

## Histopathological Study of Oral Cavity Neoplasms with Immunohistochemistry And In Relation To Age, Gender, Site and Associated Risk Factors

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### Abstract

**Introduction:** Oral cancers are the sixth most common cancer in the world. It is most frequent in fifth to sixth decade of life and are mostly associated with risk factors like smoking, alcohol consumption, and tobacco chewing in any form.

**Aims & Objectives:** To study the histopathological spectrum of oral cavity neoplasms at different sites and associated risk factors.

**Materials & Methods:** All the cases of oral cavity neoplasms were included in the study in a two year period.

**Results:** Out of 112 cases of oral cavity neoplasms, 104 were malignant, five benign tumors and three dysplasias. Among the oral cancers, Squamous cell carcinoma was the commonest constituting 95 cases and nine rare cases were identified.

**Discussion :** Squamous cell carcinoma was the commonest among oral malignancies, common in sixth to seventh decade of life. Tongue was the most common site and Tobacco chewing was the commonest risk factor. Rare tumors were also noted like Osteosarcoma, Amelanotic melanoma, Malignant peripheral nerve sheath tumor, Non Hodgkins lymphoma, Inflammatory myofibroblastic tumor, Follicular variant of papillary carcinoma in lingual thyroid.

**Conclusion :** Squamous cell carcinoma was the most common oral cancer and tobacco chewing was the commonest risk factor.

**Keywords:** Oral cavity neoplasms, Risk factors, Squamous cell carcinoma

**Abbreviations :** Squamous cell carcinoma (SCC),Follicular variant of Papillary thyroid carcinoma (FVPTC), Calcifying Epithelial odontogenic Tumor ((CEOT), Congenital Granular cell Tumor (CGCT).

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### I. Introduction

Oral cavity extends from the lips and cheeks externally to the anterior pillars of the fauces internally, where it continues into the oropharynx. Oral cancers are the sixth most common cancer in the world today<sup>1</sup>. Most common sites vary geographically reflecting different risk factors. Oral cancer may be located at the buccal mucosa, gingiva, hard palate, anterior two-thirds of the tongue and the floor of mouth<sup>2</sup>. Most cases occur in men over the age of 50, although the relative incidence among women and younger patients seems to be increasing<sup>3</sup> possibly related to rising trend of paan masala and gutkha chewing, smoking, alcohol consumption in the population.

### II. Aims & Objectives

1. To study the morphological spectrum of neoplasms in oral cavity.
2. To study the age and gender incidence of various neoplasms.
3. To study the commonest sites of various neoplasms.
4. To evaluate or analyse the associated risk factors.

### III. Materials And Methods

This is a retrospective study of all the cases of oral cavity neoplasms in the Department of Pathology, Guntur Medical College, Guntur, from June 2010 to May 2012 over a period of two years. The biopsy material was obtained from Government General Hospital, Guntur. The tissue is fixed in 10% formaldehyde, routinely processed and stained with Haematoxylin and Eosin (H&E). Immunohistochemistry was done wherever necessary.

**IV. Results**

Study comprises a total of 112 surgical biopsies from oral cavity neoplasms (2.54%) [TABLE-1] of which 104 were malignant (squamous cell carcinomas - 95 cases, rare malignancies – nine cases ) , five benign tumors and three dysplasias.

The present study includes all the cases of oral cavity neoplasms that are reported in the Dept. of Pathology , Guntur Medical College, Guntur over a period of two years that is from June 2010 to May 2012. Study includes a total of 112 cases.

**Table-1 Showing incidence of oral cavity neoplasms**

Total No. of biopsies received	No. of biopsies from oral cavity	Premalignant lesions	Benign neoplasms	Malignant neoplasms
4397 (100%)	112(2.54%)	3(2.67%)	5(4.46%)	104(92.85%)

**Table-2 Showing age incidence of oral cavity neoplasms**

Sl No	Age	Male	Female	Total	percentage
1	0-10y	2	1	3	2.67%
2	11-20y	1	1	2	1.78%
3	21-30y	3	0	3	2.67%
4	31-40y	12	4	16	14.28%
5	41-50y	19	7	26	23.21%
6	51-60y	16	9	25	22.32%
7	<b>61-70y</b>	<b>27</b>	<b>1</b>	<b>28</b>	<b>25.00%</b>
8	71-80y	5	2	7	6.25%
9	81-90y	2	0	2	1.78%
10	Total	87	25	112	100%

Maximum number of cases are seen in 61-70y. age group (25.00%) followed by 40-49y. (23.21%) and 50-59y.(22.32%).

