

# Prevalence of Oral Mucosal Changes in Eluru, Andhra Pradesh (India) - An Institutional Study

Sudhakar S<sup>1</sup>, B Praveen Kumar <sup>2</sup>, MPV Prabhat<sup>3</sup>

## ABSTRACT

**Objective:** The objective of the study was to evaluate the prevalence of oral mucosal changes (OML) in Eluru, Andhra Pradesh and to determine possible associations of OML with respect to age, gender and habits.

**Materials and Methods:** The study sample consisted of 3035 patients collected from outpatients seeking dental treatment in department of Oral Medicine and radiology. The subjects were interviewed by trained interviewers and underwent a clinical examination of the oral mucosa performed according to WHO guidelines. A specially prepared color atlas of OML was used for lesion recognition and confirmation.

**Statistical Analysis:** The data obtained were tabulated and subjected to statistical analysis utilizing the SPSS (statistical package for the social sciences) soft ware version 10.0. Pearson chi-square test was applied to test the significance between mucosal changes with respect age, gender and habits.

**Results:** The overall classification among 3035 samples showed 1042 cases presented with one or more mucosal changes/lesions/conditions, which constituted a total of about 1489 lesions. Among 1489 lesions, 929 mucosal changes were either normal variants or developmental anomalies, 206 were traumatic lesions, 254 were tobacco induced, 22 were of infectious origin and 78 were miscellaneous conditions.

**Conclusion:** The overall mucosal changes noted in the study was 49.06% and the most prevalent lesions were linea alba, frictional keratosis and Fordyce granules. Mucosal changes were predominantly noted in males, in buccal mucosa and in the age group of 16-30 yrs.

**Keywords:** Oral mucosa, Prevalence, Oral cavity, Andhra Pradesh.

---

<sup>1</sup>Senior lecturer

Department of Oral Medicine & Radiology,  
St. Joseph Dental College & Hospital,  
Eluru (Andhra Pradesh) – 534003  
Phone : 0091-9246666765

<sup>2</sup>Senior lecturer

Department of Oral Medicine & Radiology,  
St. Joseph Dental College & Hospital,  
Eluru (Andhra Pradesh) – 534003

<sup>3</sup>Associate professor

Department of Oral Medicine & Radiology,  
St. Joseph Dental College & Hospital,  
Eluru (Andhra Pradesh) – 534003

## INTRODUCTION

As age advances oral cavity is prone for myriad of changes. They can be developmental, physiological or pathological. Given the large number of alterations, diagnosis of the wide variety of lesions that occur in the oral cavity is an essential part of dental practice to ensure appropriate treatment. An important element in establishing a diagnosis is knowledge of the lesions relative frequency, or prevalence at one point in time (“point prevalence”). Prevalence data of oral mucosal lesions (OML) are available from many countries, however the information they provide are not always extrapolable to our population since cultural, ethnic and demographic differences exist. Despite the efforts made by different groups, establishment of prevalence data related to oral mucosa is meager in the Indian literature. Considering this, the present study was done to evaluate the prevalence

of OML in Eluru, Andhra Pradesh.

## MATERIAL AND METHODS

The study subjects included 3035 patients visiting as outpatients seeking dental treatment in Department of Oral Medicine and Radiology, from 10<sup>th</sup> February 2009 to 9<sup>th</sup> April 2009. The survey protocol was reviewed and approved by the institutional ethical committee and informed consent was obtained from a parent or guardian of each participant. The study samples were divided into six age groups: 1-15 years (yrs); 16-30 yrs; 31-45 yrs; 46-60 yrs; 61-75 yrs; 75 yrs and above. Subjects with adequate mouth opening were included in the study. All the subjects were questioned for any deleterious habits such as smoking, tobacco chewing, alcohol intake, cheek chewing with their frequency and duration. The examinations of the oral cavity was performed by two independent trained examiners and confirmed by a senior

---

## Contact Author

Dr. S. Sudhakar

Email: drsudhakaroralmed@yahoo.co.in

J Oral Health Comm Dent 2011;5(1)42-46

clinician, if disparity existed. A dental chair and standard light source were used during the assessment and examination was made with a mouth mirror, explorer and gauze piece. The diagnosis was made based on the history, clinical features and chair side investigations applying WHO (World health organization) guidelines. A color atlas was utilized for clinical evaluation and in case of clinically suspicious lesion biopsies were made. The diagnosis with

its anatomical location was recorded in the proforma designed for the study.

