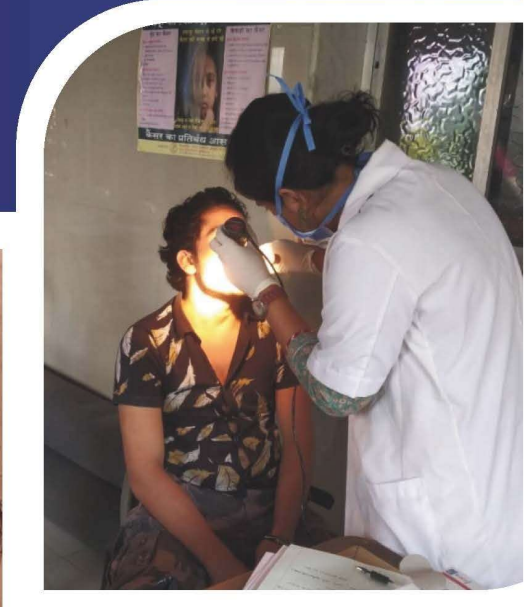




ATLAS OF ORAL PRECANCEROUS LESIONS AND ORAL CAVITY CANCERS

A PRACTICAL GUIDE FOR TRAINING
PARAMEDICAL STAFF



Prepared by :

Dr. Gauravi Mishra

Dr. Sharmila Pimple



ATLAS OF ORAL PRECANCEROUS LESIONS AND ORAL CAVITY CANCERS

A Practical Guide for Training Paramedical Staff

Department of Preventive Oncology

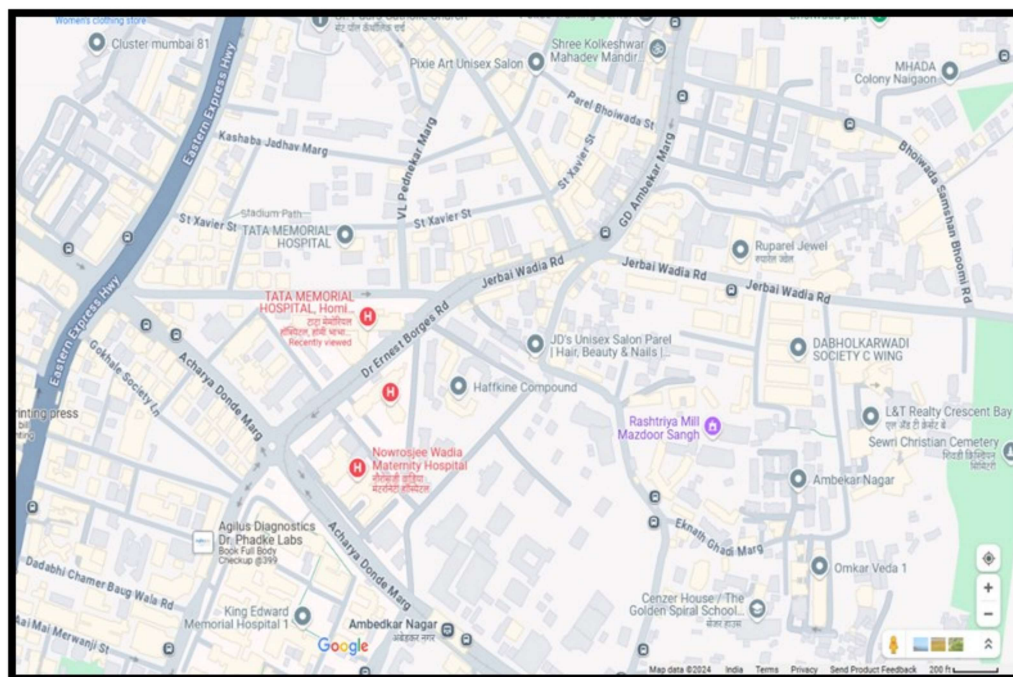
Worldwide, cancer poses a significant challenge to society, public health, and the economy. Accounting for nearly one-sixth of all fatalities (16.8%) and almost one-fourth (22.8%) of non-communicable disease (NCD) related deaths globally. [1] The paradoxically low cancer incidence but high mortality rate in India suggests an underestimation of the country's true cancer burden, driven by lack of awareness, poor adoption of early detection and screening followed by under reporting. [2–5] This is further supported by the high proportion of late-stage cancer diagnoses with around 87% of all cancer cases being detected at advanced stages. [6] Furthermore, less than 20% of the Indian population is covered under any health insurance scheme. Awareness screening, early detection and treatment have the potential to prevent nearly one-third of all cancer deaths. [7] By implementing appropriate prevention, early detection and treatment strategies, millions of lives could be saved each year.

Department of Preventive Oncology was established in 1997. Since then department has been actively engaged in Health Promotion, Cancer Control, Prevention, Screening and Early Detection of common cancers. In 2002, department was recognized as a World Health Organization (WHO)

Collaborating Centre for Cancer Prevention, Screening and Early Detection. The department plays a crucial role in combating cancer.

Goals and Objectives of the Department of Preventive Oncology:

- Information, Education and Communication
- Services
 - Cancer Screening: Hospital and Community-based Screening
 - Diagnostic Services such as Biopsy, Colposcopy etc.
 - Pre-Cancer Management
 - Special Clinics: Tobacco Cessation Clinics, Dysplasia Clinic and Breast Self Examination (BSE) Clinic
- Health and Manpower Development
- Research
- Academics
 - Flagship Training Workshops under Homi Bhabha National Institute [HBNI]
 - Fellowship in Department of Preventive Oncology [Duration: 2 Years]
 - Senior Resident in Department of Preventive Oncology [Duration: 1 Year]
 - Research Degree: PhD [Clinical Epidemiology & Preventive Oncology]
 - Observers in Department of Preventive Oncology
- Advocacy, NGO- Training and Networking



Department of Preventive Oncology
Third Floor, Service Block
Tata Memorial Hospital
Dr. Ernest Borges Marg, Parel, Mumbai - 400 012, India

Phone: +91-22- 24177000, 24177300, 24161413
Extension: 4649
Fax: +91-22-24146937
Email: Preventive@tmc.gov.in

Location: <https://maps.app.goo.gl/9ZvqpbNZGuYHj2E47>



Atlas of Oral Precancerous Lesions and Oral Cavity Cancer: A Practical Guide for Training Paramedical Staff

Dr. Gauravi Mishra

Professor and Physician, Department of Preventive Oncology, Tata Memorial Hospital

Dr. Sharmila Pimple

Professor and Head, Department of Preventive Oncology, Tata Memorial Hospital

Dr. Vasundhara Kulkarni

Scientific Officer 'C', Department of Preventive Oncology, Tata Memorial Hospital

Dr. C. S. Pramesh

Director, Tata Memorial Hospital

Dr. Sudeep Gupta

Director, Tata Memorial Centre

2025

**Department of Preventive Oncology,
Centre for Cancer Epidemiology,
Tata Memorial Centre, Mumbai, India,
Homi Bhabha National Institute (HBNI), Mumbai, India.**

Published by Department of Preventive Oncology, Centre for Cancer Epidemiology,
Tata Memorial Hospital (TMH), Mumbai

©Department of Preventive Oncology, 2025

Distributed by the Department of Preventive Oncology (preventive@tmc.gov.in)

It is illegal to copy this book, posting it on website or distribution by any other means without permission. For rights of reproduction or translation, in part or in to, application should be made to the Publishers.

Contributors

Sr. No	Name	Role	Designation and Institutional Affiliation
1.	Dr. Gauravi A Mishra	Key personnel	Professor & Physician, Department of Preventive Oncology, TMH, Mumbai
2.	Dr. Sharmila Pimple	Key personnel	Professor & Head, Department of Preventive Oncology, TMH, Mumbai
3.	Dr. Ashok Mehta	Key personnel	Surgical Oncologist, S. L. Raheja Hospital, Mumbai
4.	Dr. Vasundhara Kulkarni	Key personnel	Scientific Officer 'C', Department of Preventive Oncology, TMH, Mumbai
5.	Dr. Dharmendra Tiwari	Project Team Member	Medical Officer, Department of Preventive Oncology, TMH, Mumbai
6.	Mrs. Vaishnavi Bhagat	Project Team Member	Supervisor, Department of Preventive Oncology, TMH, Mumbai
7.	Mrs. Sangeeta Phatak	Project Team Member	Health Assistant, Department of Preventive Oncology, TMH, Mumbai
8.	Mr. Tushar Jadhav	Project Team Member	Project Co-Ordinator, Department of Preventive Oncology, TMH, Mumbai
9.	Mr. Anil Patil	Project Team Member	Former Sr. Research Statistician, Department of Preventive Oncology, TMH, Mumbai
10.	Mrs. Mrudula Meher	Project Team Member	Assistant Data Manager, Department of Preventive Oncology, TMH, Mumbai
11.	Dr. Shakthi Dorai B.	Project Team Member	Research Fellow, Department of Preventive Oncology, TMH, Mumbai
12.	Dr. Gayatri Tulapurkar	Project Team Member	Research Fellow, Department of Preventive Oncology, TMH, Mumbai
13.	Ms. Priyanshi Soni	Project Team Member	Counselor, Department of Preventive Oncology, TMH, Mumbai
14.	Ms. Poonam Petkar	Project Team Member	Assistant Data Manager, Department of Preventive Oncology, TMH, Mumbai
15.	Ms. Pratiksha Dongre	Project Team Member	Assistant Data Manager, Department of Preventive Oncology, TMH, Mumbai

Sr. No	Name	Role	Designation and Institutional Affiliation
16.	Ms. Parish Majmudar	Team Member	Medical Social Worker, TMH, Mumbai
17.	Dr. Rajendra Badwe	Mentor	Honorary Professor Emeritus, Tata Memorial Hospital (TMH), Mumbai
18.	Dr. Rajesh Dikshit	Mentor	Director, Centre for Cancer Epidemiology (CCE), Navi Mumbai
19.	Dr. Pankaj Chaturvedi	Mentor	Director, ACTREC, Navi Mumbai
20.	Dr. C. S. Pramesh	Mentor	Director, Tata Memorial Hospital (TMH), Mumbai
21.	Dr. Sudeep Gupta	Mentor	Director, Tata Memorial Centre (TMC), Mumbai

Suggested Citation:

Mishra GA, Pimple SA, Mehta A, Kulkarni V, Tiwari D, Bhagat V, Phatak S, Jadhav T, Anil P, Meher M, Dorai S, Tulapurkar G, Soni P, Petkar P, Dongre P, Majmudar P, Badwe RA, Dikshit R, Chaturvedi P, Pramesh CS, Gupta S. Atlas of Oral Precancerous Lesions and Oral Cavity Cancers: A Practical guide for Training Paramedical Staff. Tata Memorial Hospital, Mumbai, India (2025)

Office address:

Room no. 312, Third floor,
Service block building,
Department of Preventive Oncology,
Tata Memorial Hospital
Parel, Mumbai - 400012

Correspondence:

Dr. Gauravi Mishra
Professor and Physician
Department of Preventive Oncology,
Tata Memorial Hospital
Parel, Mumbai– 400012

Acknowledgements

This Atlas is the result of pictures captured while implementing Oral Cancer Screening Programme in the slums of Mumbai during the period 2022 - 2024. In this programme oral cancer screening was conducted among high-risk population (those using tobacco and / or alcohol) in low socio-economic pockets, so as to create awareness and screen 1000 beneficiaries in each BMC Ward in Mumbai. A total of 25,000 high risk population were screened in duration of two years. The photographs captured in the process were compiled. This Atlas could be used as resource material for training paramedical staff.

We would like to acknowledge the generous funding support from Watumull Sanatorium Trust and especially thank Dr. Ashok Mehta and Mr. Chetan Mehrotra for co-ordinating the same. We would like to acknowlge Ms. Nanda Bhujbal, Ms. Sushma Randive, Ms. Meena Sawant, Ms. Rashmi Shinde, Ms. Siddhi Mayekar, Ms Roopali Kasare, Ms.Sayli Tandel for being involved in programme implementation. We thank Dr. Harimadhav Vishwanathan for reviewing the document. The authors gratefully acknowledge the staff of Department of Preventive Oncology, Tata Memorial Hospital for supporting the project. We are extremely grateful to the staff of various departments viz. accounts, purchase, stores, surgical stores and CSSD for their invaluable support while implementing the project.