**Table-3 Showing gender incidence of oral cavity neoplasms**

Gender	No. of cases	Percentage
Male	87	77.67%
Female	25	22.32%
Total	100	100%

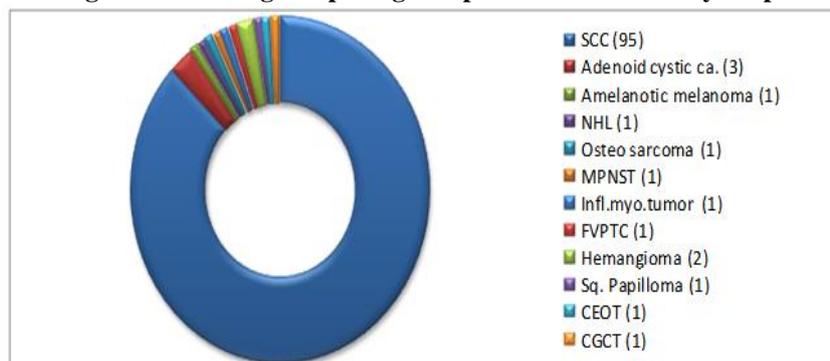
The above table shows male preponderance with M:F ratio of 3.48:1.

**Table-4 Showing distribution of habits of oral cavity neoplasms**

Sl.No.	Habits	No. of cases	percentage
1	Tobacco chewing	38	33.92
2	Smoking	9	8.03
3	Alcohol	5	4.46
4	Paan	17	15.17
5	Smoking & Alcohol	21	18.75
6	Nil	22	19.64
7	Total	112	100

Maximum cases are tobacco chewing, 38 cases (33.92%) out of total 112 cases followed by smoking, 30 cases (26.78%).

**Pie diagram-1 Showing morphological spectrum of oral cavity neoplasms**



Squamous cell carcinoma is the most common tumor among all the oral cavity neoplasms – 95 cases out of 112 cases (84.82%).

**Table-5 Showing site wise distribution of oral cavity neoplasms**

Sl.No.	Site of Lesion	No. of cases	percentage
1	Teeth & Gingiva	04	3.57%
2	Alveolus	04	3.57%
3	Lip	11	9.82%
4	Cheek	17	15.17%
5	Tongue	40	35.71%
6	Floor of mouth	10	8.92%
7	Retromolar region	05	4.46%
8	Palate	21	18.74%
9	Total	112	100%

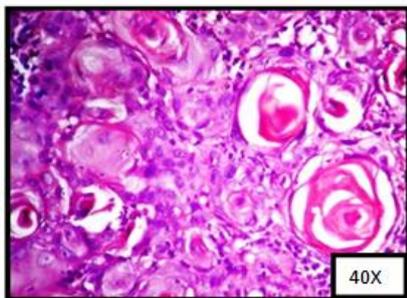
Maximum number of cases are seen in Tongue – 40 cases (35.71%) followed by palate – 21cases (18.74%) and Cheek – 17 cases (15.17%).

**Table-6 Showing morphological spectrum of squamous cell carcinomas**

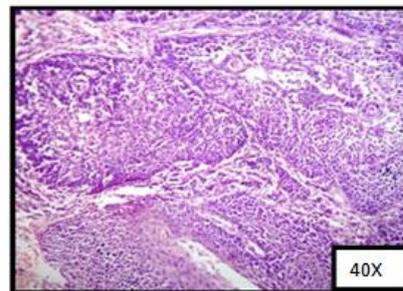
Histopathological diagnosis	No. of cases	Percentage
Well differentiated SCC	59	62.10%
Moderately differentiated SCC	29	30.52%
Poorly differentiated SCC	1	1.05%
Basaloid variant of SCC	1	1.05%
Spindle cell carcinoma	1	1.05%
Recurrences	4	4.21%
TOTAL	95	100%

