate diagnosis, and appropriate management. This article aims to provide a comprehensive analysis of malignant transformation and the long-term outcomes of oral and laryngeal leukoplakia [1].

## Description

Malignant transformation refers to the process by which benign leukoplakic lesions develop into invasive cancers. Although the exact mechanisms are not fully understood, various risk factors have been identified. Tobacco use, particularly smoking, is a well-established risk factor for malignant transformation, with a dose-dependent relationship between tobacco exposure and the risk of developing oral and laryngeal cancer. Other risk factors include heavy alcohol consumption, chronic irritation from ill-fitting dentures or dental restorations, poor oral hygiene, and certain viral infections, such as human papillomavirus and Epstein-Barr virus. The long-term outcome of leukoplakia depends on several factors, including the site and size of the lesion, histopathological features, patient age, and lifestyle habits. While most cases of leukoplakia do not progress to cancer, the risk of malignant transformation varies widely. Studies have reported that approximately 3-17% of oral leukoplakia cases progress to squamous cell carcinoma, whereas the rate of malignant transformation in laryngeal leukoplakia is relatively lower, ranging

from 1-6%. Laryngeal leukoplakia is a pre-cancerous condition characterized by the presence of white or grayish patches on the mucous membranes of the larynx, the organ responsible for voice production. While leukoplakia can occur in various areas of the body, laryngeal leukoplakia specifically affects the larynx and poses unique challenges in terms of diagnosis and management [2].

The exact cause of laryngeal leukoplakia is not fully understood, but several risk factors have been identified. Tobacco use, including smoking and smokeless tobacco, is considered the primary risk factor. Chronic irritation from factors such as alcohol consumption, exposure to environmental pollutants, vocal cord trauma, and reflux of stomach acid into the throat (gastroesophageal reflux disease or GERD) may also contribute to the development of laryngeal leukoplakia. Viral infections, particularly human papillomavirus, have been associated with a subset of cases. Laryngeal leukoplakia often presents with non-specific symptoms, which can make diagnosis challenging. Some common symptoms include persistent hoarseness, throat discomfort, a lump sensation in the throat, and changes in voice quality. In some cases, laryngeal leukoplakia may be incidentally detected during a routine examination or endoscopic evaluation. Diagnosis of laryngeal leukoplakia involves a thorough evaluation by an otolaryngologist (ear, nose, and throat specialist). The initial assessment typically includes a detailed medical history, physical examination, and laryngoscopy. Laryngoscopy involves the use of a flexible or rigid endoscope to visualize the larynx and identify any suspicious lesions. Tissue biopsy and histopathological examination are essential for confirming the diagnosis and determining the severity of the condition [3].

Laryngeal leukoplakia has the potential to undergo malignant transformation, progressing into laryngeal cancer. The rate of malignant transformation in laryngeal leukoplakia is relatively lower compared to oral leukoplakia, ranging from 1-6%. However, it is important to note that the risk varies depending on the individual case and specific factors, such as the presence of dysplasia (abnormal cellular changes) within the lesion. The long-term outcome of laryngeal leukoplakia depends on several factors, including the size, location, and histopathological features of the lesion, as well as the patient's age and lifestyle habits. Regular follow-up examinations are crucial to monitor the progression of the lesion and detect any signs of malignant transformation. With early detection and appropriate management, the prognosis for laryngeal leukoplakia can be favourable [4].

The management of laryngeal leukoplakia aims to reduce the risk of malignant transformation and preserve laryngeal function. The treatment approach depends on the severity of the lesion, the presence of dysplasia, and the patient's overall health. In many cases, a multidisciplinary team

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involving otolaryngologists, speech therapists, and pathologists is involved in the decision-making process. Conservative measures may be employed for low-risk or small lesions, including close surveillance, lifestyle modifications (e.g., smoking cessation, alcohol moderation), and voice therapy to reduce vocal cord strain. For high-risk or symptomatic lesions, surgical intervention may be recommended. This can involve endoscopic procedures such as laser ablation or microflap excision, aimed at removing the leukoplakic lesion while preserving as much normal tissue as possible. In cases where malignant transformation has occurred or is suspected, a more extensive surgical approach may be necessary [5].

Histopathological examination plays a crucial role in risk stratification and predicting the likelihood of malignant transformation. Dysplasia, a histological marker of cellular abnormality, is a significant risk factor. Lesions exhibiting severe dysplasia or carcinoma in situ are associated with a higher risk of malignant transformation. Other features, such as the presence of epithelial dysplasia, pattern of keratinization, and depth of invasion, help in determining the potential for progression to invasive carcinoma. Given the potential for malignant transformation, management of oral and laryngeal leukoplakia requires a multidisciplinary approach involving otolaryngologists, oral surgeons, and pathologists. The primary goals are early detection, accurate diagnosis, risk stratification, and appropriate treatment. Conservative approaches include close surveillance, patient education on tobacco cessation and alcohol moderation, and regular follow-up visits to monitor lesion progression. Surgical intervention, such as excisional biopsy or laser ablation, may be recommended for high-risk or symptomatic lesions.

## Conclusion

Oral and laryngeal leukoplakia represent pre-cancerous conditions with the potential for malignant transformation. Understanding the risk factors, histopathological features, and long-term outcomes is essential for effective management and improved patient outcomes. Close surveillance, risk

stratification, and appropriate treatment options tailored to individual patients are vital in minimizing the risk of malignant transformation and optimizing long-term outcomes. Continued research efforts are necessary to develop new biomarkers, imaging techniques, and therapeutic approaches for the early detection and prevention of malignant transformation in leukoplakia.

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