Index

Sr. No	Topic	Page No.
1.	Preface	XIII
2.	Background	1
3.	Introduction	3
4.	Leukoplakia	5
5.	Erythroplakia	36
6.	Oral Submucous Fibrosis	44
7.	Oral Carcinoma	67
8.	Algorithm for Management	78
9.	References	79
10.	Abbreviations	84

Preface

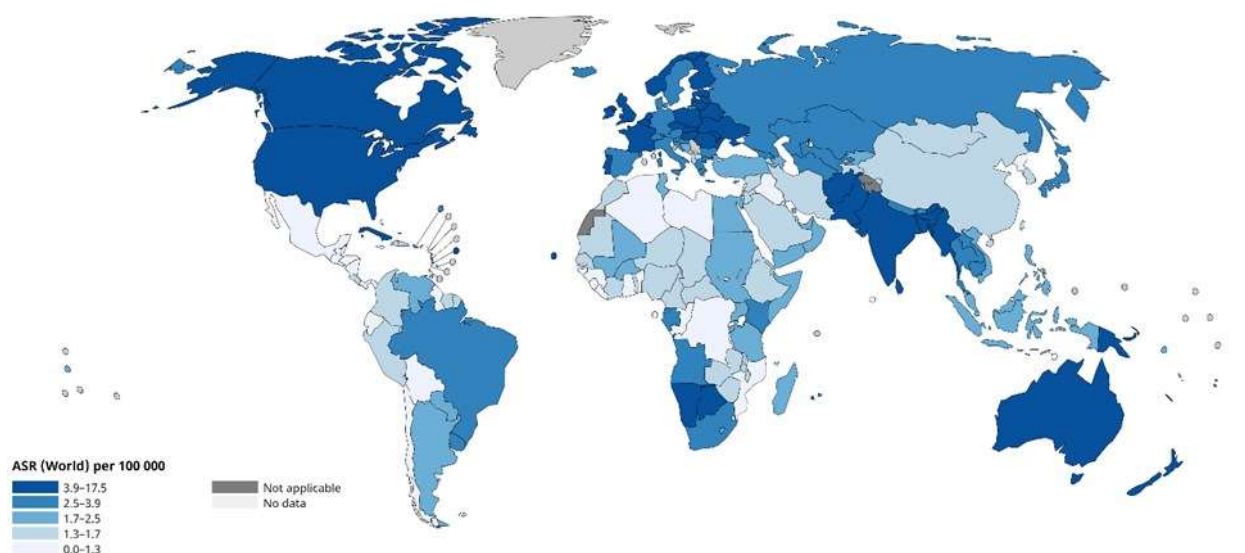
The National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) was launched in 2010 with focus on strengthening infrastructure, human resource development, health promotion, early diagnosis, management and referral. Under NPCDCS, Non Communicable Diseases (NCD) cells were established at National, State and District levels for programme management, and NCD clinics were set up at District and Community Health Centers (CHC) levels, to provide services for early diagnosis, treatment and follow-up for common cancers. From 2023, this programme was changed to National Programme for Prevention of Non- Communicable Diseases (NP-NCD). Recent initiatives under NP-NCD 2023-2030 include, early detection of diabetes, hypertension and common cancers in the community. However, till date less than 2% of eligible Indian population has been covered by screening. To address the rising burden of cancer, State Health Services are initiating comprehensive cancer control programs which includes; prevention, early detection, and treatment of common cancers. Among common cancers, oral cavity cancers and precancerous lesions are comparatively easy to screen and diagnose. The Department of Preventive Oncology at Tata Memorial Hospital (TMH) has over three decades of experience in conducting community-based cancer awareness and screening programs. This Atlas is a compilation of images of lesions identified in a community-based service programme conducted by Department of Preventive Oncology, TMH with funding support from Watumull Sanatorium Trust. The atlas primarily focuses on familiarizing Auxiliary Nurse Midwifery (ANMs), Primary Health Workers (PHWs), Community Health Volunteers (CHVs), Accredited Social Health Activist (ASHAs), Paramedical Staff and Doctors from State Health Services and Non-Governmental Organizations (NGOs) in identification of oral precancerous lesions and conditions. It is intended to be utilized as training and teaching aid.

Dr. Gauravi Mishra & Dr. Sharmila Pimple

Background

The global cancer statistics for the year 2022 shows one in five men or women develop cancer in their lifetime and around one in nine men and one in twelve women die from it. [1] As per the GLOBOCAN 2022 fact sheet, cancers of lip and oral cavity, ranks 16th in global prevalence, recording 389,846 incident cases and 188,438 deaths annually. [8] India and Southeast Asian Countries have highest rate of occurrence of Oral Cavity Cancers. [9] In India, it is the second most prevalent cancer (both genders combined), with 143,759 (10.2%) new cases and 79,979 (8.7%) deaths. The top most cancer among men in India is oral cavity cancer and it ranks as the fourth most common cancer among women. [10]

Age-Standardized Rate (World) per 100 000, Incidence, Both sexes, in 2022
Lip, oral cavity



All rights reserved. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization / International Agency for Research on Cancer concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate borderlines for which there may not yet be full agreement.

Cancer TODAY | IARC
<https://gco.iarc.who.int/today>
Data version: GLOBOCAN 2022 - 08.02.2024
© All Rights Reserved 2024

International Agency
for Research on Cancer
World Health
Organization

Use of tobacco (smoking and smokeless forms), alcohol consumption, Human Papilloma Virus (HPV) infection, poor diet, poor dental health, poor oral health and occupational exposure to carcinogens are the risk factors for oral cavity cancers. [9, 11, 12] Tobacco use has been identified as the most important risk factor for oral cavity cancers.[12] As per Global Adult Tobacco Survey (GATS) India 2016-17, 42.4% of men, 14.2% of women and 28.6% (266.8 million) of adults currently use tobacco in some or the other form. 26.6% of the population in Maharashtra are tobacco users. However, use of smokeless tobacco is predominant with 24.4% of adults consuming it. [13]

The population residing in Low and Middle Income Countries (LMICs) has high risk of developing oral cavity cancers because of extensive exposure to various risk factors, most importantly availability of tobacco in any form. Persistent use of any of smoking or smokeless forms of tobacco is a major cause of pre-cancers and cancers of the oral cavity. [12] Furthermore, other contributing factors like nutrition, healthcare, living conditions, risk behaviors, lack of access to cancer care systems etc. are responsible for Oral Cavity Cancers. [9]

The Department of Preventive Oncology, Tata Memorial Hospital in collaboration with Watumull Sanatorium Trust initiated a community-based service programme for residents of 25 Brihan Mumbai Municipal Corporation (BMC) Wards in Mumbai. Under this programme, health education sessions were conducted to create awareness among the high risk individuals (those using tobacco and/ or alcohol) residing in low socio-economic areas of these 25 BMC Wards. This was followed by oral cavity cancer screening using low cost and effective screening technique viz., Oral Visual Inspection (OVI). Awareness and oral cavity screening was conducted for 1000 high risk individuals from each BMC ward, adding to a total of 25,000 individuals. This picture Atlas is compilation of intraoral precancerous lesions and conditions detected during this screening programme. It will serve as a pictorial guide for clinical identification of pre cancers and cancers of the oral cavity. It will be used by Department of Preventive Oncology for training of grass root level staff like ANMs/ ASHAs/ CHVs and other paramedical staff from within and outside the Institution.

Introduction to Cancers & Pre-cancers

What is cancer?

Human body is made up of millions of cells which grows and divides in timely manner. Cells usually die when they get matured or old.[14] Cancer is a disease when abnormal cells divide without control and can invade nearby tissues. It spreads through blood and lymphatic system to other parts of the body.[15]

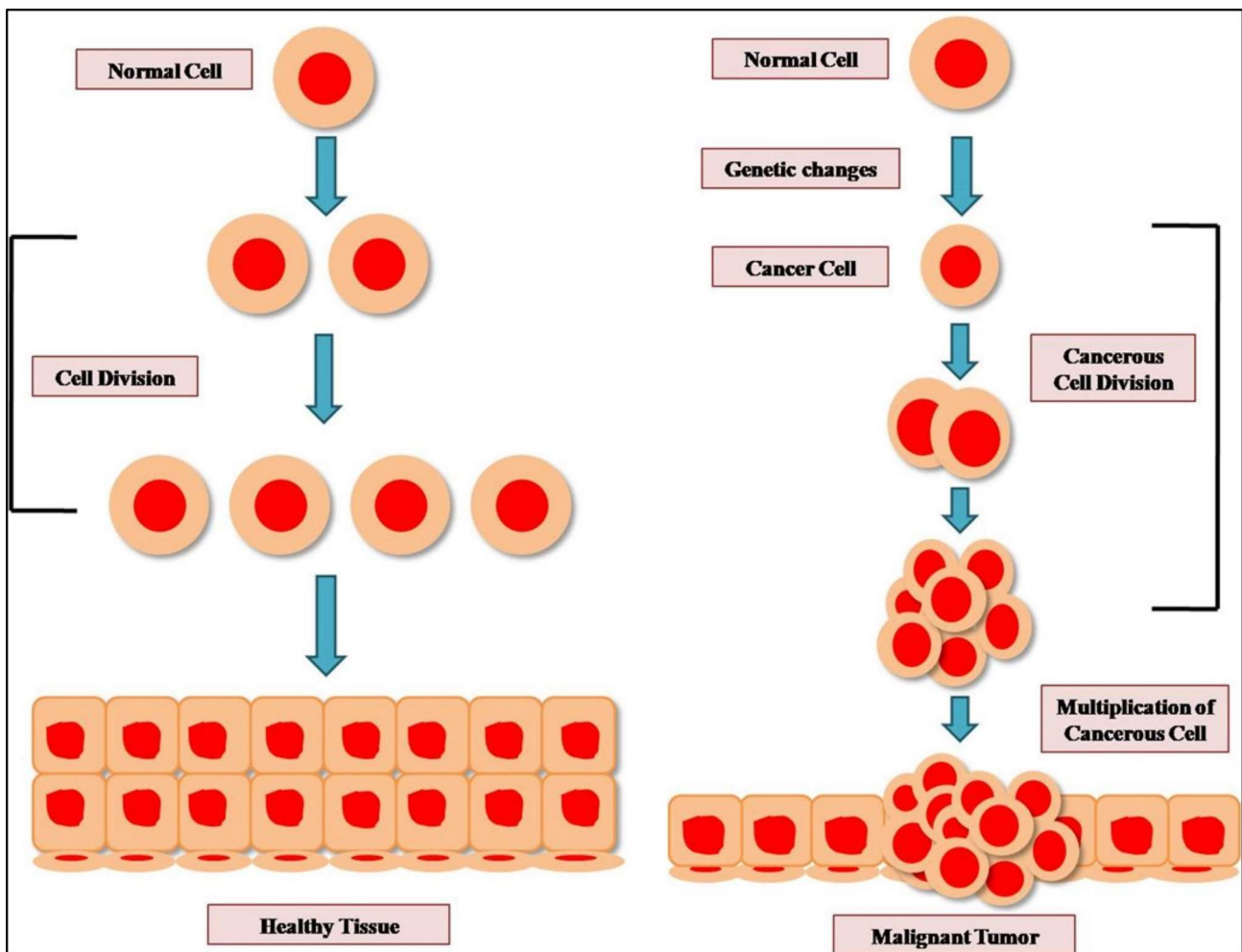


Figure 1: Cell Division

What does the word ‘Precancerous’ exactly mean? (Precancerous lesions and conditions)

According to National Cancer Institute (NCI), precancerous is a term which is used to describe a condition that is more likely or may progress to cancer. Another terms used for precancerous are premalignant and potentially malignant. [16] In 1972, WHO classified ‘Precancer’ into ‘lesions’ and ‘conditions’. [17]

Classification of oral precancers:

Classification of Precancerous lesions and conditions is as follows: - [18]

Precancerous Lesions	Precancerous Conditions
Erythroplakia	Oral Submucous Fibrosis
Leukoplakia	Oral Lichen Planus
Erythroleukoplakia	Actinic Keratosis
Smoker’s Palate	Discoid Lupus Erythematosus

Risk Factors:



Figure 2: Risk Factors for Oral Cavity Cancers

The most common premalignant lesions and conditions seen clinically are described in detail in the consecutive chapters.

Leukoplakia

In 2007, WHO defined leukoplakia as “A predominantly white plaque of questionable risk having excluded (other) known diseases or disorders that carry no increased risk of cancer” [19]

The criteria to be considered for clinical diagnosis of leukoplakia are as follows: [19, 20]

1. Predominantly white patch or plaque that cannot be scrapped.
2. Homogeneous leukoplakia, having well – defined borders.
3. Non-homogeneous leukoplakia, represents more diffuse borders and many have red or nodular components.
4. There is no sign of chronic traumatic irritation in that area (for example – a sharp tooth impinging the tongue, a masticatory friction causing white patch on alveolar ridge or retro molar pad)
5. It is not reversible even after elimination of apparent traumatic causes.
6. While stretching (retracting) the tissue, the lesions do not disappear or fade away.
7. The lesions are asymptomatic.

Etiology:

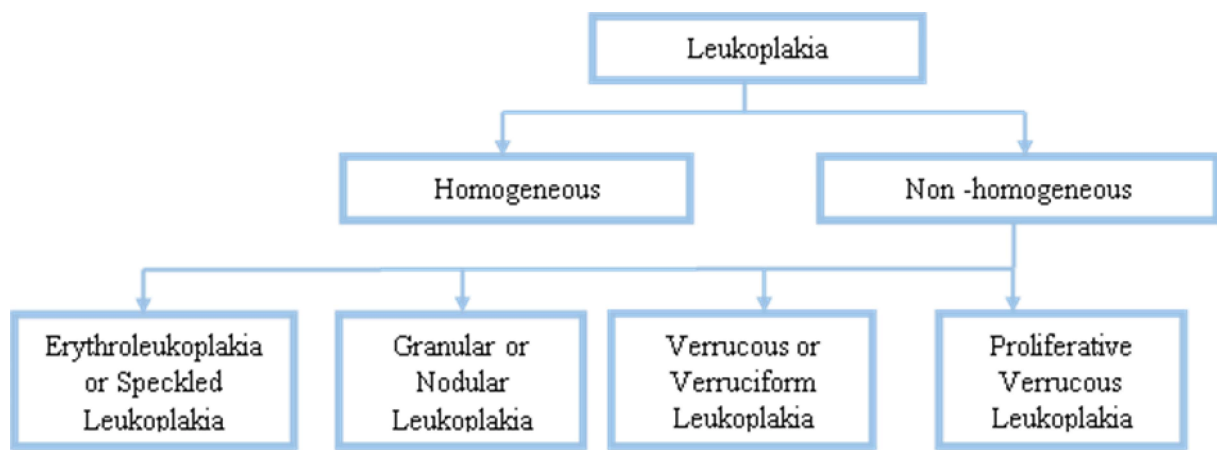
1. Major risk factors are use of tobacco, in any form. Significant regression has been reported after stopping tobacco habits.
2. It is more frequently observed in men.
3. Association with Human papillomavirus (HPV), has potential for malignant transformation of oral premalignant lesions.
4. Chewing areca nut without tobacco acts as an independent risk factor for oral leukoplakia.
5. Other reported independent risk factor is alcohol. [21]

Nonhomogeneous Leukoplakia

1. ***Erythroleukoplakia or speckled leukoplakia:*** White patches or plaque are intermixed with red tissue elements. They are called as erythroleukoplakia or speckled leukoplakia for their combined appearance of white and red areas.
2. ***Granular or Nodular Leukoplakia:*** Some lesions of homogeneous leukoplakia become more severe and develop increased surface irregularities.
3. ***Verrucous or Verruciform Leukoplakia:*** Demonstrates sharp or blunt projections, as the white component is expressed as papillary projections and similar to oral papillomas. Also are referred to as verrucous or verruciform leukoplakia.
4. ***Proliferative Verrucous Leukoplakia:*** It is an aggressive proliferative subtype of leukoplakia with high recurrence rate.[20, 22]