The data obtained were tabulated and subjected to statistical analysis. The following statistical methods were adopted utilizing the SPSS (statistical package for the social sciences) soft ware version 10.0. Initially the frequency distribution of each of the variable included in the study such as age, gender, awareness, habits and

mucosal changes were determined and cross tabulation was prepared to show their relationship. Pearson chi-square test was applied to test the significance between mucosal changes with respect to age, gender and habits.

## RESULTS AND DISCUSSION

Among 3035 samples/cases included in the study 1042 (34.33%) subjects showed oral mucosal changes. Out of 1042 samples

**Table 1: Demographic data**

Lesions	Number	Percentage	Point prevalence ranking	Common Age group Affected	Gender Commonly affected	Site Commonly affected
<b>Normal variants and developmental anomalies</b>						
Linea alba	554	18.25	1	16-30	Male	Buccal Mucosa
Fordyce granules	148	4.88	3	16-30/31-45	Male	Buccal Mucosa
Lingual varices	89	2.93	5	61-75	Male	Tongue
Leukoedema	79	2.60	6	46-60	Male	Buccal Mucosa
Fissured tongue	28	0.92	10	46-60	Female	Tongue
Physiological pigmentation	18	0.59	13	16-30	Female	Buccal Mucosa
Geographic tongue	8	0.26	20	16-30	Female	Tongue
Ankyloglossia of the mouth	4	0.13	25	16-30	Female	Tongue & Floor
Median rhomboid glossitis	1	0.03	33	46-60	Male	Tongue
<b>Traumatic lesions</b>						
Frictional keratosis	152	5	2	16-30/46-60	Male	Buccal Mucosa
Traumatic ulcer	30	0.98	9	16-30	Female	Buccal Mucosa
Irritational fibroma	17	0.56	14	46-60	Female	Buccal Mucosa
Morsciatio	3	0.09	27	16-30	Male	Buccal Mucosa
Chemical burn	2	0.07	28	46-60	Male	Buccal Mucosa
Thermal burn	1	0.03	33	46-60	Female	Palate
Epulis fissuratum	1	0.03	33	31-45	Male	Alveolar Ridge
<b>Tobacco-induced lesions</b>						
Smoker's melanosis	106	3.49	4	46-60	Male	Buccal Mucosa
Leukoplakia	62	2.04	7	46-60	Male	Buccal Mucosa
Smoker's palate	36	1.18	8	46-60	Male	Palate
Osmf	21	0.7	12	16-30	Male	Buccal Mucosa
Smoker's keraosis	15	0.49	16	46-60	Male	Palate
Tobacco pouch keratosis	5	0.16	23	16-30	Male	Buccal Mucosa
Malignancy mouth	5	0.16	23	>75	Male	Floor of the
Chewer's mucosa	4	0.13	25	16-30	Male	Buccal Mucosa
<b>Infections</b>						
Angular cheilitis	9	0.3	19	31-45	Female	Angle of mouth
Denture stomatitis	7	0.23	21	46-60	Female	Palate
Herpes labialis	6	0.2	22	16-30	Female	Labial Mucosa
<b>Miscellaneous conditions</b>						
Lichenoid reaction	24	0.79	11	16-30	Male	Buccal Mucosa
Apthous ulcer	17	0.56	14	16-30	Male	Buccal Mucosa
Lichen planus	14	0.46	18	46-60	Female	Buccal Mucosa
Anaemic stomatitis	15	0.42	16	31-45	Female	Buccal Mucosa
Allergic stomatitis	2	0.6	28	46-60	Female	Buccal Mucosa
Hemangioma	2	0.6	28	31-45	Male	Buccal Mucosa
Nevus	2	0.6	28	16-30	Female	Labial Mucosa
Mucocele	2	0.6	28	16-30	Female	Labial Mucosa

