

**TOBACCO-RELATED ORAL MUCOSAL LESIONS
AND CONDITIONS IN INDIA**



Public Health Service
National Institutes of Health
United States of America



TOBACCO-RELATED ORAL MUCOSAL LESIONS AND CONDITIONS IN INDIA

A GUIDE FOR DENTAL STUDENTS, DENTISTS, AND PHYSICIANS

Fali S. Mehta
James E. Hammer, III

Published by
BASIC DENTAL RESEARCH UNIT
TATA INSTITUTE OF FUNDAMENTAL RESEARCH
BOMBAY

Funded by the Indo-US Fund Agreement No: N-406-645 U.S. Department of Health and Human Service, Public Health Services.

The Second printing is partially funded by the
WHO Collaborating Centre for Prevention of Oral Cancer at the Tata Institute of
Fundamental Research.



Exclusively distributed by
JAYPEE BROTHERS MEDICAL PUBLISHERS (P) LTD.
EMCA HOUSE, 23/23B, ANSARI ROAD, DARYAGANJ,
NEW DELHI 110 002

Published by
BASIC DENTAL RESEARCH UNIT
TATA INSTITUTE OF FUNDAMENTAL RESEARCH
BOMBAY 400 005

Exclusively distributed by
JAYPEE BROTHERS MEDICAL PUBLISHERS (P) LTD.
EMCA House, 23/23B, Ansari Road, Daryaganj,
New Delhi 110 002

Branches at

- 1A, Indian Mirror Street Wellington Square, Calcutta 700 013
- 202, Batavia Chambers, 8, Kumara Krupa Road, Kumara Park East , Bangalore 560 001
- Lady Hardinge Medical College, New Delhi 110 001

© 1993, Tata Institute of Fundamental Research

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the written permission of the publishers.

ISBN 81-7179-347-9

Price Rs.60/-

Published by the Tata Institute of Fundamental Research, Bombay
Printed at Tata Press, Bombay 400 025

Exclusively distributed by
Jaypee Brothers Medical Publishers (P) Ltd. EMCA House, 23/23B, Ansari Road,
Daryaganj, New Delhi 1100 002

ABOUT THE AUTHORS

Dr. Fali S. Mehta is the Head of the Basic Dental Research Unit and the WHO Collaborating Centre for Oral Cancer Prevention at the Tata Institute of Fundamental Research, Bombay. He is the Principal Investigator for the 27-year Indo-US collaborative research project on oral Cancer Institute, National Institute of Health, USA. He received an LDSc from Bombay, a DMD, and a Postgraduate Diploma in Periodontology from the Tufts University, USA. He was a Professor at the Nair Hospital Dental College, Bombay, and Head of Research at the College. He is the Honorary Dental Surgeon, Police Hospital police. He was the Chief of Dental Services at the Bhabha Atomic Research Centre, Bombay; Chief of Dental Services, Department of Atomic Energy, Government of India, and was the President of the Dental Council of India. Dr. Mehta was the recipient of Shri Om Prakash Bhasin Award for Science & Technology for the year 1992 in the field of Health & Medical Sciences, and was presented a Certificate of Merit by the American Cancer Society in 1993.

Dr. James E. Hamner, III, is the NIH Project Officer for the Indo-US collaborative 27- year research project on oral cancer and precancer in India and a Visiting Professor at the Tata Institute of Fundamental Research, Bombay. He received a BS and DDS from the University of Tennessee, and an MS in Pathology from the Medical College of Virginia, a PhD in Pathology from Georgetown University, Washington, DC, and an MBA in Health Care Management from Loyola College, Baltimore, Maryland, USA. He is a Professor of Pathology at the College of Medicine, Director of International Programs and Associate Vice Chancellor at the University of Tennessee, Memphis, Tennessee, USA.