Other definable leukoplakia

1. **Hyperplastic candidiasis (Candidial Leukoplakia):** Hyperplastic epithelial lesion has the presence of candida albicans thus referred as candida associated leukoplakia or it is also termed as hyperplastic candidiasis. Due to absence of clinical response to antifungal treatment, it is preferable to consider it as leukoplakia.[23]
2. **Hairy leukoplakia (Greenspan lesion):** The term “Hairy Leukoplakia” is a misnomer. It is a definable lesion. Therefore, the usage of the term should be abandoned. Thus an alternative term “Greenspan Lesion” has been proposed.[23] Epstein –Barr virus causes Hairy Leukoplakia and is associated with Human Immunodeficiency Virus (HIV) infection or other immunosuppressive conditions.[24]
3. **Idiopathic leukoplakia:** Non- tobacco associated leukoplakia often referred to as idiopathic leukoplakia.[23]



Treatment

- ◆ Tobacco cessation. Look for regression in size. Initial follow-up every 3 months, later follow-up every 6-12 months.
- ◆ Non-surgical treatment – Vitamins (Vitamins A, C, E), carotenoids (lycopene, beta – carotene), fenretinide (Vitamin A analogue), anti - inflammatory drugs, protease inhibitor and photodynamic therapy.
- ◆ Surgical treatment - Conventional surgery, electrocoagulation, cryosurgery and laser surgery. [25]
- ◆ Selection of treatment strategy will be based on risk assessment.
- ◆ Low Risk lesions- size- <math><200\text{mm}^2</math>, homogenous appearance, subsites excluding tongue and floor of mouth.
- ◆ For low-risk lesions, clinical management is limited to non-surgical treatment and lifelong close surveillance.
- ◆ High-risk lesions- Size- >math>200\text{mm}^2</math>, non-homogeneous appearance, site involved- Tongue, floor of mouth, female gender, family history of cancer, long duration of leukoplakia, Non-smoker, presence of invasive candida albicans
- ◆ High-risk lesions require biopsy to rule out dysplasia or carcinoma in situ and often require surgical management.[26]

Images of Leukoplakia



Age/ Gender: 57 Years/Male

Tobacco History:

Forms of Tobacco Used: Smoking Form

Type: Beedi

Age at Initiation: 17 years

Duration: 40 years

Frequency: 10 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Left Buccal Mucosa



Age/ Gender: 70 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless Form

Type: Tobacco Chewing

Age at Initiation: 20 years

Duration: 50 years

Frequency: 15 times per day

Alcohol Habit: Spirit

Age at Initiation: 22 years

Duration: 48 years

Frequency: 3 times per week

Clinical Finding:

Leukoplakia- Proliferative Verrucous

Site: Right Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 61 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 41 years

Duration: 20 years

Frequency: 10 times per day

Alcohol Habit: Spirit

Age at Initiation: 41 years

Duration: 20 years

Frequency: 10 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Left Buccal Mucosa



Age/ Gender: 34 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both (Smoking and Smokeless)

Smoking: Cigarette

Age at Initiation: 17 years

Duration: 17 years

Frequency: 2 times per day

Smokeless: Gutka

Age at Initiation: 17 years

Duration: 17 years

Frequency: 7 times per day

Clinical Finding:

Leukoplakia- Homogeneous

Site: Left Lower Alveolar Ridge

Images of Leukoplakia



Age/ Gender: 51 Years/ Male 003

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 43 years

Duration: 8 years

Frequency: 4 times per day

Clinical Finding:

Leukoplakia- Homogeneous

Site: Left Lower Gingivobuccal Sulcus



Age/ Gender: 44 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both (Smoking and Smokeless)

Smoking: Cigarette

Age at Initiation: 43 years

Duration: 1 year

Frequency: 20 times per day

Smokeless: Gutka

Age at Initiation: 14 years

Duration: 29 years

Frequency: 15 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Right Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 22 Years/ Male

Tobacco History:

Forms of Tobacco Used:

Both (Smoking and Smokeless)

Smoking: Cigarette

Age at Initiation: 17 years

Duration: 5 year

Frequency: 4 times per week

Smokeless: Tobacco Chewing

Age at Initiation: 16 years

Duration: 6 years

Frequency: 10 times per day

Smokeless: Gutka

Age at Initiation: 16 years

Duration: 6 years

Frequency: 5 times per day

Alcohol Habit: Spirit

Age at Initiation: 17 years

Duration: 5 years

Frequency: Twice a week

Clinical Finding:

Leukoplakia- homogeneous

Site: Left Buccal Mucosa



Age/ Gender: 41 Years/ Female 5

Tobacco History:

Form of Tobacco Used: Smokeless Form

Type: Gutka

Age at Initiation: 17 years

Duration: 24 years

Frequency: 8 times per day

Clinical Finding:

Leukoplakia- Proliferative Verrucous

Site: Right Lateral Border of Tongue

Images of Leukoplakia



Age/ Gender: 18 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 16 years

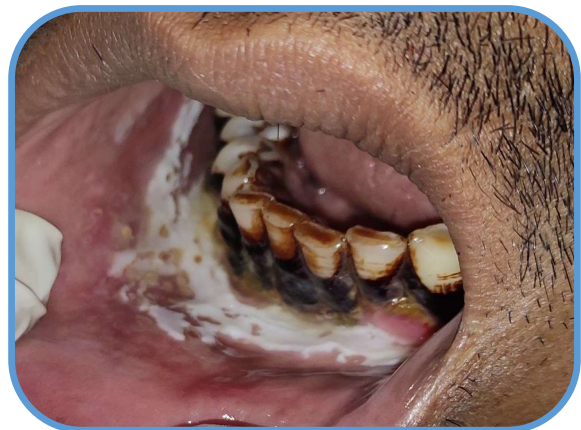
Duration: 2 years

Frequency: Twice a day

Clinical Finding:

Leukoplakia- homogeneous

Site: Right Buccal Mucosa



Age/ Gender: 35 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 16 years

Duration: 19 years

Frequency: 9 times per day

Type: Mawa

Age at Initiation: 16 years

Duration: 19 years

Frequency: 3 times per day

Clinical Finding:

Leukoplakia- Proliferative Verrucous

Site: Lower Anterior Gingivobuccal

Images of Leukoplakia



Age/ Gender: 34 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 22 years

Duration: 12 years

Frequency: 5 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Right Lateral Border of Tongue



Age/Gender: 42 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 32 years

Duration: 10 years

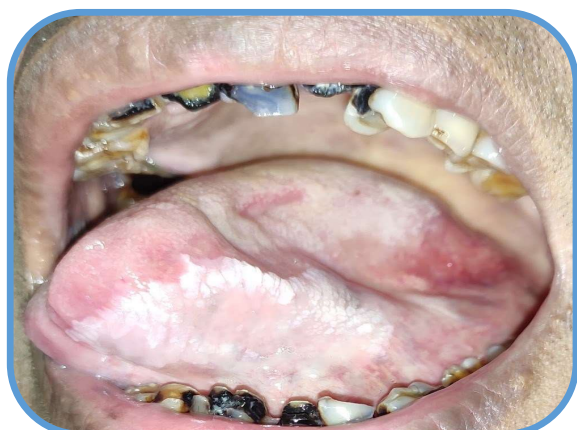
Frequency: 20 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Left Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 52 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 26 years

Duration: 26 years

Frequency: 8 times per day

Alcohol Habit: Spirit

Age at Initiation: 26 years

Duration: 26 years

Frequency: 2 times per month

Clinical Finding:

Leukoplakia- Verrucous

Site: Left Ventrolateral Surface of Tongue



Age/ Gender: 27 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both (Smoking and Smokeless)

Smoking Type: Cigarette

Age at Initiation: 24 years

Duration: 3 years

Frequency: Twice a day

Smokeless Type: Tobacco Chewing

Age at Initiation: 17 years

Duration: 10 years

Frequency: 5 times per day

Smokeless Type: Gutka

Age at Initiation: 17 years

Duration: 10 years

Frequency: 10 times per day

Alcohol Habit: Beer

Age at Initiation: 20 years

Duration: 7 years

Frequency: Twice a week

Clinical Finding:

Leukoplakia- Homogeneous

Site: Left Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 40 Years/Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 20 years

Duration: 20 years

Frequency: 6 times per day

Clinical Finding:

Leukoplakia- Verrucous Proliferative

Site: From Lower Alveolar Mucosa to Lower labial mucosa



Age/ Gender: 50 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 40 years

Duration: 10 years

Frequency: 4 times per day

Alcohol Habit: Spirit

Age at Initiation: 18 years

Duration: 40 years

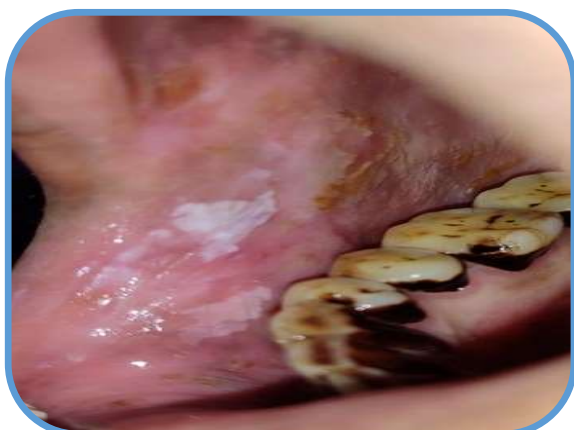
Frequency: Once a week

Clinical Finding:

Leukoplakia- homogeneous

Site: Right Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 40 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 20 years

Duration: 20 years

Frequency: 6 times per day

Clinical Finding:

Leukoplakia- Verrucous Proliferative

Site: From Lower Alveolar Mucosa to Lower labial mucosa



Age/ Gender: 42 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 20 years

Duration: 22 years

Frequency: 6 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Left Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 55 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 15 years

Duration: 40 years

Frequency: 4 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Lower Labial Mucosa



Age/ Gender: 31 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both

Smoking Type: Cigarette

Age at Initiation: 21 years

Duration: 10 years

Frequency: 2 times per day

Smokeless Type: Tobacco Chewing

Age at Initiation: 21 years

Duration: 10 years

Frequency: 5 times per day

Smokeless Type: Gutka

Age at Initiation: 21 years

Duration: 10 years

Frequency: 4 times per day

Alcohol Habit: Beer

Age at Initiation: 21 years

Duration: 10 years

Frequency: Twice a day

Clinical Finding:

Leukoplakia- homogeneous

Site: Hard palate (Right Side)

Images of Leukoplakia



Age/ Gender: 40 Years/ Female

Tobacco History:

Forms of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 20 years

Duration: 20 years

Frequency: 8 times per day

Type: Gutka

Age at Initiation: 30 years

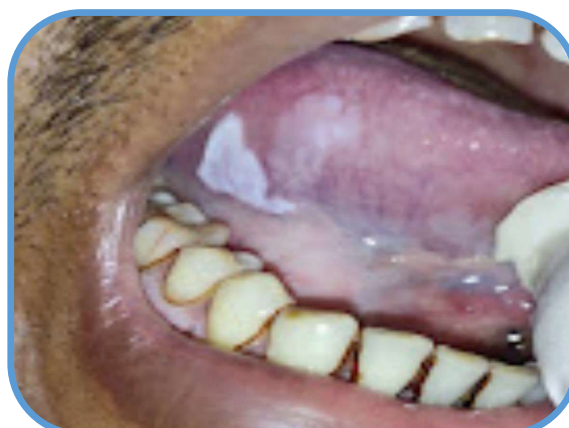
Duration: 10 years

Frequency: 7 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Left Buccal Mucosa



Age/ Gender: 36 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 17 years

Duration: 19 years

Frequency: 5 times per day

Type: Gutka

Age at Initiation: 17 years

Duration: 19 years

Frequency: 7 times per day

Alcohol Habit: Country liquor

Age at Initiation: 20 years

Duration: 16 years

Frequency: Twice a week

Clinical Finding:

Leukoplakia- verrucous

Site: Right Lateral Border of Tongue

Images of Leukoplakia



Age/ Gender: 38 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 18 years

Duration: 20 years

Frequency: 20 times per day

Alcohol Habit: Spirit

Age at Initiation: 31 years

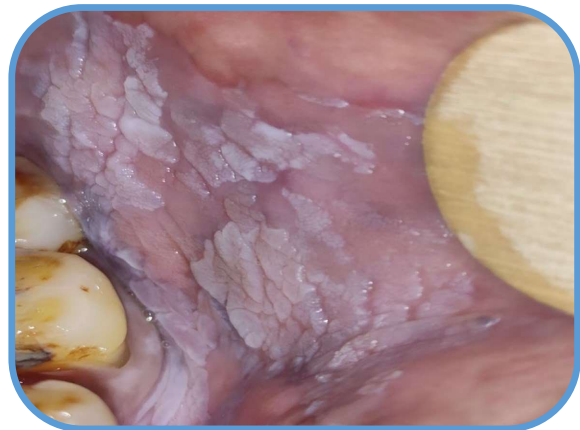
Duration: 7 years

Frequency: Once a day

Clinical Finding:

Leukoplakia- homogeneous

Site: Right Buccal Mucosa



Age/ Gender: 36 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both (smoking and smokeless)

Smoking Type: Cigarette

Age at Initiation: 30 years

Duration: 6 years

Frequency: Once a day

Smokeless Type: Gutka

Age at Initiation: 31 years

Duration: 5 years

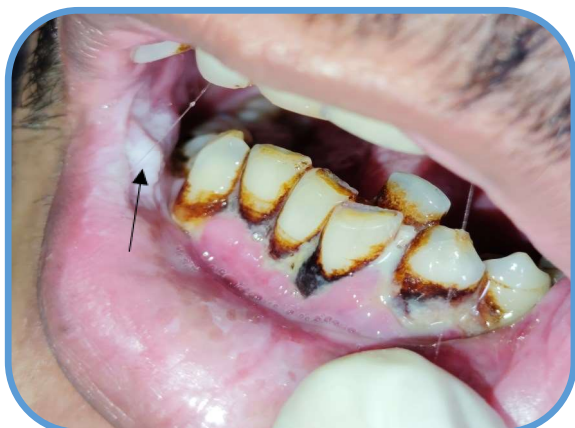
Frequency: Twice a day

Clinical Finding:

Leukoplakia- homogeneous

Site: Left Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 29 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both (smoking and smokeless)

Smoking Type : Cigarette

Age at Initiation: 24 years

Duration: 5 years

Frequency: 5 times per day

Smokeless Type: Gutka

Age at Initiation: 17 years

Duration: 10 years

Frequency: 4 times per day

Clinical Finding:

Leukoplakia- Verrucous

Site: Right Labial Commissure



Age/ Gender: 33 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Pan with Tobacco

Age at Initiation: 24 years

Duration: 9 years

Frequency: 4 times per day

Alcohol Habit: Spirit

Age at Initiation: 24 years

Duration: 9 years

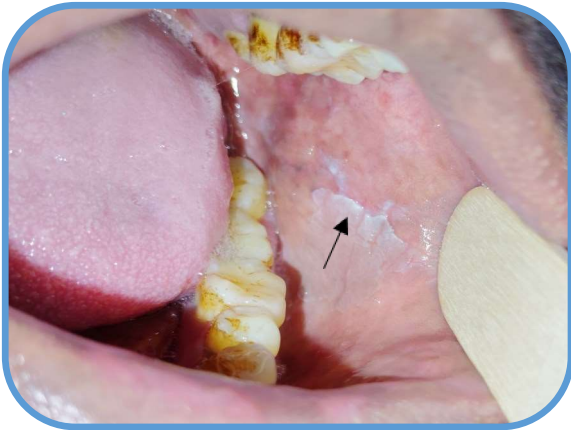
Frequency: Once a month

Clinical Finding:

Leukoplakia- homogeneous

Site: Right Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 36 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smoking

Type: Cigarette

Age at Initiation: 30 years

Duration: 6 years

Frequency: 7 times per day

Type: Beedi

Age at Initiation: 30 years

Duration: 6 years

Frequency: 7 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Left Buccal Mucosa



Age/ Gender: 61 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Mawa

Age at Initiation: 41 years

Duration: 20 years

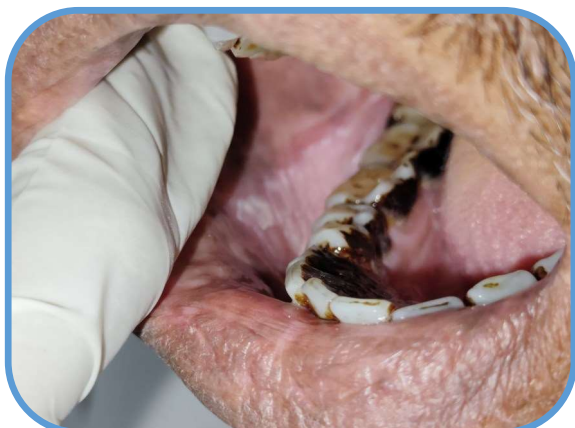
Frequency: 5 times per day

Clinical Finding:

Leukoplakia homogeneous

Site: Left Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 47 Years/ Male

Tobacco History:

Form of Tobacco Used: Smoking

Type: Beedi

Age at Initiation: 25 years

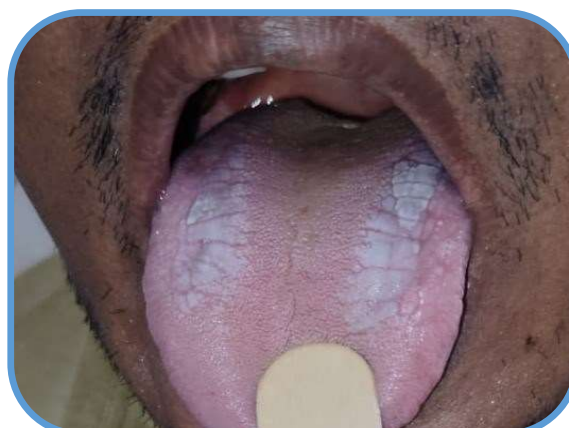
Duration: 22 years

Frequency: 20 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Right Buccal Mucosa



Age/ Gender: 36 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 26 years

Duration: 10 years

Frequency: 4 times per day

Alcohol Habit: Spirit

Age at Initiation: 26 years

Duration: 10 years

Frequency: 4 times per day

Clinical Finding:

Leukoplakia- homogeneous

Site: Dorsum of the Tongue

Images of Leukoplakia



Age/ Gender: 61 Years/ Male

● **Tobacco History:**

● Form of Tobacco Used: Smokeless

● Type: Tobacco Chewing

● Age at Initiation: 41 years

Duration: 20 years

Frequency: 10 times per day

Clinical Finding:

Leukoplakia- homogenous

Site: Right Buccal Mucosa



Age/ Gender: 42 years/ male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 50 years

Duration: 5 years

Frequency: 3 times per day

Alcohol Habit: Country Liquor

Age at Initiation: 37 years

Duration: 5 years

Frequency: Once a week

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Commissure

Images of Leukoplakia



Age/ Gender: 67 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco

Age at Initiation: 20 years

Duration: 47 years

Frequency: 6 times per day

Clinical Finding:

Leukoplakia- Nodular

Site: Left Buccal Mucosa



Age/ Gender: 58 Years/ Male

Tobacco History:

Form of Tobacco Used: Smoking

Type: Cigarette

Age at Initiation: 18 years

Duration: 40 years

Frequency: 3 times per day

Alcohol Habit: Spirit

Age at Initiation: 16 years

Duration: 42 years

Frequency: Once a day

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 45 years/ Male

● **Tobacco History:**

● Form of Tobacco Used: Smoking

● Type: Smoking

● Age at Initiation: 43 years

Duration: 2 years

Frequency: 7 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Commissure



Age/ Gender: 45Years/ Male

Tobacco History:

Form of Tobacco Used: Smoking

Type: Beedi

Age at Initiation: 20 years

Duration: 25 years

Frequency: 6 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Mucosa extending to right buccal commissure

Images of Leukoplakia



Age/ Gender: 33 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 28 years

Duration: 5 years

Frequency: 5 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Commissure



Age/ Gender: 43 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both

Smoking Type: Beedi

Age at Initiation: 18 years

Duration: 25 years

Frequency: 5 times per day

Smokeless Type: Tobacco Chewing

Age at Initiation: 18 years

Duration: 25 years

Frequency: 3 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Left Buccal Commissure extending to left buccal mucosa

Images of Leukoplakia



Age/ Gender: 41 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 26 years

Duration: 15 years

Frequency: 4 times per day

Alcohol Habit: Spirit

Age at Initiation: 26 years

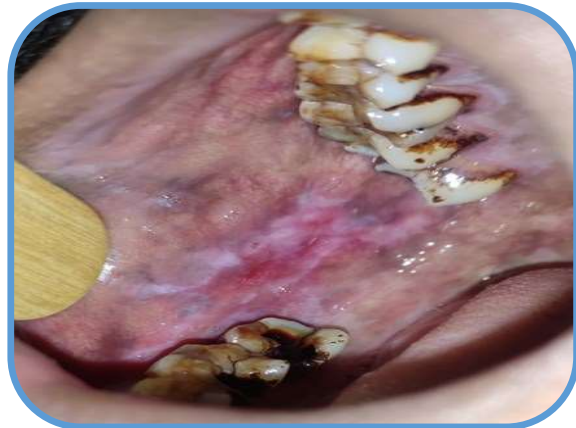
Duration: 15 years

Frequency: Twice a week

Clinical Finding:

Leukoplakia- speckled

Site: Left Buccal Mucosa



Age/ Gender: 37 years / Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco

Age at Initiation: 22 years

Duration: 12 years

Frequency: 3 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 60 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Betel Leaf / Paan with Tobacco

Age at Initiation: 20 years

Duration: 40 years

Frequency: 5 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Left Buccal Mucosa



Age/ Gender: 39 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both Smoking and Smokeless Form

Smoking Type: Cigarette

Age at Initiation: 21 years

Duration: 10 years

Frequency: 10 times per day

Smoking Type: Ganja

Age at Initiation: 26

Duration: 5 years

Frequency: 5 times per day

Smokeless Type: Tobacco Chewing

Age at Initiation: 22 years

Duration: 9 years

Frequency: 10 times per day

Alcohol Habit: Spirit

Age at Initiation: 17 years

Duration: 22 years

Frequency: Once a week

Clinical Finding:

Leukoplakia- speckled

Site: Left Buccal Mucosa extending to left retromolar trigone

Images of Leukoplakia



Age/ Gender: 29 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Smokeless Type: Tobacco Chewing

Age at Initiation: 19 Years

Duration: 10 Years

Frequency: 12 times per day

Smokeless Type:

Betel Leaf/ Paan with Tobacco

Age at Initiation: 19 Years

Duration: 10 Years

Frequency: 12 times per day

Alcohol Habit: Spirit

Age at Initiation: 26 Years

Duration: 3 years

Frequency: Once a day

Clinical Finding:

Leukoplakia- speckled

Site: Right Retromolar Trigone



Age/ Gender: 31 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Smokeless Type: Pan with tobacco

Age at Initiation: 20 years

Duration: 11 years

Frequency: Twice a day

Smokeless Type: Gutka

Age at Initiation: 20 years

Duration: 11 years

Frequency: 15 times per day

Clinical Finding:

Leukoplakia- nodular

Site: Left Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 26 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Smokeless Type: Gutka

Age at Initiation: 24 years

Duration: 2 years

Frequency: 3 times per day

Alcohol Habit: Spirit

Age at Initiation: 20 years

Duration: 6 years

Frequency: Thrice a week

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Commissure extending to right buccal mucosa



Age/ Gender: 33 years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 23 Years

Duration: 10 Years

Frequency: 5 times per day

Alcohol Habit: Spirit

Age at Initiation: 23 Years

Duration: 10 Years

Frequency: 5 times per day

Clinical Finding:

1) Leukoplakia- speckled

Site: From Right Buccal Commissure extending to Right Buccal Mucosa

2) Suspicious Growth: Right Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 39 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Smokeless Type: Tobacco

Age at Initiation: 17 Years

Duration: 22 Years

Frequency: 8 times per day

Smokeless Type: Gutka

Age at Initiation: 17 Years

Duration: 22 Years

Frequency: 8 times per day

Alcohol Habit: Spirit

Age at Initiation: 17 Years

Duration: 22 Years

Frequency: Once a week

Clinical Finding:

Leukoplakia- speckled

Site: Left Buccal Mucosa



Age/ Gender: 26 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Smokeless Type: Gutka

Age at Initiation: 17 years

Duration: 9 years

Frequency: 2 times a day

Alcohol Habit: Spirit

Age at Initiation: 14 years

Duration: 12 years

Frequency: Once a month

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Commissure extending to right buccal mucosa

Images of Leukoplakia



Age/ Gender: 33 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 28 years

Duration: 5 years

Frequency: 5 times a day

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Mucosa



Age/ Gender: 52 years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 49 Years

Duration: 3 Years

Frequency: 10 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Commissure

Images of Leukoplakia



Age/ Gender: 55 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 10years

Duration: 45 years

Frequency: 10 times per day

Alcohol Habit: Country Liquor

Age at Initiation: 15 years

Duration: 40 years

Frequency: Once a day

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Mucosa



Age/ Gender: 37 Years/ Female

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 33 years

Duration: 4 years

Frequency: 6 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Left Buccal Mucosa

Images of Leukoplakia



Age/ Gender: 55 Years/ Male

Tobacco History:

Form of Tobacco Used: Smoking

Type: Beedi

Age at Initiation: 10 years

Duration: 45 years

Frequency: 7 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Right Buccal Mucosa



Age/ Gender: 52 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Smokeless Type: Paan with tobacco

Age at Initiation: 49 years

Duration: 3 years

Frequency: 2 times per day

Smokeless Type: Gutka

Age at Initiation: 32 years

Duration: 20 years

Frequency: 5 times per day

Alcohol Habit: Spirit

Age at Initiation: 20 years

Duration: 30 years

Frequency: Once a day

Clinical Finding:

Leukoplakia- nodular

Site: Right Buccal Commissure extending to right buccal mucosa

Images of Leukoplakia



Age/ Gender: 48 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 33 years

Duration: 15 years

Frequency: 6 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Left Buccal Mucosa



Age/ Gender: 65 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Smokeless Type: Tobacco Chewing

Age at Initiation: 20 years

Duration: 45 years

Frequency: 4 times per day

Smokeless Type: Gutka

Age at Initiation: 20 years

Duration: 45 years

Frequency: 4 times per day

Clinical Finding:

Leukoplakia- speckled

Site: Left Labial Commissure

Erythroplakia

World Health Organization (WHO) in 1978 defined oral erythroplakia as, 'any lesion of the oral mucosa that presents as bright red velvety plaques which cannot be characterized clinically or pathologically as any other recognizable condition'. It is considered to be one of the most severe premalignant lesion amongst all. [27]

Prevalence of Erythroplakia:

Erythroplakia prevalence ranges from 0.02% to 0.83%. [28, 29] It is more prevalent amongst middle aged population and has no specific gender predilection. [27]

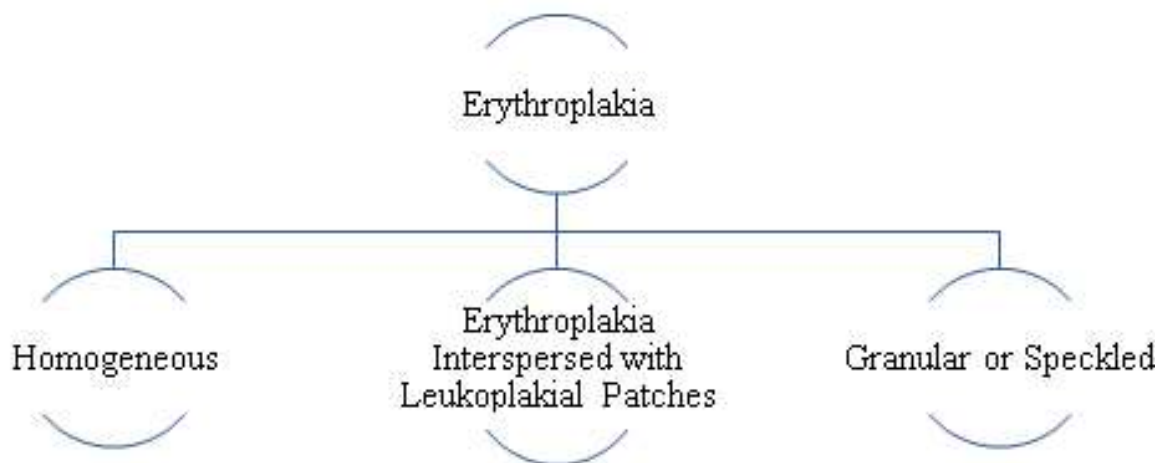
Etiology of Erythroplakia:

Studies show use of smoking or chewing tobacco, chewing betel quid with or without tobacco as etiologic causes for erythroplakia. [30] A stronger association is observed in patients with alcohol abuse and tobacco. [28]

Clinical features:

Erythroplakias are usually asymptomatic. [31] The lesions of erythroplakia are bright red irregular, well-defined borders and with granular surface. [29] Sometimes, patients experience burning sensation on intake of food. In India, reverse smoking of chutta is practiced widely. Because of this practice, a form of erythroplakia is observed in patients with defined red areas combining with white tissues. Some lesions also present with ulcerations and depigmented areas. [31]

The most common sites for occurrence of erythroplakia are ventral surface of tongue, floor of the mouth, retromolar area, tonsillar fauces and soft palate. [28]



Clinical forms of erythroplakia:

The first review on oral erythroplakia was made by Blau and Hyman in 1955. [32] In 1972, an article and discussion of erythroplakia was published by Shear. In this article, he proposed division of oral erythroplakia into 3 subtypes which describe its clinical variation [29, 32]

Malignant transformation:

The malignant potential of erythroplakia is very high as compared to other Oral Premalignant Disorders (OPMDs). [28] Erythroplakia is regarded as one of the most serious oral precancerous conditions. The likelihood of severe dysplasia or cancer development within these lesions is notably high, ranging from 80% to 90%. [27]

Treatment

By clinical identification of the patch, a provisional diagnosis is made.[31] Individuals diagnosed with erythroplakia should be informed to discontinue tobacco and alcohol, while also being urged to have a diet abundant in vegetables and fruits, which are rich in antioxidants.[27] Biopsy is essential to confirm the diagnosis. Management depends on biopsy results. Mild and non-cancerous cases are monitored with frequent follow-up visits while severe, recurring, or cancerous cases will require surgical management. Cold-knife surgical removal (cold knife excision) along with laser surgery, is extensively employed for management of erythroplakias. Recovery depends on type of surgery done, size and nature of the lesion and body’s healing capacity.[33]

Images of Erythroplakia



Age/ Gender: 53 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both Smoking and Smokeless

- Smoking Type: Cigarette
- Age at Initiation: 25 years
- Duration: 28 years
- Frequency: Once a day
- Smokeless Type: Tobacco Chewing
- Age at Initiation: 25 years
- Duration: 28 years
- Frequency: 5 times per day
- Smokeless Type: Gutka
- Age at Initiation: 25 years
- Duration: 28 years
- Frequency: 5 times per day
- Alcohol Habit: Spirit**
- Age at Initiation: 25 years
- Duration: 28 years
- Frequency: Once a day

Clinical Finding:

Erythroplakia - ulcerated

Site: Right Buccal Mucosa extending upto right retromolar trigone



Age/ Gender: 57 Years/ Male

Tobacco History:

Form of Tobacco Used: Smoking

- Type: Cigarette
- Age at Initiation: 37 years
- Duration: 20 years
- Frequency: 15 times per day
- Alcohol Habit: Beer**
- Age at Initiation: 42 years
- Duration: 15 years
- Frequency: Once a month

Clinical Finding:

Erythroplakia - ulcerated

Site: Hard and Soft Palate

Images of Erythroplakia



Age/ Gender: 36 Years/ Male

Tobacco History:

Form of Tobacco Used: Both Smoking and Smokeless

- Smoking Type: Beedi
- Age at Initiation: 26 years
- Duration: 10 years
- Frequency: Twice a day
- Smokeless Type: Gutka
- Age at Initiation: 26 years
- Duration: 10 years
- Frequency: 5 times per day

Clinical Finding:

Erythroplakia

Site: Hard Palate



Age/ Gender: 49 Years/ M

Tobacco History:

Form of Tobacco Used: Smokeless

Smokeless Type: Tobacco Chewing

Age at Initiation: 34 years

Duration: 15 years

Frequency: 4 times per day

Smokeless Type: Masheri

Age at Initiation: 34 years

Duration: 15 years

Frequency: 3 times per day

Clinical Finding:

Erythroplakia

Site: Left Buccal Mucosa

Images of Erythroplakia



Age/ Gender: 45 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 30 years

Duration: 15 years

Frequency: 4 times per day

Clinical Finding:

Erythroplakia

Site: Right Buccal Mucosa



Age/ Gender: 67 Years/ Male

Tobacco History:

Form of Tobacco Used: Smoking

Type: Beedi

Age at Initiation: 60 years

Duration: 7 years

Frequency: 12 times per day

Alcohol Habit: Spirit

Age at Initiation: 20 years

Duration: 32 years

Frequency: 2 times per day

Clinical Finding: Erythroplakia

Site: Right Buccal Mucosa

Images of Erythroplakia



Age/ Gender: 29 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Type Smokeless: Tobacco Chewing

Age at Initiation: 19 years

Duration: 10 years

Frequency: 12 times per day

Smokeless Type: Paan with Tobacco

Age at Initiation: 19 years

Duration: 10 years

Frequency: Twice a day

Alcohol Habit: Spirit

Age at Initiation: 26 years

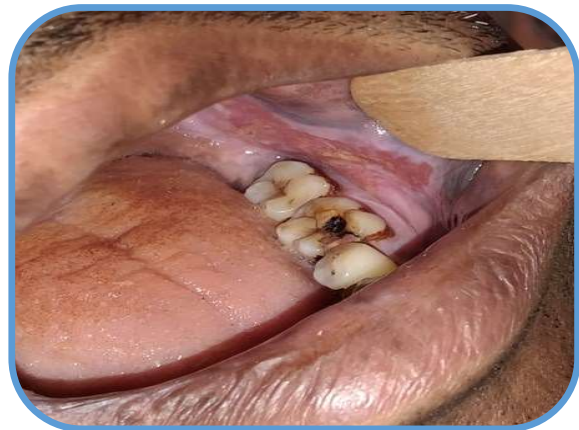
Duration: 3 years

Frequency: Once a day

Clinical Finding:

Erythroplakia

Site: Right Retromolar Triangle



Age/ Gender: 39 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Smokeless Type: Tobacco Chewing

Age at Initiation: 17 years

Duration: 22 years

Frequency: 8 times per day

Smokeless Type: Gutka

Age at Initiation: 17 years

Duration: 22 years

Frequency: 4 times per day

Alcohol Habit: Spirit

Age at Initiation: 17 years

Duration: 22 years

Frequency: Once a week

Clinical Finding:

Erythroplakia

Site: Left Buccal Mucosa

Images of Erythroplakia



Age/ Gender: 46 Years/ Female

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Masherri

Age at Initiation: 40 years

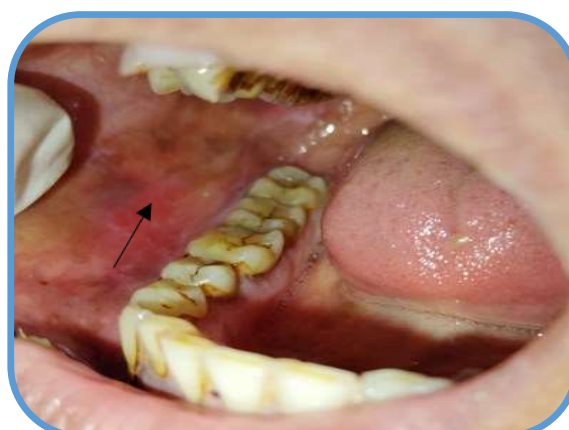
Duration: 6 years

Frequency: 5 times per day

Clinical Finding:

Erythroplakia

Site: Left Buccal Mucosa and Left Lower Gingivobuccal Sulcus



Age/ Gender: 50 Years/ Female

Tobacco History:

Forms of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 13 years

Duration: 37 years

Frequency: 8 times per day

Type: Masherri

Age at Initiation: 13 years

Duration: 37 years

Frequency: 3 times per day

Clinical Finding:

Erythroplakia

Site: Right Buccal Mucosa

Images of Erythroplakia



Age/ Gender: 26 Years/ Female

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 18 years

Duration: 8 years

Frequency: 5 times per day

Clinical Finding:

Erythroplakia

Site: Left Buccal Mucosa

Oral Submucous Fibrosis

Oral Submucous Fibrosis (OSMF) is classified under oral precancerous condition. Pindborg defined OSMF in 1966 as “an insidious chronic disease affecting any part of the oral cavity and sometimes even pharynx. It is associated with juxta-epithelial inflammatory reaction followed by fibro elastic changes in the lamina propria layer, along with epithelial atrophy which leads to rigidity of oral mucosa, proceeding to trismus and difficulty in mouth opening”. [34] The other terminologies used for OSMF are, “diffuse oral sub-mucous fibrosis, idiopathic scleroderma of the mouth, idiopathic palatal fibrosis, sclerosing stomatitis and juxta-epithelial fibrosis”. [35]

Epidemiology:

Overall prevalence of OSMF in India is 0.2 to 1.2%. It's distribution is 0.2 – 2.3% in males and 1.2- 4.6% in females. [36, 28] Most cases are seen in age group 11 to 60 years. [32] Globally, India has highest number of OSMF patients.[37]

Etiology:

Chewing areca nut (betel nut) is the most important etiologic cause associated with OSMF.[38]

Around 10% to 20% of global population consumes areca nut in some form or the other.[36]

Areca nut contains 11 - 12% tannins and 0.15 - 0.67% alkaloids like guvacoline, guvacine, arecoline and arecaidine. Amongst all, arecoline is the main substance. Hydrolysis occurs when slaked lime [$\text{Ca}(\text{OH})_2$] combines with areca nut. Thus, arecoline converts to arecaidine substances. Arecaidine causes fibroblast stimulation and proliferation. Thus it induces collagen synthesis. Tannin decreases collagen degradation by preventing collagenases. Thus, OSMF is a combined effect of tannin and arecoline by mechanism of increasing production of collagen and decreasing collagen degradation.[34]

Studies have shown that duration of habit is of less significance as compared to daily use of areca nut. Areca nut and tobacco combination has led to increased frequency of OSMF. [38] Areca nut in freeze-dried commercial items like gutkha, pan masala and mawa (combining areca nut and lime) have significantly higher concentrations as compared to traditional betel quid prepared at home.[39]

Clinical features:

OSMF affects oral cavity, upper third of oesophagus and pharynx. [39] Condition develops gradually over a span of 2 to 5 years. Early signs consist of a burning sensation in the oral cavity while eating spicy foods. Palate in particular shows the emergence of blisters, ulcers or repeated inflammation throughout mouth lining, increased saliva production, impaired taste sensation and a sensation of dryness in the mouth. Oral mucosa shows blanching, opaque and white fibrous bands as disease advances.

Initially, it was believed that the palate and the faucial pillars of the throat get affected first. But it's now understood that cheeks (buccal mucosa) and lips may be the first to be impacted. Symmetrical changes occur in the oral cavity lining and vertical fibrous bands in the cheeks are seen. [40] Thus, 'Marble like' appearance is noticed due to fibrosis in the oral mucosa. These fibrotic bands restrict the mouth opening called as 'Trismus.' This increases challenges maintaining oral hygiene and also affects oral cavity functions like mastication, swallowing and speech. [38]

Classification: [34]

Stage	Functional staging
Grade 1	35 mm of mouth opening.
Grade 2	25-35 mm of mouth opening and flexibility of cheek reduces by 33%.
Grade 3	15-25 mm of mouth opening and flexibility of cheek reduces by 66%.
Grade 4	Less than 15 mm or nil mouth opening.

Treatment

OSMF is a condition which persists even after discontinuation of the habit.[38] The management of OSMF varies according to the severity of the condition and its clinical manifestations. In the initial stages, cessation of the habit and dietary supplements are recommended. In moderate cases, a combination of intralesional injections and medication is employed as a conservative approach. In advanced stages, surgical procedures like cold knife excision, CO₂, diode laser and subsequent reconstruction with tissue flaps become necessary for treatment.[34] All patients should be referred to physiotherapy department, where they will be taught exercises aimed at improving mouth opening. Regular exercise with/ without mouth exercising devices can result in better outcomes.[41]

Extraoral Images of OSMF



Age/ Gender: 38 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 20 years

Duration: 18 years

Frequency: 7 times per day

Type: Gutka chewing

Age at Initiation: 30 years

Duration: 8 years

Frequency: 6 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening: One finger breadth- <15 mm



Age/ Gender: 54 Years/ Female

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 29 years

Duration: 25 years

Frequency: 4 times per day

Clinical Finding:

OSMF (Grade 3)

Mouth Opening: Two finger breadth- 22 mm

Extraoral Images of OSMF



Age/ Gender: 19 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Mawa

Age at Initiation: 14 years

Duration: 5 years

Frequency: 2 times per day

Clinical Finding:

OSMF (Grade 3)

Mouth Opening: Two finger breadth- 22 mm



Age/ Gender: 50 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 35 years

Duration: 15 years

Frequency: twice a day

Clinical Finding:

OSMF (Grade 3)

Mouth Opening: 1 ½ finger breadth- 16 mm

Extraoral Images of OSMF



Age/ Gender: 29 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both (smoking and smokeless form)

- Smoking Type: Cigarette
- Age at Initiation: 15 years
- Duration: 14 years
- Frequency: 3 times per day
- Smokeless Type: Tobacco Chewing
- Age at Initiation: 15 years
- Duration: 14 years
- Frequency: 5 times per day
- Smokeless Type: Gutka
- Age at Initiation: 15 years
- Duration: 14 years
- Frequency: 6 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm



Gender: 37 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 30 years

Duration: 7 years

Frequency: 6 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm

Extraoral Images of OSMF



Age/ Gender: 22 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both (Smokeless and Smoking)

Smoking Type: Cigarette

Age at Initiation: 13 years

Duration: 9 years

Frequency: 2 times per day

Smokeless Type: Gutka

Age at Initiation: 13 years

Duration: 9 years

Frequency: 25 times per day

Alcohol Habit: Spirit

Age at Initiation: 13 years

Duration: 9 years

Frequency: 1 times per week

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth - < 15mm



Age/ Gender: 29 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Mawa

Age at Initiation: 13 years

Duration: 16 years

Frequency: 6 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth - < 15mm

Extraoral Images of OSMF



Age/ Gender: 57 Years/ Female

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Masherri

Age at Initiation: 20 years

Duration: 37 years

Frequency: 8 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm



Age/ Gender: 34 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 19 years

Duration: 15 years

Frequency: 4 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm

Extraoral Images of OSMF



Age/ Gender: 28 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both Smoking and Smokeless Form