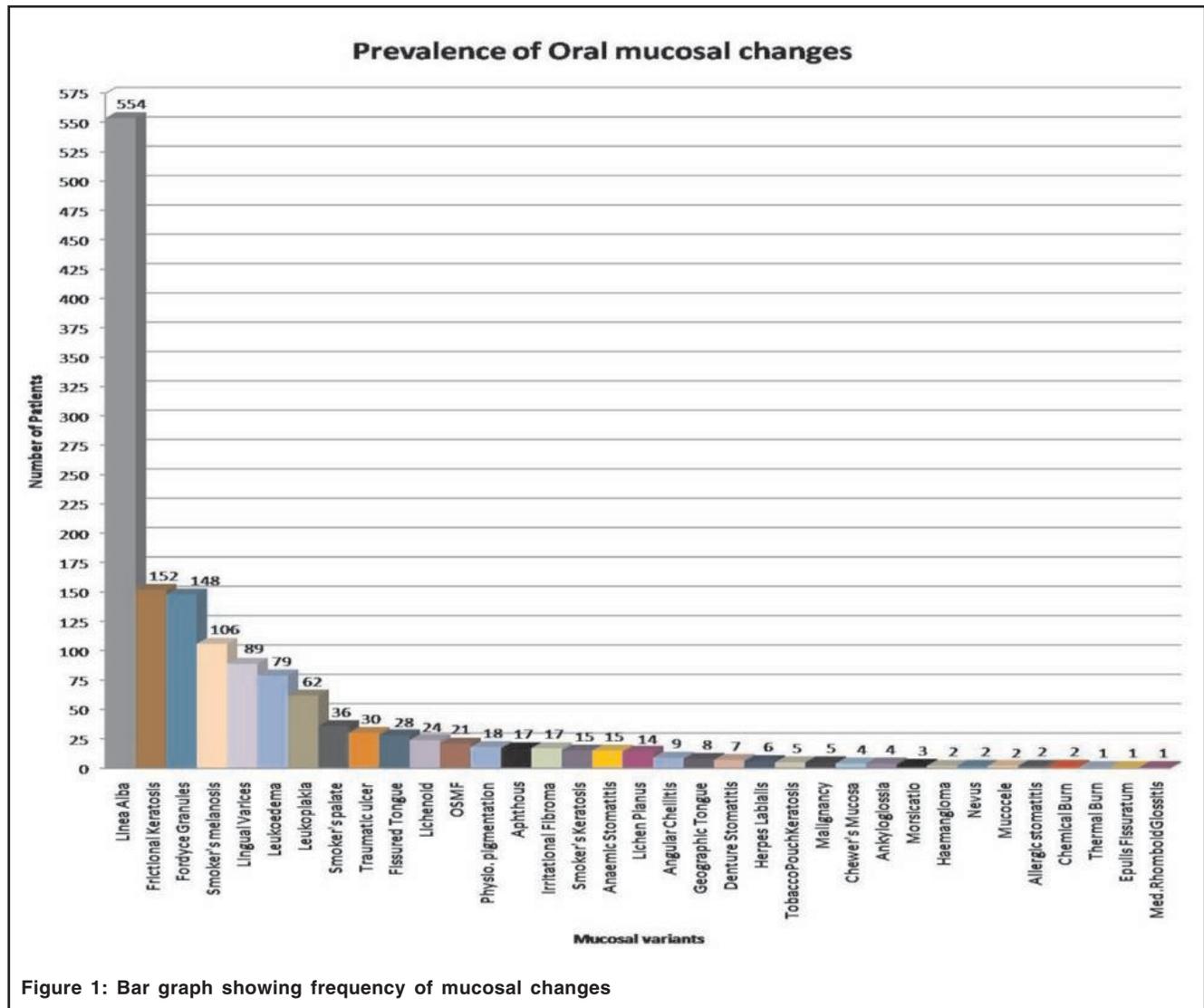


Figure 1: Bar graph showing frequency of mucosal changes

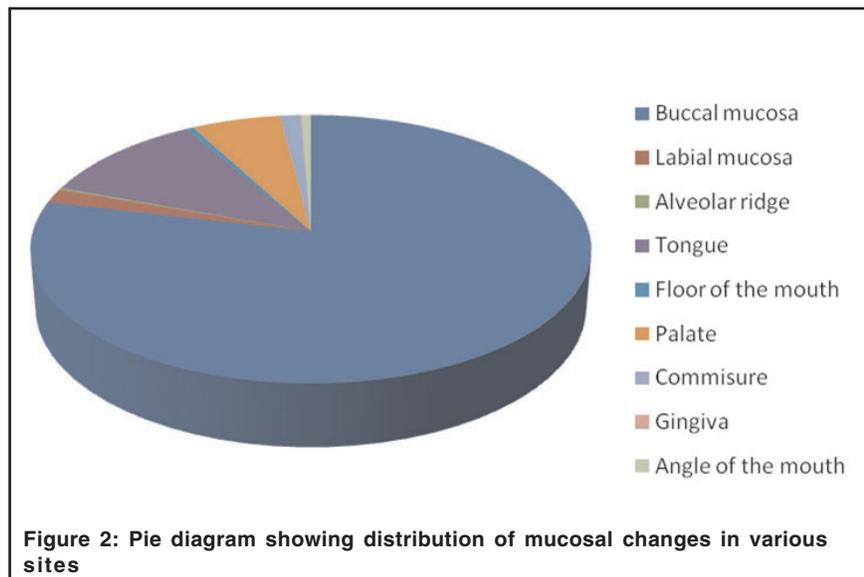


Figure 2: Pie diagram showing distribution of mucosal changes in various sites

214 of them had more than one mucosal change. The affected samples (1042) when classified based on the age showed 12(1.2%) were in the age group of 1-15yrs, 353(33.9%) were between 16-30yrs, 302(29%) were among 31-45yrs and 279(26.8%), 84(8.1%), 12(1.2%) in the age group 46-60, 61-75, 76 and above respectively (Table 1).

The overall gender classification among the affected samples indicated male predominance 649(62.3%) while females represented 393(37.7%). Smoking habit was found very common (280 cases), followed by smokeless (55 cases) and both (45 cases); however majority of the samples (662) claimed or denied any habits, either

in the past or at present. In respect to the awareness; only 68 cases (6.5%) were aware of their condition, otherwise 974 cases (93.5%) were unaware of the mucosal changes.

The overall classification among 3035 samples showed 1042 cases presented with one or more mucosal changes, which constituted a total of about 1489 (49.06%) lesions. Among 1489 lesions, 929 mucosal changes were either normal variants or developmental anomalies, 206 were traumatic lesions, 254 were tobacco induced, 22 were of infectious origin and 78 were miscellaneous conditions (Table 1). In regard to site, majority of the lesions were seen in the buccal mucosa (78.6%) and the least common site was gingiva (0.27%) (Fig 1).

### Normal variants and Developmental anomalies

Among all the mucosal changes recorded in the study, linea alba was the most prevalent condition (18.25%), which was comparatively higher than Martinez et al (10.7%) (1). Linea alba was most commonly seen in the buccal mucosa (99%) and 36.5% of them were seen in the age group 16-30 yrs.

Fordyce granules was seen in 4.88% of the cases, a finding which was less than Mathew et al (6.5%) (2). An interesting finding recorded in the study was that all the 148 cases (100%) were present in the buccal mucosa.