CONTENTS

Acknowledgments.....	x
Foreword.....	xi
Introduction.....	xiii
1. A LESION WITH SERIOUS OUTCOME	
Oral Cancer.....	1
Introduction.....	1
Clinical aspects.....	1
Oral cancer at different intraoral.....	4
Multicentric oral cancer.....	16
Lesions that can be mistaken for oral cancer.....	17
Clinical markers for prognosis of oral cancer.....	24
Prognosis of oral cancer.....	26
2. LESIONS MOST LIKELY TO UNDERGO MALIGNANT TRANSFORMATION	
2.1. Oral precancer.....	27
Introduction.....	27
Precancerous lesions.....	27
Precancerous conditions.....	27
2.2. Leukoplakia.....	28
Intorduction.....	28
Definition.....	28
Clinical types.....	29
Leukoplakia at different intraoral locations.....	30
Certain lesions that resemble leukoplakia.....	39
Natural history.....	42
Clinical aspects of malignant transformation.....	44
Conclusions.....	45

Viii Contents

2.3. Palatal changes among reverse smokers.....	47
Introduction.....	47
Classification.....	47
Clinical aspects.....	51
Natural history.....	52
Conclusions.....	53
2.4. Erythoplakia.....	54
Introduction.....	54
Clinical aspects.....	54
Malignant transformation.....	55
Conclusions.....	55
2.5. Oral submucous fibrosis.....	56
Introduction.....	56
Definition and criteria.....	56
Clinical aspects.....	57
Submucous fibrosis at different intraoral locations.....	59
Associated features.....	63
Diagnostic pitfalls.....	64
Natural history.....	65
Conclusions.....	67
2.6. Oral lichen planus.....	68
Introduction.....	68
Diagnostic criteria.....	68
Clinical aspects.....	69
Natural history.....	73
Conclusions.....	73
3. LESIONS LESS LIKELY TO BECOMES CANCERS	
Introduction.....	75
Preleukoplakia.....	75
Leukoedema.....	75
Smoker's palate.....	76
Palatal erythema.....	77

Central papillary atrophy of the tongue.....	80
Tabaccoo-lime user's lesion.....	82
<i>Pan</i> stain.....	82
<i>Pan</i> encrustation.....	82
Oral lichen planus-like lesion.....	83

4. SCOPE FOR PRIMARY PREVENTION

Introduction.....	85
Effects of primary prevention.....	85
Primary prevention in day-to-day clinical practice.....	85

APPENDICES

I.	Tobacco habits in India.....	89
	Introduction.....	89
	Harmful substances.....	89
	Reasons for tobacco use in India.....	89
	Smoking habits.....	90
	Smokeless tobacco use.....	95
II.	Examination technique of the mouth and topography of the oral mucosa.....	101
	Introduction.....	101
	Examination technique.....	101
	Topography of the oral mucosa.....	104
III.	The TNM system of tumor staging.....	107
	Introduction.....	107
	“T”, Primary tumor.....	107
	“N”, Regional lymph noder.....	107
	“M”, Distant metastasis.....	108
	RECOMMENDED READING.....	111
	INDEX.....	115

ACKNOWLEDGMENTS

The founder and first Director of the Tata Institute of Fundamental Research (TIFR), the late Dr. Homi Bhabha, had the vision and foresight to encourage the formation of the Basic Dental Research Unit at the TIFR for initiating epidemiologic research on oral cancer and precancerous lesions in India. Successive Directors of the TIFR, Professor M.G.K. Menon (1966-75), Professor B.V. Sreekantan (1975-87), and Professor V. Singh (1987-), have also been highly supportive of the research. The Chairman of the Governing Council of the TIFR, Bharat Ratna Mr. J.R.D. Tata, has always been keenly interested in the work of the Basic Dental Research Unit: this has also encouraged us enormously. The Principal Secretary to the Government of India, Department of Atomic Energy and the Chairman of the Atomic Energy Commission, Dr. H.N. Sethna (1972-83) helped the Unit during its crucial phase of development. This volume, the outcome of the research at the Basic Dental Research Unit for over a quarter century, would not have been possible without the foresight of the Dr. Homi Bhabha, the support of successive Directors of the TIFR, the interest shown by Mr. J.R.D. Tata, and the help of Dr. H.N. Sethna.

The major burden in preparing this volume has been shared by Dr. P.R. Murti, Dr. R.B. Bhonsle, and Dr. P.C. Gupta of this Unit. We are grateful to Professor J.J. Pindborg, the Co-principal Investigator of our project, and to Dr. D.K. Daftary of our Unit, for their contribution to the research and to this volume in particular. We wish to record our special appreciation to the members of our field teams, especially the examining dentists, Drs R.B. Bhonsle, P.R. Murti, V.K. Pitkar, P.N. Sinor, M.M. Vilekar, V.S. Pawar, R.R. Irani A.K. Hegde, and many others who have worked with us in the past. It was these years of painstaking and diligent fieldwork, often performed in tiresome and harsh conditions in rural areas of India, that provided the insights and the knowledge incorporated in this volume.