Well differentiated squamous cell carcinoma is the most common subtype among the squamous cell carcinomas – 59 cases out of 95 cases (62.10%)

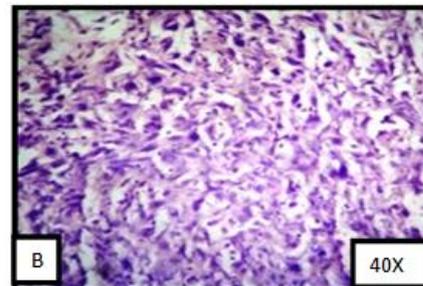
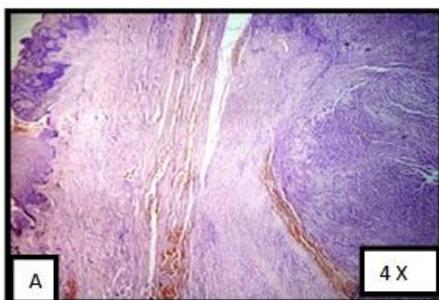
Figures:



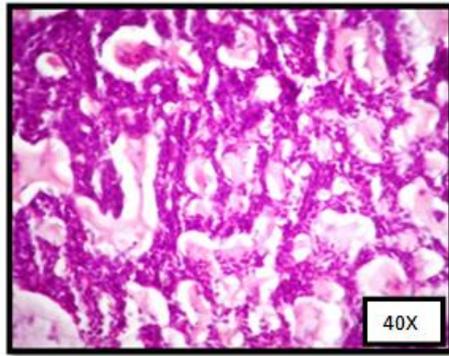
**Squamous cell carcinoma**  
Fig.1: High power view showing pleomorphic squamous epithelial cells arranged in sheets and nests, with keratin pearls (H&E).



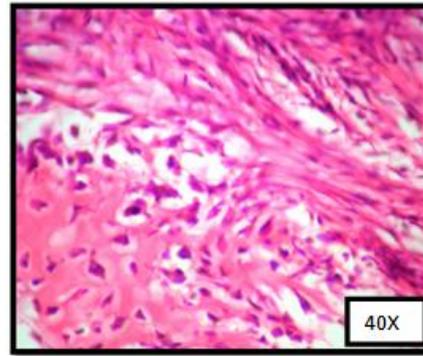
**Basaloid variant of SCC**  
Fig.2: Low power view showing solid tumor cell islands exhibiting peripheral palisading with areas of squamous differentiation (H&E).



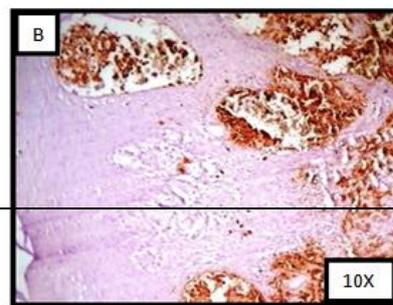
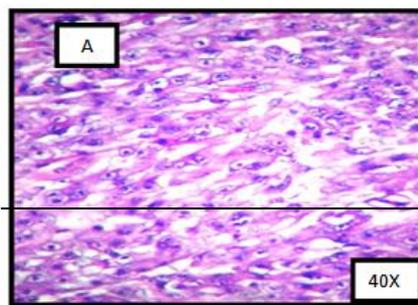
**Spindle cell variant of SCC**  
Fig.3: [A&B] [A] - Scanner view showing tumor in the subepithelium , [B] - Low power view showing sarcoma like formation blends with areas of obvious squamous cell carcinoma