The prevalence of Lingual varices in the present study was 2.93%. This finding was higher than Mathew et al (1.17%) (2). However, a typical finding noted in the study was that as the age advanced the occurrence also increased and the most prevalent age group was 61-75 yrs (41%).

Among all the normal variants found in the study, the following conditions showed consistent findings with other studies: Fissured tongue (0.92%) with Shulman et al (0.85%) (3), Geographic tongue (0.24%) with Bouquot (0.3%) (4) and Ankyloglossia 0.13% with Mathew et al (0.58%) (2).

The presence of Leukoedema was seen in 2.6% of the cases, which was less when compared with Mathew et al (3.7%) (2). However, our study was consistent in regard to site as 97% of the cases were seen in buccal mucosa and it was seen predominately in the age group of 46-60 yrs.

Another notable variant noted in our sample was physiological pigmentation, which constituted of about 0.59%, which was far below than Salonen (6.6%) (5) and Martinez (24.6%) (1).

### Traumatic lesions

The traumatic lesions in the present study constituted about 204 cases (13.9%). Most of the lesions were seen in the buccal mucosa and in the age group 16-30. Interestingly, the prevalence of majority of the following traumatic lesions found in the study were more consistent with the other studies: Frictional keratosis (5%) with Mathew et al (5.79%) (2) Traumatic ulcer (0.98%) with Mathew et al (1.0%) (2), Morsciatio (0.09%) with Bouquot et al (0.12%) (6).

The other traumatic lesions showed findings comparable with various studies include: Chemical burn (0.06%) with Shulman et al (0.12%) (3) Thermal burn (0.03%) with Shulman et al (0.12%) (3), Epulis fissuratum (0.03%) with Shulman et al (0.14%) (3) Irritational fibroma (0.56%) with Shulman et al (0.19%) (3), Mathew et al (0.84%) (2) and Corbet et al (1.0%) (7).

### Tobacco induced lesions

Among all the tobacco related lesions smoker's melanosis was common and it constituted of about 3.5%. Most of them were seen on the buccal mucosa and they were in the form of ill-defined or diffused grayish-black patches.

The prevalence of leukoplakia in our study was 2.04%, which was comparable with Mathew et al (1.59%) (2) Reichert et al (1.1%) (8) and Banoczy et al (1.3%) (9). The most common type was homogenous leukoplakia.

Smoker's palate was seen in 1.18% of the cases, which varied when compared with Shulman (0.50%) (3) and Mathew et al (2.77%) (2).

The presence of oral sub mucous fibrosis (OSMF) was noted in 0.7% of the population, which was far below than Mathew et al (2.01%) (2). In the present study, stage IV OSMF (clinical evidence of fibrotic bands) was found to be very common.

In the present study, evidence of oral malignancy was seen in 0.16% of the cases, as similar to Ikeda et al (0.1%) (10) and Axel (<0.1%) (11). All the lesions were confirmed by biopsy and all the reports were suggestive of squamous cell carcinoma.

Betel chewer's mucosa was recorded in 0.13% of our samples, which was consistent with Mathew et al (0.84%) (2). Characteristically, chewer's mucosa was common in young adults.

The other tobacco related lesions recorded in our study were smoker's keratosis 0.49% and tobacco pouch keratosis 0.16%.

### Infections

Lesions of infectious origin in the present study were about 5.23%. The most common lesion was angular cheilitis and the least common was median rhomboid glossitis. This prevalence data virtually correlated well with the following studies: Angular cheilitis (0.30%) with Shulman et al (0.71%), Denture stomatitis (0.23%) with Mathew et al (0.84%) (2), Median rhomboid glossitis (0.03%) with Shulman et al (0.17%) (3) and Herpes labialis-6 (0.2%) with Mathew et al (0.6%) (2), Chiang mai (0.9%) (12).

### Miscellaneous conditions

The prevalence of Lichen planus in our study was 0.46% which was in par with Martinez et al (0.50%) (1). The most prevalent age group was 46-60 yrs (35.7%) and all the lesions were found in the buccal mucosa.