From 1966 onwards until the present time, the funding for this research project on oral cancer and precancer has been provided by the National Institutes of Health, Bethesda, Maryland, USA, first under US PL 480 Research Agreements and then under Indo-US Fund Research Agreements. Thus, it is the longest running Indo-US Collaborative Project in the health field. We are grateful to Dr Morris T. Jones, Fogarty International Center, National Institutes of Health, USA, Ms Linda Vogel, Office of International Health, US Public Health Services, and Mr. Saxena, Science Office, US Embassy, New Delhi, for their keen interest and timely help on numerous occasions during this period.

The smooth running of the project over the year within the TIFR was made feasible by the excellent administrative support provided by Mr. S. Bridson and Mr. N.R. Puthran.

The Printing of this volume has been funded by Indo-US Fund Research Agreement No.N-406-645.

Fali S. Mehta
James E. Hammer, III

FOREWORD

It is at once a great privilege and pleasure to write a foreword for this invaluable compilation of Dr Fali Mehta and Dr James Hamner. The authors have taken extraordinary pains and care in putting together meticulously collected data over many years. This has resulted not only in production of superb volume but has neatly reproduced the natural biologic behavior of lesion in the oral from precancer to a full blown cancer.

Much of cancer prevalent today is dependent on our life styles. Tobacco and diet account for nearly two-third of all cancers we see worldwide which are preventable. The Indian scenario – as far as tobacco is concerned – is even worse with the tobacco chewing and smoking habits responsible for many more cancers in oral cavity, the oropharynx, and the respiratory tract and upper aerodigestive cancers including the esophagus. Education – public and professional – is the first step towards effective cancer control for prevention and treatment. In this respect the book is indeed a highly educative volume and can be unhesitatingly recommended not only to dentists and medical practitioners but oncologists in the field of surgery, radiotherapy and chemotherapy. Cancer educationists and public health workers will also greatly benefit from this compilation.

In fact, I would consider this book by Drs Mehta and Hamner an important visual and educative landmark in the prevention, early diagnosis and understanding of oral cancer. I am sure that this book will rapidly find a place in most progressive libraries the world over.

A handwritten signature in dark ink, appearing to read 'P.B. Desai', is written above a horizontal line. The signature is stylized and cursive.

Dr P.B. Desai
Director
TATA MEMORIAL CENTRE
BOMBAY

INTRODUCTION

In day-to-day experience, students of dentistry and dental and medical practitioners often encounter a wide spectrum of oral mucosal lesions. They range from innocuous mucosal alteration needing simple therapeutic remedies and patients counseling to lesions of a life – threatening nature. Many of these lesions, and almost all the potentially dangerous ones, are caused by some type of tobacco use. It is estimated that about 47% of Indians aged 15 years and over use tobacco in one form or another (see Appendix I). A variety of oral mucosal changes attributable to its use are observed in up to 50% of the tobacco users. As dentists are often the first to examine the patient's mouth, they are in a key position to detect these lesions at an early stage and initiate suitable remedial measures, thereby contributing to the better prognosis and welfare of the patient. This is especially true of early detection of oral cancer. The requisites for early diagnosis are correct examination of oral lesions in all their diversity and natural history (see the text and figures).

This volume is not a travelogue of the world's oral lesions; nor does it attempt to include all lesions which occur in India. Its purpose is to acquaint its readers with the most common tobacco – related oral lesion seen in India whose detection is likely to be missed. This often culminates in oral and facial deformity, both of which are preventable. As early as 1954, Dr Fali S. Mehta initiated studies among the tribal people of Maharashtra to investigate the effects of tobacco on periodontal tissues. In 1959, he initiated a 10-year prospective study on oral precancer among 4,734 policemen in Bombay.

With a view to investigating the effects of the use of tobacco on the oral mucosa, and in particular, the study of the natural history of oral precancer and the development of preventive strategies for cancer, the basic Dental Research Unit was established by Dr Mehta at the Tata Institute of Fundamental Research in 1964. Professor J.J. Pindborg was the Co-principal Investigator, and Dr James E. Hamner, III, the NIH Project Officer for this investigation. Over 200,000 villagers in seven districts of six states of India were examined in several cross – sectional studies, and 66,000 of them were followed – up for over ten years. These studies generated valuable scientific data on the most common tobacco – related oral mucosal lesions in India which formed the basis for this publication.