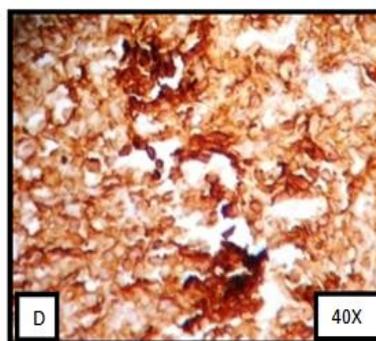
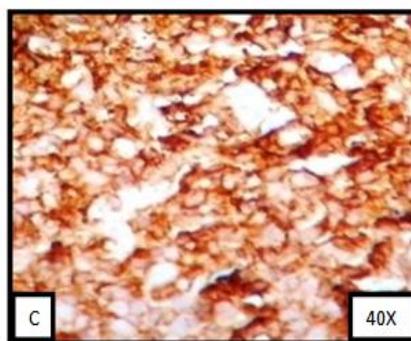
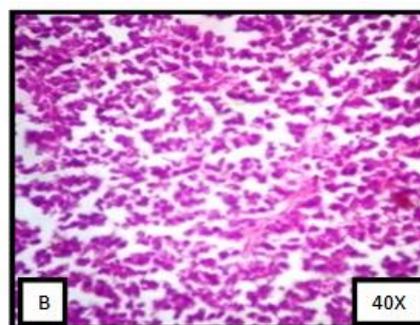
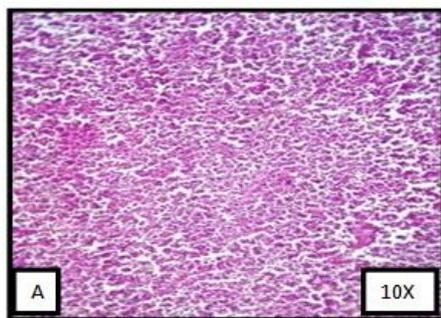
**Adenoid cystic carcinoma**  
 Fig.4: High power view showing nests of cells with cylindromatous microcystic spaces (H&E).



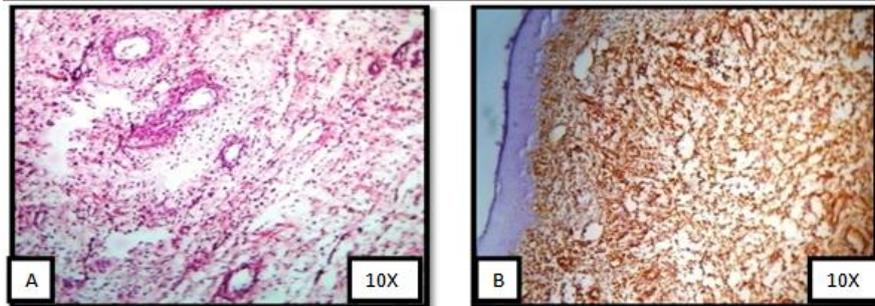
**Osteosarcoma**  
 Fig.5: High power view showing lace like osteoid, rimmed by pleomorphic cells (H&E).



**Amelanotic melanoma**  
 Fig.6: [A&B] [A], High power view showing individual tumor cells with prominent central eosinophilic nucleoli (H&E). [B] – Tumor cells with diffuse cytoplasmic positivity with HMB45 (IHC).