- Smoking Type: Cigarette
 - Age at Initiation: 18 years
 - Duration: 10 years
 - Frequency: 5 times per day
 - Smokeless Type: Tobacco Chewing
 - Age at Initiation: 18 years
 - Duration: 10 years
 - Frequency: 5 times per day
 - Smokeless Type: Gutka
 - Age at Initiation: 18 years
 - Duration: 10 years
 - Frequency: 10 times per day
- Alcohol Habit: Beer**
- Age at Initiation: 23 years
- Duration: 5 years
- Frequency: Twice a week

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm



Age/ Gender: 30 Years/ Female

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 15 years

Duration: 15 years

Frequency: 5 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm

Extraoral Images of OSMF



Age/ Gender: 45 Years/ Female

Tobacco History:

Forms of Tobacco Used: Both Smoking and Smokeless Forms

- Smoking Type: Cigarette
- Age at Initiation: 35 years
- Duration: 10 years
- Frequency: 1 times per day
- Smokeless Type: Gutka
- Age at Initiation: 35 years
- Duration: 10 years
- Frequency: 10 times per day
- **Alcohol Habit: Beer**
- Age at Initiation: 35 years
- Duration: 10 years
- Frequency: 2 times per week

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

Two finger breadth - 22mm



Age/ Gender: 47 Years/ Female

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 37 years

Duration: 10 years

Frequency: 10 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm

Extraoral Images of OSMF



Age/ Gender: 33 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 15 years

Duration: 18 years

Frequency: 10 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm



Age/ Gender: 25 Years/ Female

Tobacco History:

Forms of Tobacco Used: Smokeless

Smokeless Type: Tobacco Chewing

Age at Initiation: 12 years

Duration: 12 years

Frequency: 8 times per day

Smokeless Type: Gutka

Age at Initiation: 12 years

Duration: 12 years

Frequency: 4 times per day

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

Two finger breadth - 24mm

Extraoral Images of OSMF



Age/ Gender: 38 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 24 years

Duration: 14 years

Frequency: 15 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm



Age/ Gender: 28 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Betel leaf/ Paan with tobacco

Age at Initiation: 25 years

Duration: 3 years

Frequency: 8 times per day

Alcohol Habit: Spirit

Age at Initiation: 13 years

Duration: 9 years

Frequency: Once a week

Alcohol Habit: Beer

Age at Initiation: 23 years

Duration: 5 years

Frequency: 4 times per week

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

Two finger breadth 24mm

Extraoral Images of OSMF



Age/ Gender: 23 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Smokeless Type: Tobacco chewing

Age at Initiation: 17 years

Duration: 6 years

Frequency: Twice a day

Smokeless Type: Gutka

Age at Initiation: 17 years

Duration: 6 years

Frequency: 5 times per day

Alcohol Habit: Beer

Age at Initiation: 17 years

Duration: 6 years

Frequency: Twice a week

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm



Age/ Gender: 40 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 27 years

Duration: 13 years

Frequency: 15 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

Less than One finger breadth < 15mm

Extraoral Images of OSMF



Age/ Gender: 28 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 24 years

Duration: 4 years

Frequency: 6 times per day

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

1 ½ fingers - 16 mm



Age/ Gender: 60 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both Smoking and Smokeless

Smoking Type: Beedi

Age at Initiation: 35 years

Duration: 25 years

Frequency: 20 times per day

Smokeless Type: Tobacco Chewing

Age at Initiation: 35 years

Duration: 25 years

Frequency: 20 times per day

Smokeless Type: Gutka

Age at Initiation: 30 years

Duration: 30 years

Frequency: 25 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm

Extraoral Images of OSMF



Age/ Gender: 46 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both Smoking and Smokeless Form

Smoking Type: Beedi

Age on Onset: 40

Duration: 6 years

Frequency: 5 times per day

Smokeless Type: Tobacco Chewing

Age at Initiation: 43 years

Duration: 3 years

Frequency: Twice a day

Smokeless Type: Betel leaf/ Paan with tobacco

Age at Initiation: 43 years

Duration: 3 years

Frequency: 5 times per day

Alcohol Habit: Spirit

Age at Initiation: 40 years

Duration: 6 years

Frequency: 5 times per week

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

Two finger breadth-24 mm



Age/ Gender: 52 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 22 years

Duration: 30 years

Frequency: 5 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth- < 15mm

Extraoral Images of OSMF



Age/ Gender: 23 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco

Age at Initiation: 13 years

Duration: 10 years

Frequency: 20 times per day

Alcohol Habit: Beer

Age at Initiation: 13 years

Duration: 10 years

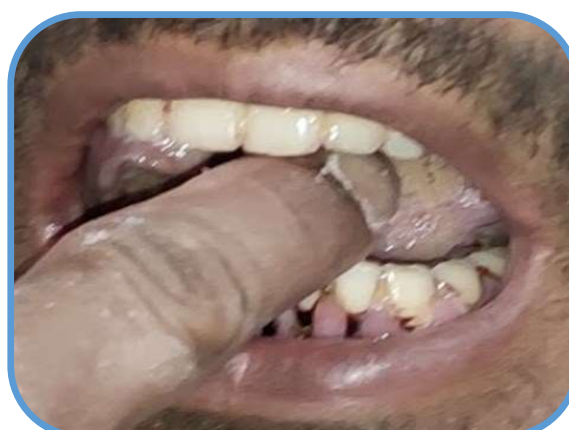
Frequency: Once a week

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth- < 15mm



Age/ Gender: 28 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 20 years

Duration: 8 years

Frequency: 3 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth- < 15mm

Extraoral Images of OSMF



Age/ Gender – 26 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both Smoking and Smokeless Form

Smoking Type: Cigarette

Age at Initiation: 24 years

Duration: 2 years

Frequency: Once a day

Smokeless Type: Tobacco Chewing

Age at Initiation: 24 years

Duration: 2 years

Frequency: 5 times per day

Smokeless Type: Gutka

Age at Initiation: 24 years

Duration: 2 years

Frequency: 5 times per day

Alcohol Habit: Spirit

Age at Initiation: 24 years

Duration: 2 years

Frequency: Once a week

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

Two finger breadth - 23mm



Age/ Gender: 47 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Mawa

Age at Initiation: 27 years

Duration: 20 years

Frequency: 8 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm

Extraoral Images of OSMF



Age/ Gender: 44 Years/ Male

Tobacco History:

Form of Tobacco Consumed: Smoking

Type: Beedi

Age at Initiation: 10 years

Duration: 34 years

Frequency: 18 times per day

Alcohol Habit: Beer

Age at Initiation: 43 years

Duration: 1 years

Frequency: Once a week

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

1 ½ finger breadth - 18 mm



Age/ Gender: 42 years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco

Age at Initiation: 18 years

Duration: 24 years

Frequency: 3 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth - 10 mm

Extraoral Images of OSMF



Age/ Gender: 42 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 27 years

Duration: 15 years

Frequency: 10 times per day

Alcohol Habit: Beer

Age at Initiation: 27 years

Duration: 15 years

Frequency: Once a day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm



Age/ Gender: 43 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 20 years

Duration: 23 years

Frequency: 5 times per day

Alcohol Habit: Spirit

Age at Initiation: 38 years

Duration: 5 years

Frequency: Once in a day

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

Two finger breadth-22 mm

Extraoral Images of OSMF



Age/ Gender: 35 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Smokeless Type: Tobacco chewing

Age at Initiation: 17 years

Duration: 17 years

Frequency: Twice a day

Smokeless Type: Gutka

Age at Initiation: 17 years

Duration: 28 years

Frequency: 25 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm



Age/ Gender: 26 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Smokeless Type: Tobacco Chewing

Age at Initiation: 10 years

Duration: 16 years

Frequency: Twice a day

Smokeless Type: Gutka

Age at Initiation: 10 years

Duration: 16 years

Frequency: 20 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm

Extraoral Images of OSMF



Age/ Gender: 31 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 15 years

Duration: 16 years

Frequency: 10 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

Less than one finger breadth < 15mm



Age/ Gender: 25 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 16 years

Duration: 9 years

Frequency: 10 times per day

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

Two finger breadth - 22 mm

Extraoral Images of OSMF



Age/ Gender: 24 Years/ Female

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 23 years

Duration: 1 year

Frequency: Twice a day

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

1 ½ finger breadth - 18 mm



Age/ Gender: 42 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Smokeless Type: Tobacco

Age at Initiation: 26 years

Duration: 16 years

Frequency: Twice a day

Smokeless Type: Mawa

Age at Initiation: 26 years

Duration: 16 years

Frequency: 4 times per day

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

Two finger breadth -23 mm

Extraoral Images of OSMF



Age/ Gender: 31 Years/ Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Smokeless Type: Tobacco Chewing

Age at Initiation: 16 years

Duration: 15 years

Frequency: 3 times per day

Smokeless Type: Betel Leaf/

Paan with tobacco

Age at Initiation: 16 years

Duration: 15 years

Frequency: 4 times per day

Smokeless Type: Gutka

Age at Initiation: 16 years

Duration: 15 years

Frequency: 4 times per day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

One finger breadth < 15mm



Age/ Gender: 41 Years/ Male

Tobacco History:

Forms of Tobacco Used: Both smoking and smokeless

Smoking Type: Beedi

Age at Initiation: 20 years

Duration: 15 years

Frequency: 20 times per day

Smokeless Type: Betel leaf/

Paan with tobacco

Age at Initiation: 25 years

Duration: 16 years

Frequency: Twice a day

Alcohol Habit: Spirit

Age at Initiation: 20 years

Duration: 20 years

Frequency: Once a day

Clinical Finding:

OSMF (Grade 4)

Mouth Opening:

Less than one finger breadth < 15mm

Extraoral Images of OSMF



Age/ Gender: 65 Years/ Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 20 years

Duration: 45 years

Frequency: 4 times per day

Alcohol Habit: Wine

Age at Initiation: 25 years

Duration: 40 years

Frequency: Once a day

Clinical Finding:

OSMF (Grade 3)

Mouth Opening:

Two finger breadth- 23 mm

Oral Carcinoma

The cancers which arise from any site within anatomically defined Oral Cavity are called as Oral Cavity Cancers. These sites include buccal mucosa, retromolar trigone, tongue, floor of the mouth and hard palate.[42] Oral cavity cancers represents 15.6% of all cancers among males and 5% of all cancers among females. In the terms of mortality, oral cavity cancer accounts for 12.7% of cancer-related deaths among males and 4.5% among females.[10]

Risk Factors:

Oral cavity cancers risk factors are given in chapter 1. (Introduction chapter)

Oral cavity cancers and clinical features: [40]

1. Cancers of Lip:

Carcinoma of the lip is commonly known as Epidermoid carcinoma. There is male predilection with age group of 55-75 years being most prone for acquiring the disease. Risk factors include pipe smoking, tobacco use in any form, prolonged sun exposure, history of trauma and chronic trauma from jagged teeth. The most commonly affected site is lower lip. The tumor often starts at the vermilion border, presenting as thickening or induration, progressing to ulceration or irregular surfaces, and eventually forming a crater-like defect. Exophytic growth may lead to large fungating masses.

2. Carcinoma of Tongue:

Carcinoma of the tongue predominantly affects individuals aged 32 to 87 years. Average age at occurrence is around 53 years and there is male predilection. Most commonly involved sites are the lateral border or ventral surface of the tongue, with rare occurrences on the dorsum. Presence of tumors in posterior 1/3rd of the tongue poses higher malignant potential, early metastasis and a poorer prognosis.

This carcinoma initially presents as painless mass or ulcer, which may become painful upon secondary infection. The lesion progresses from superficially indurated ulcer with raised margins to fungating, exophytic mass or deep penetrations, leading to fixation and induration without surface changes.

Base of the tongue lesions manifest symptoms like painful throat and difficulty in swallowing. Risk factors include poor maintenance of oral hygiene, alcohol use, tobacco use, chronic trauma, chronic irritation from carious or broken teeth, ill-fitting dentures and pre-existing leukoplakia.

3. Carcinoma of Floor of the Mouth:

Carcinoma in floor of the mouth typically arises in individuals aged 57 to 67 years, with a strong male predominance (81-91%). Risk factors include pipe or cigar smoking, tobacco and alcohol use, poor oral hygiene and dental irritation. Pre-existing leukoplakia also contributes to its development. The clinical features of this carcinoma are indurated ulcers of varying sizes, often on one side of the midline. These lesions may be painful or painless and can lead to restricted tongue movements and slurred speech if close to the tongue.

4. Carcinoma of Buccal Mucosa:

A special form of Carcinoma of the buccal mucosa is Verrucous Carcinoma. It most commonly occurs in elderly patients and typically presents with lesions appearing below or opposite to the occlusal plane. Risk factors include tobacco and betel nut chewing. Pre-existing leukoplakia of long duration is also a risk factor. These may be painful ulcerative lesions with induration, penetrating in deeper tissues or as exophytic or verrucous growths.

5. Carcinoma of Gingiva:

Carcinoma of the gingiva, typically affects individuals over 40 years and has male predilection. It shows higher incidence in the mandibular gingiva, especially in edentulous areas. Clinically, these lesions present as areas of ulceration, erosive patches or show exophytic, granular, or verrucous growth, which can be either painful or painless. Chronic irritation and inflammation due to calculus formation, microbial accumulation and occasionally tooth extraction are common predisposing factors for its initiation.