In our study group, Aphthous ulcer was seen in 0.56% of the cases which was comparable with Shulman et al (0.89%) (3). The most commonest site was buccal mucosa (70.5%) and 58.8% of them were young adults.

The presence of Lichenoid reaction was noted in 0.79% of the cases. Among them 95% of the cases were seen in the buccal mucosa and 62.5% of them were seen in the age group of 16-30 yrs.

Mucocele was observed in 0.06% of the cases and were comparable with Shulman et al (0.02%) (3), Axel (0.10) (11), Mathew et al (0.16%) (2). Similarly, hemangioma was seen in 0.06% of the cases, which was comparable with Shulman et al (0.28%) (3), but very less when compared with Martinez et al (3.2%) (1).

Other conditions recorded in the study were: Anaemic stomatitis 0.42%, Allergic stomatitis 0.06% and Nevus 0.06%.

## CONCLUSION

From the present study, the following features were evident

- The overall mucosal changes noted in the study were 49.06%, suggesting 1 in 2 patients visiting dentist can present with mucosal changes.
- The most prevalent conditions in the

study were developmental lesions/ normal variants and linea alba was the predominant condition. The age group frequently affected was 16-30 yrs. Male predominance and predilection for buccal mucosa was noticed.

- In spite of limited availability of tobacco products disappointingly tobacco induced lesions were seen in 17% of our cases (254 lesions out of 1489) necessitating more patient education.

On the contrary, it should be considered that the data presented here reflects only the specific patient population reported to our institution and not the community as a whole. Hence, the study can be only used as a guide for additional multicenter studies in India.

## REFERENCES

1. Martinez AI, Garcia-Pola MJ. Epidemiological study of oral mucosal pathology in patients of the Oviedo School of Stomatology. *Medicina Oral* 2002;7:4-16.
2. Mathew AA, Pai KM, Sholapurkar AA, et al. The prevalence of oral mucosal lesions in patients visiting a dental school southern india. *Indian J Dent Res* 2008; 19(2): 99-103.
3. Shulman JD, Beach MM, Rivera-hidalgo F. The prevalence of oral mucosal lesions in US adults: Data from the third national health and Nutrition Examination Survey, 1988-1994. *J Am Dent Assoc* 2004;135;

1279-1286.

4. Bouquot JE. Common oral lesion found during a mass screening examination. *J Am Dent Assoc* 1986;112:50-57.
5. Salonen L, Axell T, Hellden L. Occurrence of oral mucosal lesions, the influence of tobacco habits and an estimate of treatment time in adult Swedish population. *J Oral Pathol Med* 1990;19: 170-176.
6. Bouquot JE, Gorlin RJ. Leukoplakia, lichen planus, and other oral keratosis in 23,616 white Americans over the age of 35 years. *Oral Surg Oral Med Oral Pathol* 1986;61:373-381.
7. Corbet EF, Holmgren CJ, Philipsen HP. Oral mucosal lesions in 65-74 year old hongkong Chinese. *Community Dent Oral Epidemiol* 1994;22:392-395.
8. Reichart PA, Mohr U, Srisuwan S, Geerlings H, et al. Precancerous and other oral mucosal lesions related to chewing, smoking and drinking habits in Thailand. *Community Dent Oral Epidemiol* 1987;15:152-160.
9. Banoczy J, Rigo O. Prevalence study of oral precancerous lesions with a complex screening system in hungary. *Community Dent Oral Epidemiol* 1991;19:265-267.
10. Ikeda N, Handa Y, Khim SP, et al. Prevalence study of oral mucosal lesions in a selected Cambodian population. *Community Dent Oral Epidemiol* 1995;23:49-54.
11. Axel T. A prevalence study of oral mucosal lesion in an adult Swedish population. Thesis Odontol revy 1976;27:100-103.
12. Axel T et al. Prevalence of oral soft tissue lesions in out patients at two Malaysians and Thai Dental school. *Community Dent Oral Epidemiol* 1990;18:95-99.