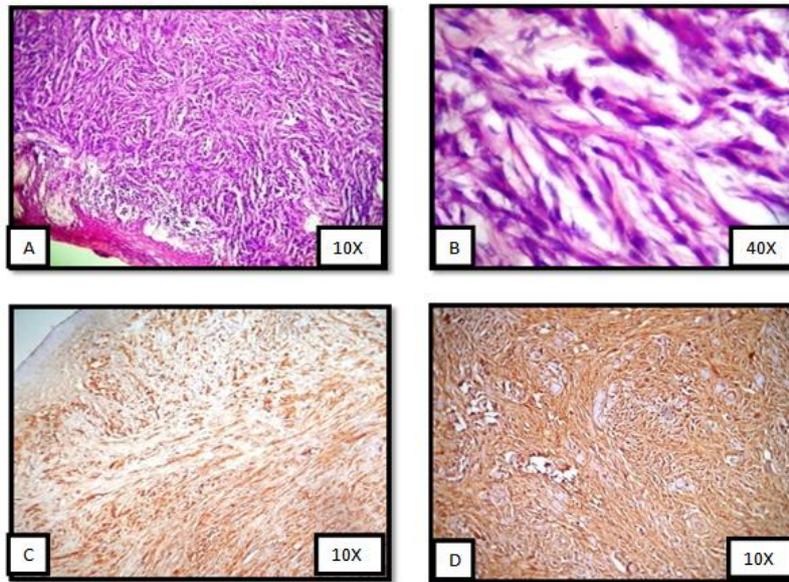


**Non-Hodgkin's Lymphoma**  
 Fig 7: [A,B,C & D] - [A & B] Low power and high power views showing proliferation of neoplastic lymphoid series of cells (H&E) ; [C & D] – Diffuse cytoplasmic positivity for CD45 & CD20 respectively (IHC).



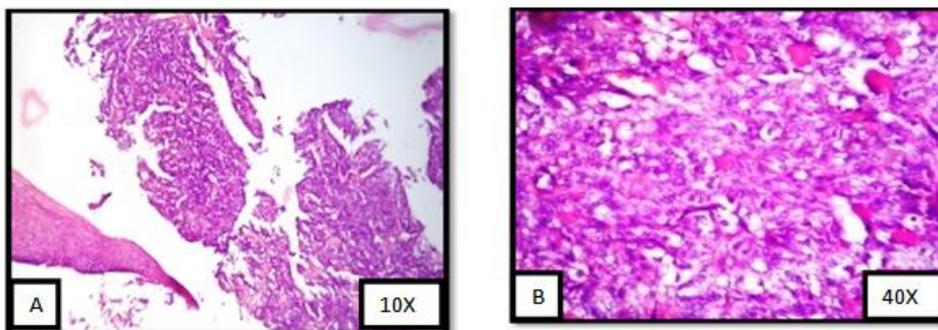
**Inflammatory Myofibroblastic tumor**

Fig.8: [A&B]. [A] – Low power view showing edematous and inflammatory background (H&E). Fig [B] – Tumor cells showing diffuse cytoplasmic positivity for vimentin (IHC).



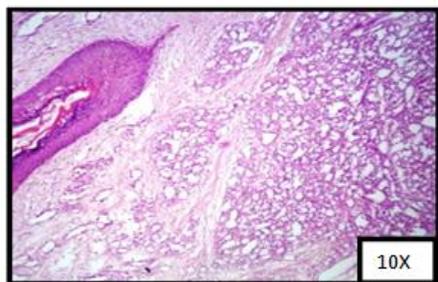
**Malignant Peripheral Nerve Sheath Tumor**

Fig 9: [A,B,C & D] . [A] –Low power view showing spindle cells arranged in fascicles reaching upto the epithelium (H&E)., [B] – High power view showing tumor cells with wavy sinuous nuclei and prominent nucleoli (H&E)., [C] – Patchy immunoreactivity with S100 (IHC)., [D] – Tumor cells showing diffuse cytoplasmic positivity with vimentin (IHC).



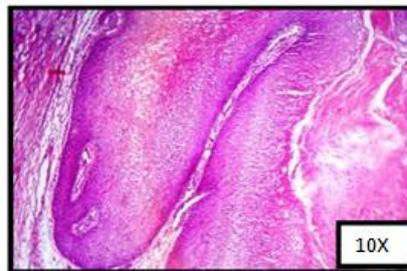
**Follicular Variant of Papillary Thyroid Carcinoma in lingual thyroid**

Fig 10: [A&B] . [A] – Low power view showing stratified squamous epithelium and subepithelium showing a tumor composed of thyroid acinar epithelial cells, arranged in follicles and with focal abortive papillae [B] – High power view showing tumor cells having nuclear grooves and intranuclear cytoplasmic inclusions (H&E).



**Hemangioma**

Fig -11: Low power view squamous epithelium and subepithelium showing masses of closely packed spindle cells with neofomed spaces that contain little blood (H&E).



**Squamous papilloma**

Fig -12: Low power view showing stratified squamous epithelium with acanthosis, hyperkeratosis and koilocytic change, arranged in papillae with fibrovascular core (H&E)

## V. Discussion

Oral cavity neoplasms are common in India due to higher consumption of tobacco in the form of chewing as well as smoking. A total of 4397 biopsy specimens are received in the Department of Pathology over a period of two years (i.e; from June 2010 to May 2012), among which 112 were oral cavity neoplasms (2.54%) [TABLE:1].