6. Carcinoma of Palate:

The other name for the carcinoma is Epidermoid Carcinoma. These lesions usually cross the palatal midline and spread laterally to affect the lingual gingiva, tonsillar pillar and even the uvula. These lesions clinically present as poorly defined, ulcerated and painful masses, indicating advanced disease progression. [43]

Treatment

- ◆ Treatment for oral cavity cancer is based largely on stage of the disease.
- ◆ Surgery is the mainstay for treatment of oral cancers. It may include: surgery to remove the tumor, surgery to remove the cancer that has spread to neck and surgery to reconstruct the mouth.
- ◆ Radiation therapy uses high-energy beams like X-ray or protons to kill the cancer cells. It might be used alone in case of an early-stage cancer and in combination with chemotherapy or surgery in advanced cases. It can help in relieving signs and symptoms like pain due to cancer.
- ◆ Chemotherapy uses drugs to kill cancer cells. Drugs are given alone or in combination with other drugs or other modalities of treatment like surgery or radiation therapy.
- ◆ Chemotherapy increases the effectiveness of radiation therapy and hence they are often combined.
- ◆ Other therapeutic types are: Targeted biological therapy, Oncolytic virus therapy, Gene therapy, light therapy or photodynamic therapy, Nanothernostics.[44, 45]

Images of Suspicious Ulcers and growths



Age/Gender: 39Years/Male

Tobacco History:

Forms of Tobacco Used: Both smoking and smokeless form

- Smoking Type: Cigarette
 - Age at Initiation: 36 years
 - Duration of use: 3 years
 - Frequency of use: Twice a day
- Smokeless: Gutka
- Age at Initiation: 36 years
- Duration: 3 years
- Frequency: 15 times per day

Clinical Finding:

Suspicious Ulcer

Site: Left Buccal Mucosa



Age/Gender: 54Years/Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 21 years

Duration of use: 33 years

Frequency of use: 10 times per day

Clinical Finding:

Suspicious Ulcero Proliferative Growth

Site: Extending from Left Buccal
Commissures to Left Buccal Mucosa

Images of Suspicious Ulcers and growths



Age/Gender: 34Years/Male

Tobacco History:

Forms of Tobacco Used: Both Smoking and Smokeless form

Smoking Type: Cigarette

Age at Initiation: 30 years

Duration of use: 4 years

Frequency of use: 15 times per day

Smokeless Type: Gutka

Age at Initiation: 20 years

Duration: 14 years

Frequency: 5 times per day

Alcohol Habit: Spirit

Age at Initiation: 20 years

Duration: 14 years

Frequency: 4 times per week

Clinical Finding:

Suspicious Ulcer

Site: Right Buccal Mucosa



Age/ Gender: 56 Years/Male

Tobacco History:

Forms of Tobacco Used: Both Smoking and Smokeless form

Smoking Type: Beedi

Age at Initiation: 20 years

Duration: 36 years

Frequency: Twice a day

Smokeless Type: Tobacco Chewing

Age at Initiation: 15 years

Duration: 41 years

Frequency: 4 times per day

Smokeless Type: Mawa

Age at Initiation: 15 years

Duration: 41 years

Frequency: 6 times / day

Alcohol Habit: Beer

Age at Initiation: 20 years

Duration: 36 years

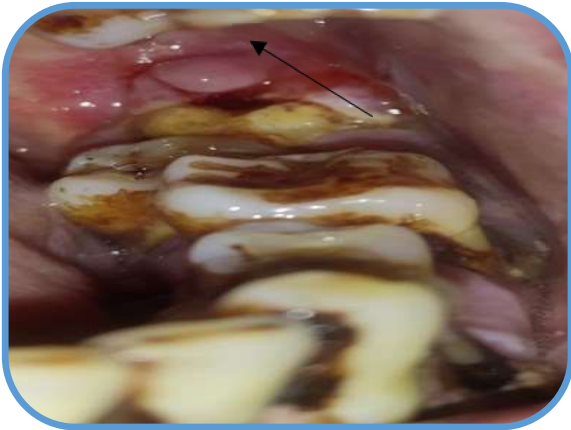
Frequency: Twice a week

Clinical Finding:

Suspicious Ulceroproliferative growth

Site: Extending from Right Buccal Mucosa to Right Retromolar Trigone

Images of Suspicious Ulcers and growths



Age/ Gender: 40 Years/Male

Tobacco History:

Forms of Tobacco Used: Smokeless

Smokeless Type: Tobacco Chewing

Age at Initiation: 36 years

Duration: 4 years

Frequency: 4 times per day

Smokeless Type: Gutka

Age at Initiation: 36 years

Duration: 4 years

Frequency: 7 times per day

Clinical Finding:

Suspicious proliferative growth

Site: Lower Left Alveolar ridge

(Behind the third molar)



Age/ Gender – 30 Yrs./M

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 15 years

Duration: 15 years

Frequency: 5 times per day

Clinical Finding:

Suspicious growth

Site: Left Buccal Mucosa

Restricted Mouth opening +

Images of Suspicious Ulcers and growths



Age/Gender: 65 Years/Male

Tobacco History:

Form of Tobacco Used: Smokeless Form

Type: Tobacco Chewing

Age at Initiation: 20 years

Duration: 45 years

Frequency: 4 times per day

Alcohol Habit: Wine

Age at Initiation: 25 years

Duration: 40 years

Frequency: Once a day

Clinical Finding:

Suspicious Ulceroproliferative Growth

Site: Right Lower Alveolar ridge and
Gingivobuccal Sulcus



Age/ Gender: 51 Years/Female

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 20 years

Duration: 31 years

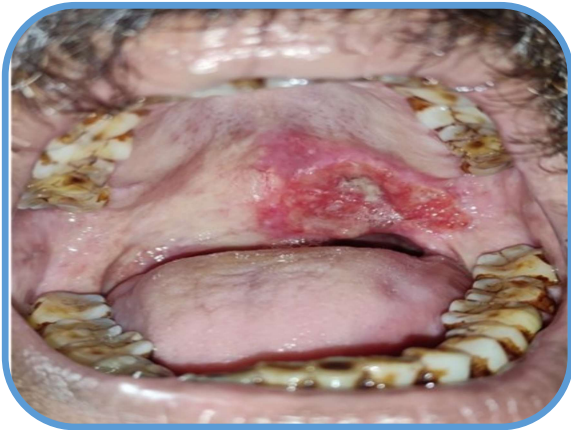
Frequency: 10 times per day

Clinical Finding:

Suspicious growth

Site: Right Retromolar Trigone

Images of Suspicious Ulcers and growths



Age/ Gender: 50 Years/ Male

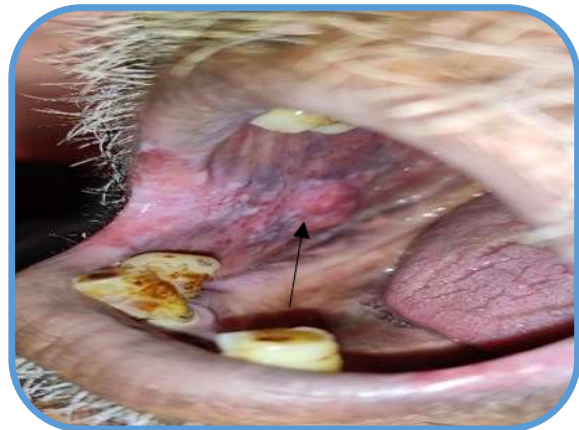
Tobacco History:

Form of Tobacco Used: Both Smoking and Smokeless Form

- Smoking Type: Cigarette
- Age at Initiation: 20 years
- Duration: 30 years
- Frequency: Once a day
- Smokeless Type: Tobacco
- Age at Initiation: 35 years
- Duration: 15 years
- Frequency: 10 times per day

Clinical Finding: Suspicious ulcero proliferative growth

Site: Extending from soft palate to uvula



Age/ Gender: 62 Years/Male

Tobacco History:

Form of Tobacco Used: Smoking

Type: Cigarette

Age at Initiation: 20 years

Duration: 42 years

Frequency: 6 times per day

Clinical Finding: Suspicious growth

Site: Right Buccal Mucosa

Images of Suspicious Ulcers and growths



Age/ Gender: 75 Years/ Female

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 21 years

Duration: 54 years

Frequency: 8 times per day

Clinical Finding:

Suspicious proliferative growth

Site: Mandibular Alveolar Ridge



Age/ Gender: 40 Years/Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Gutka

Age at Initiation: 35 years

Duration: 5 years

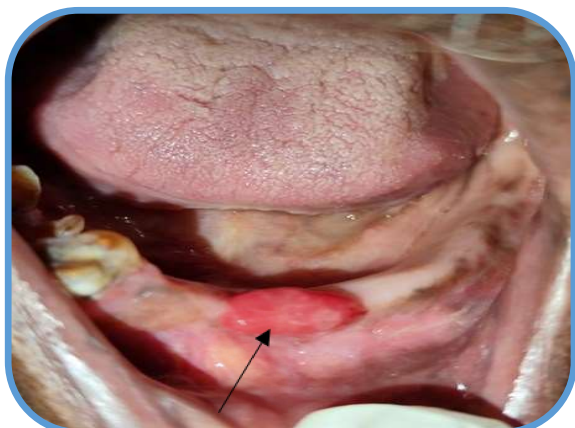
Frequency: 6 times per day

Clinical Finding:

Suspicious Proliferative Growth

Site: Right Buccal Mucosa

Images of Suspicious Ulcers and growths



Age/ Gender: 73 Years/Male

Tobacco History:

Form of Tobacco used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 15 years

Duration: 58 years

Frequency: 5 times per day

Alcohol Habit: Beer

Age at Initiation: 20 years

Duration: 53 years

Frequency: Twice a week

Clinical Finding:

Suspicious Proliferative Growth

Site: Anterior Mandibular Alveolar Ridge



Age/Gender: 43Years/Male

Tobacco History:

Form of Tobacco Used: Smokeless

Type: Tobacco Chewing

Age at Initiation: 18 years

Duration: 25 years

Frequency: 10 times per day

Clinical Finding:

Suspicious Ulcer

Site: Right Lateral Border of Tongue

Images of Suspicious Ulcers and growths



Age/Gender: 52 Years/Male

Tobacco History:

Forms of Tobacco Used: Smoking Form

Smoking Type: Cigarette

Age at Initiation: 19 years

Duration: 33 years

Frequency: 10 times per day

Smoking Type: Beedi

Age at Initiation: 19 years

Duration: 33 years

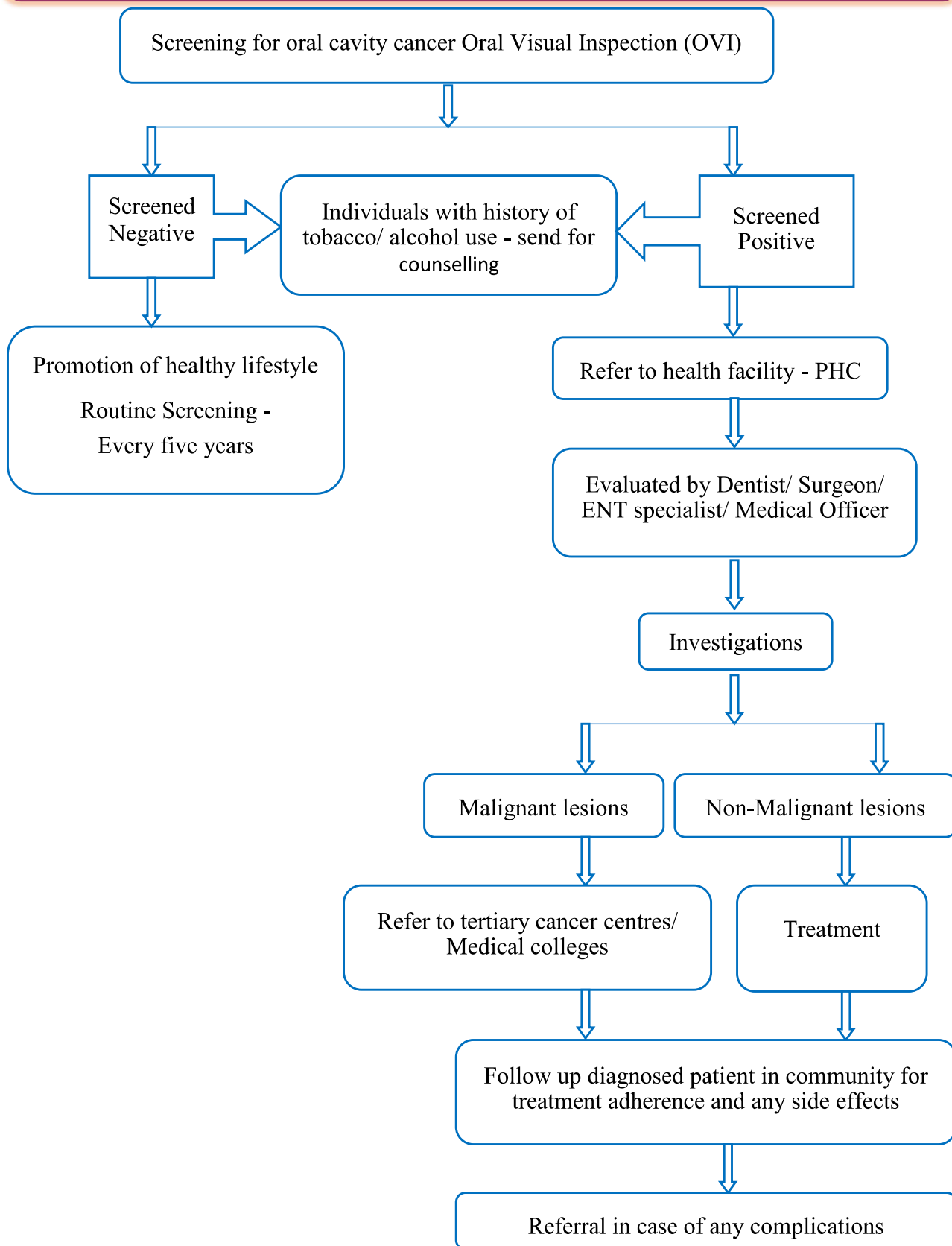
Frequency: 24 times per day

Clinical Finding:

Suspicious Ulcer

Site: Floor of the Mouth (Left Side) and Left
Ventral Surface of Tongue

Algorithm for Management



Reference- Ministry of Health and Family Welfare (India). Module for Multi-Purpose Workers - Prevention, Screening and Control of Common NCDs. 2018.