The discussion is presented under the headings of age incidence, gender incidence with analysis of risk factors, site and histological type.

### 5.1. Age Incidence

Our study includes age group of one day to 90years. The maximum number of cases (i.e., 95cases, 84.82%) are observed between 4th to 7th decades [TABLE : 2], in which majority (92 cases, 88.46%) are malignant lesions. Among malignant tumors, squamous cell carcinomas are the predominant group. The age incidence of Squamous cell carcinomas showed a wide range, starting from 28 to 90years. which is in accordance with findings observed by Abhinandan et al<sup>4</sup> (2006).

### 5.2. Gender Incidence Of Oral Cavity Neoplasms

Oral tumors showed a marked male preponderance with male to female ratio of 3.48:1 [TABLE: 3] (87 males and 25 females) and this is correlated with the study done by Thakur B.S.et al<sup>5</sup> in 1997 showed a much higher prevalence of oral tumors in males. In the present study 78.84% are males while 21.15% are females affected with oral malignancies. The M:F ratio, is similar with the study reported by Sharma<sup>6</sup> (1964) and Mehrotra Ravi et al<sup>7</sup> (2003).

### 5.3. Incidence Of Risk Factors In Oral Cavity Neoplasms

Majority were tobacco chewers (42.22%) followed by smokers (33.33%) [TABLE:4].

**Smokeless tobacco use :** The incidence of smokeless tobacco used in present study was 51.91% (54 cases) which is in accordance with findings of Sharma et al<sup>6</sup>.

**Smoking:** The incidence of smoking in oral cancers is 24.99% (26 cases) which is almost similar to the findings of Haribhakti and Mehta et al<sup>8</sup> in which it was 34.2%. It was much higher in other studies.

**Alcohol:** The incidence of alcohol consumption in oral cancer is 4.80% (five cases) in the present study. Durazzo et al. (2005)<sup>9</sup> showed a strong correlation of alcohol intake along with tobacco in cases of oral cancers;. Mashberg et al<sup>10</sup> also observed that alcohol drinking and tobacco smoking was responsible for significant cases of oral malignancies.

15cases of SCC did not show association with known risk factors like tobacco abuse. The possible role of HPV in oral carcinogenesis may be considered in these cases and needs to be evaluated further to confirm the association. The recommended markers are HPV-DNA alongwith p16, by immunohistochemistry. Oral cavity cancers with p16 expression are known to have good prognosis.

### 5.4. Site

The present study shows majority of cases occurring, in the tongue (35.71%) [TABLE:5] which is in accordance with the results in the study conducted by Alvi et al<sup>11</sup>, with 30.3% of cases occurring in tongue and Mehrotra et al,<sup>7</sup> study shows that tongue is the most common site (42.57%).

## **5.5. Histopathological Typing**

In the present study, it is observed that squamous cell carcinoma is the commonest type of malignant tumor in oral cavity and thus its incidence is in accordance with study done by Mridu Manjari et al<sup>12</sup> (1996) interpreted that the dominant group was squamous cell carcinoma (91.34%) followed by adenoid cystic carcinoma (2.88%) [Pie diagram:1].

### **5.5.1. SQUAMOUS CELL CARCINOMA**

In the study conducted by Patel, M.M and Pandya, A.N.<sup>13</sup> (2004) at Govt. Medical College, they found Well differentiated squamous cell carcinoma [“Fig”.1] as the most common histological grade (60.12%) , among all the cases of invasive squamous cell carcinoma which is in well accordance with present study. Present study also includes Basaloid variant [“Fig”.2] and spindle cell variant [“Fig”.3,A&B] of SCC one case each.

### **5.5.2. NON – SQUAMOUS CELL MALIGNANCIES**

**Adenoid cystic carcinoma** : The present study includes three cases (2.88%) of age ranging from 40-42years and all are males [“Fig”.4]. Among them , one case showed perineural invasion and the other case in floor of mouth, with bony invasion. The present study correlates with the studies of Jasser K. Ma’aita<sup>14</sup> et al.,2.5% and Mridu Manjari et al<sup>12</sup>,1.71%.