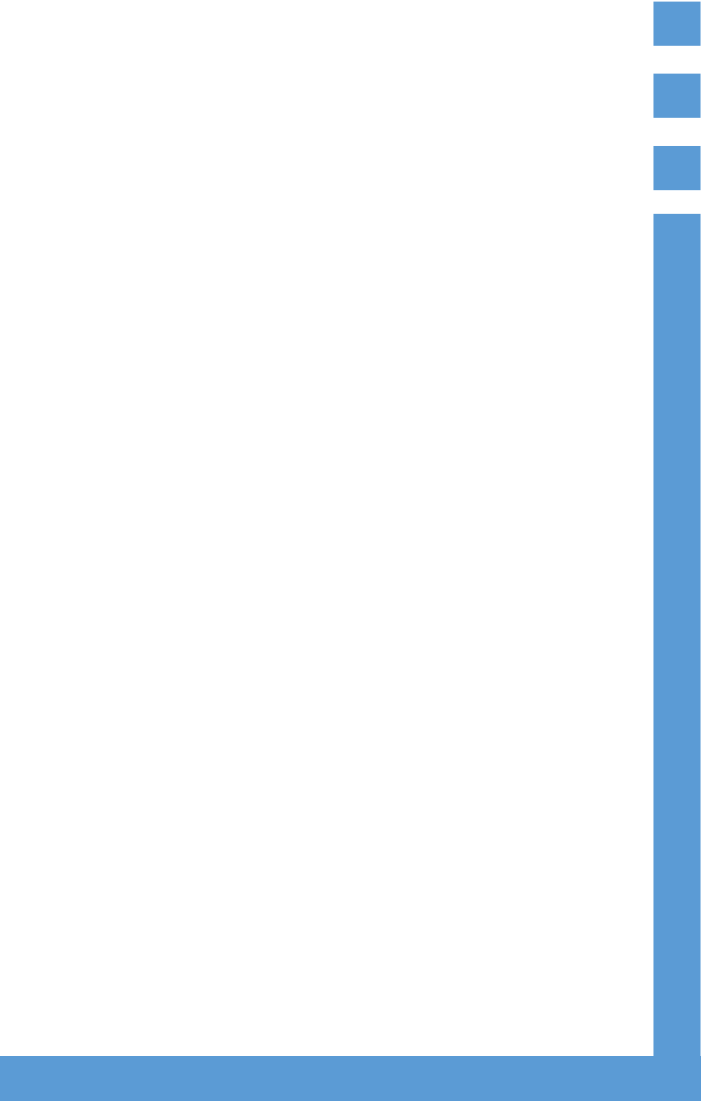
References

1. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, Jemal A. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*. 2024 May;74(3):229-63. [Last accessed on – 13.01.2025]
2. Kadam YR , Quraishi SR, Dhoble RV, Sawant MR, Gore AD. Barriers for Early Detection of Cancer Amongst Urban Indian Women: A Cross Sectional Study. *Iran J Cancer Prev*9 (1), e3900 (2016). [Last accessed on – 13.01.2025]
3. Tripathi N , KadamYR, DhobaleRV, GoreAD. Barriers for early detection of cancer amongst Indian rural women. *South Asian J Cancer*3(2), 122–127 (2014). [Last accessed on – 13.01.2025]
4. Kulothungan V , SathishkumarK, LeburuSet al. Burden of cancers in India - estimates of cancer crude incidence, YLLs, YLDs and DALYs for 2021 and 2025 based on National Cancer Registry Program. *BMC Cancer*22(1), 527 (2022). [Last accessed on – 13.01.2025]
5. Dhankhar A , KumariR, BahurupiYA. Out-of-Pocket, Catastrophic Health Expenditure and Distress Financing on Non-Communicable Diseases in India: A Systematic Review with Meta-Analysis. *Asian Pac J Cancer Prev*22(3), 671–680 (2021). [Last accessed on 13.01.2025]
6. Chintapally N, Nuwayhid M, Arroju V, Muddu VK, Gao P, Reddy BY, Sunkavalli C. State of cancer care in India and opportunities for innovation. *Future Oncology*. 2023 Dec 1;19 (39):2593-606. [Last accessed on – 13.01.2025]
7. World Cancer Day, What is Cancer? (<https://www.worldcancerday.org/about/why-cancer>) [Last accessed on 23/12/2025]
8. GLOBOCAN 2022 lip and oral cavity fact sheets (<https://gco.iarc.who.int/media/globocan/factsheets/cancers/1-lip-oral-cavity-fact-sheet.pdf>) [Last accessed on – 13.01.2025]
9. Varshitha A. Prevalence of oral cancer in India. *Journal of Pharmaceutical Sciences and Research*. 2015;7(10):845. [Last accessed on – 13.01.2025]
10. GLOBOCAN 2022- India fact sheets (<https://gco.iarc.who.int/media/globocan/factsheets/populations/356-india-fact-sheet.pdf>) [Last accessed on – 13.01.2025]

11. Radoi L, Luce D. A review of risk factors for oral cavity cancer: the importance of a standardized case definition. *Community dentistry and oral epidemiology*. 2013 Apr;41 (2):97-109. [Last accessed on – 13.01.2025]
12. Borse V, Konwar AN, Buragohain P. Oral cancer diagnosis and perspectives in India. *Sensors International*. 2020; 1:100046. [Last accessed on – 13.01.2025]
13. Global Adult Tobacco Survey 2 India fact sheets (<https://ntcp.mohfw.gov.in/assets/document/surveys-reports-publications/Global-Adult-Tobacco-Survey-Second-Round-India-2016-2017.pdf>) [Last accessed on – 13.01.2025]
14. American Cancer Society <https://www.cancer.org/cancer/understanding-cancer/what-is-cancer.html> [Last accessed on – 09.05.2025]
15. <https://www.cancer.gov/publications/dictionaries/cancer-terms/def/cancer> [Last accessed on - 13.01.2025]
16. National Cancer Institute Directory (<https://www.cancer.gov/publications/dictionaries/cancer-terms/def/precancerous>) [Last accessed on – 09.05.2025]
17. Sarode SC, Sarode GS, Tupkari JV. Oral potentially malignant disorders: A proposal for terminology and definition with review of literature. *Journal of oral and maxillofacial pathology: JOMFP*. 2014 Sep;18(Suppl 1):S77. [Last accessed on – 13.01.2025]
18. Pawar U, de Souza C. Precancerous lesions of oral cavity. *An International Journal of Otorhinolaryngology Clinics*. 2010 Aug 1;2(1):7-14. [Last accessed on – 13.01.2025]
19. Warnakulasuriya S, Kujan O, Aguirre-Urizar JM, Bagan JV, González-Moles MÁ, Kerr AR, Lodi G, Mello FW, Monteiro L, Ogden GR, Sloan P. Oral potentially malignant disorders: A consensus report from an international seminar on nomenclature and classification, convened by the WHO Collaborating Centre for Oral Cancer. *Oral diseases*. 2021 Nov;27(8):1862-80. [Last accessed on – 13.01.2025]
20. Greenberg MS, Glick M, A Jonathan. Red and White Lesions. *Burket's, Oral Medicine*, 11th edition, Chapter 4, Pg No - 85. [Last accessed on – 13.01.2025]
21. https://screening.iarc.fr/atlasoral_list.php?lang=1&cat=Az [Last accessed on – 13.01.2025]
22. Neville BW, Damm DD, Allen CM, Bouquot JE. *Oral and Maxillofacial Pathology*, 3rd Edition, Chapter 10, Pg No- 388 [Last accessed on – 13.01.2025]
23. Shafer W, Hine M, Levy B. *Shafer's textbook of Oral Pathology*. Rajendran R,

- Sivapathasundharam B, editors Elsevier A division of Reed Elsevier India Private Limited, 7th edition, Chapter 2, Benign and Malignant Tumors of the Oral Cavity, Pg No: 367 - 447. [Last accessed on – 13.01.2025]
24. Neville BW, Damm DD, Allen CM, Bouquot JE. Oral and Maxillofacial Pathology, 3rd Edition, Chapter 1, Pg No- 14 [Last accessed on – 13.01.2025]
 25. Deliverska EG, Petkova M. MANAGEMENT OF ORAL LEUKOPLAKIA-ANALYSIS OF THE LITERATURE. Journal of IMAB–Annual Proceeding Scientific Papers. 2017 Mar 26;23(1):1495-504. [Last accessed on – 13.01.2025]
 26. Birur PN, Patrick S, Warnakulasuriya S, GurushanthK,Raghavan SA, Rath GK, et al. Consensus guidelines on management of oralpotentially malignant disorders. Indian J Cancer 2022;59:442-53. [Last accessed on – 13.01.2025]
 27. Patait M, Nikate U, Saraf K, Singh P, Jadhav V. Oral erythroplakia–A case report. Int. J. Appl. Dental Sci. 2016;2(4):79-82. [Last accessed on – 13.01.2025]
 28. IARC digital manual for the early diagnosis of oral neoplasia https://screening.iarc.fr/atlasoral_list.php?cat=A3&lang=1 [Last accessed on – 13.01.2025]
 29. Shafer W, Hine M, Levy B. Shafer's textbook of Oral Pathology. Rajendran R, Sivapathasundharam B, editors Elsevier A division of Reed Elsevier India Private Limited, 9th edition, Chapter 5, Epithelial neoplasms of the Oral Cavity, Pg No: 790. [Last accessed on – 13.01.2025]
 30. Holmstrup P. Oral erythroplakia—What is it?. Oral diseases. 2018 Mar;24(1-2):138-43. [Last accessed on – 13.01.2025]
 31. Jontell M, Holmstrup P. Red and white lesions of the oral mucosa. In Greenberg M, Glick M, Ship J, editors, Burket's Oral Medicine. 11th edition ed. BC Decker Inc, Hamilton. 2008. Pg No: 87-88 [Last accessed on – 13.01.2025]
 32. Lorenzo-Pouso AI, Lafuente-Ibáñez de Mendoza I, Pérez-Sayáns M, Pérez-Jardón A, Chamorro-Petronacci CM, Blanco-Carrión A, Aguirre-Urizar JM. Critical update, systematic review, and meta-analysis of oral erythroplakia as an oral potentially malignant disorder. Journal of Oral Pathology & Medicine. 2022 Aug;51(7):585-93. [Last accessed on – 13.01.2025]
 33. <https://my.clevelandclinic.org/health/diseases/24595-erythroplakia> [Last accessed on – 13.01.2025]

34. Passi D, Bhanot P, Kacker D, Chahal D, Atri M, Panwar Y. Oral submucous fibrosis: Newer proposed classification with critical updates in pathogenesis and management strategies. *National journal of maxillofacial surgery*. 2017 Jul 1;8(2):89-94. [Last accessed on – 13.01.2025]
35. Rajendran R. Oral submucous fibrosis: etiology, pathogenesis, and future research. *Bulletin of the World health organization*. 1994;72(6):985. [Last accessed on – 13.01.2025]
36. Rao NR, Villa A, More CB, Jayasinghe RD, Kerr AR, Johnson NW. Oral submucous fibrosis: a contemporary narrative review with a proposed inter-professional approach for an early diagnosis and clinical management. *Journal of Otolaryngology-Head & Neck Surgery*. 2020 Jan;49(1):3. [Last accessed on – 13.01.2025]
37. Shih YH, Wang TH, Shieh TM, Tseng YH. Oral submucous fibrosis: a review on etiopathogenesis, diagnosis, and therapy. *International journal of molecular sciences*. 2019 Jun 16;20(12):2940. [Last accessed on – 13.01.2025]
38. Wollina U, Verma SB, Ali FM, Patil K. Oral submucous fibrosis: an update. *Clinical, cosmetic and investigational dermatology*. 2015 Apr 13:193-204. [Last accessed on – 13.01.2025]
39. Tilakaratne WM, Klinikowski MF, Saku T, Peters TJ, Warnakulasuriya S. Oral submucous fibrosis: review on aetiology and pathogenesis. *Oral oncology*. 2006 Jul 1;42(6):561-8. [Last accessed on – 13.01.2025]
40. Rajendran R. Oral submucous fibrosis: etiology, pathogenesis, and future research. *Bulletin of the World health organization*. 1994;72(6):985. [Last accessed on – 13.01.2025]
41. Gondivkar SM, Gadbail AR, Sarode SC, Gondivkar RS, Patil S, Gaikwad RN, Yuwanati M. Clinical efficacy of mouth exercising devices in oral submucous fibrosis: A systematic review. *J Oral BiolCraniofac Res*. 2020 Oct-Dec;10(4):315-320. doi: 10.1016/j.jobcr.2020.06.010. Epub 2020 Jul 3. PMID: 32714782; PMCID: PMC7371900. [Last accessed on – 13.01.2025]
42. Alzahrani R, Obaid A, Al-Hakami H, Alshehri A, Al-Assaf H, Adas R, Alduhaibi E, Alsafadi N, Alghamdi S, Alghamdi M. Locally advanced oral cavity cancers: what is the optimal care?. *Cancer Control*. 2020 Apr 22;27(1):1073274820920727. [Last accessed on – 13.01.2025]

- 
- 
- 
- 
43. Shafer W, Hine M, Levy B. Shafer's textbook of Oral Pathology. Rajendran R, Sivapathasundharam B, editors Elsevier A division of Reed Elsevier India Private Limited, 9th edition, Chapter 5, Epithelial neoplasms of the Oral Cavity, Pg No: 833-847. [Last accessed on – 13.01.2025]
 44. Nandini DB, Rao RS, Hosmani J, Khan S, Patil S, Awan KH. Novel therapies in the management of oral cancer: An update. Disease-a-Month. 2020 Dec 1;66(12):101036. [Last accessed on – 13.01.2025]
 45. <https://www.mayoclinic.org/diseases-conditions/mouth-cancer/diagnosis-treatment/drc-20351002> [Last accessed on – 13.01.2025]

Abbreviations

NCD - Non-Communicable Diseases

WHO - World Health Organization

BSE - Breast Self Examination

HBNI - Homi Bhabha National Institute

TMH - Tata Memorial Hospital

TMC- Tata Memorial Centre

NPCDCS - The National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke

CHC- Community Health Centers

NP-NCD- National Programme for Prevention of Non- Communicable Diseases

ANM- Auxiliary Nurse Midwifery

PHW- Primary Health Workers

CHV- Community Health Volunteers

ASHA- Accredited Social Health Activist

NGO- Non-Governmental Organizations

HPV- Human Papilloma Virus

GATS- Global Adult Tobacco Survey

LMIC- Low and Middle Income Countries

BMC- Brihan Mumbai Municipal Corporation

OVI- Oral Visual Inspection

NCI- National Cancer Institute

HIV - Human Immunodeficiency Virus

OPMD- Oral Premalignant Disorders

OSMF- Oral Submucous Fibrosis



Tata Memorial Centre
Department of Preventive Oncology,
Mumbai, India, Pincode 400012,
022-24177000, Ext. 4635