**Osteosarcoma** : 17yr young adult female presented with a swelling over left maxillary area. Mandible is more commonly affected and some studies also reported in maxilla<sup>15</sup>. [“Fig”.5]

**Amelanotic melanoma** : The present study includes one case of 19yr young adult presented with an ulcer of 1X1 cm., over left lateral border of tongue. Though, mucosal malignant melanomas [“Fig”.6] are rare, they were also reported in the study done by Abdul Wahid et al<sup>16</sup>, 2% and Mridu Manjari et al<sup>12</sup> 0.19%.

**Non Hodgkin’s Lymphoma** : Our study includes a single case in a 67year old male in the base of tongue. Similar case was reported in the study done by Mridu Manjari et al<sup>12</sup>, 0.38%. [“Fig”.7,A,B,C,D]

**Inflammatory myofibroblastic tumor** : 25 day old male child, presented with a pedunculated mass from root of mouth [Fig.8: (A&B)] and is rarely reported in oral cavity<sup>17</sup>.

**Malignant peripheral nerve sheath tumor** : 54year old male with a lower lip swelling [“Fig”.7,A,B,C,D]. Most frequently it occurs between 20 to 50years of age. Half of all cases of MPNST are diagnosed in persons with neurofibromatosis 1, but the present case is not associated with neurofibromatosis 1<sup>18</sup>.

**Follicular variant of papillary carcinoma in lingual thyroid** : A seven year old male child, presented with a soft swelling of 3X2cm., in the floor of mouth. Follicular variant of papillary carcinoma Fig.10: [A&B] is extremely rare in lingual thyroid and only three cases have been reported in literature, till date<sup>19</sup>.

### **5.5.3. BENIGN TUMORS OF ORAL CAVITY**

In the present study there are five cases of benign tumors (4.46%).

**5.5.3.1. Hemangioma** : Our study includes two cases constituting 1.73%, One case is cavernous hemangioma in a 25 year old male, in lower lip and the other case is a capillary hemangioma [“Fig”.11] in a 40 year old female in upper lip. Marchuk<sup>20</sup> said that hemangioma were more common in females as compared to males.

**5.5.3.2. Squamous papilloma** : 66 year old female who presented with a growth in the cheek [“Fig”.12]. Greer and Goldman<sup>21</sup> reported 110 cases while Abbey et al<sup>22</sup> reported 464 cases of oral papillomas.

**5.5.3.3. Calcifying epithelial odontogenic tumor** : 26 year old adult male, presented with a cystic mass attached to tooth [“Fig”.13 ]. It shows a propensity for development in association with a tooth, usually in patients 30 to 50 years of age<sup>23</sup>.

**5.5.3.4. Congenital Granular cell tumor** : It is found in a one day old female child on the alveolar ridge on the maxilla<sup>24</sup> [“Fig”.14 ]. Tucker et al.<sup>25</sup> reported granular cell tumor commonly occurring at alveolar ridge in almost predominantly in female infants.

### **5.5.4. PREMALIGNANT LESIONS OF ORAL CAVITY**

Three cases of dysplasias of which mild dysplasia in lipin 55yr. old, moderate dysplasia in floor of mouth and severe dysplasia in cheek, both were 80 year old each and all are males.

## **VI. Conclusion**

A total of 112 cases of oral cavity neoplasms are studied, in which majority are malignant tumors (92.85%) and among them, invasive squamous cell carcinoma (84.82%) is the most frequent histological type followed by adenoid cystic carcinoma. Among the oral cancers, peak age incidence is the 7th decade of life. There is significant male preponderance with M : F of 3.72: 1. Tongue is the most common site involved (38.46%). Intra oral growth (74.10%) or ulcer (25.89%) is the commonest presenting symptom. Smokeless

tobacco consumption (49.09%) is the commonest associated habit which leads to malignancy. 15 cases of SCC did not show association with known risk factors. The possible role of HPV in oral carcinogenesis may be considered. We encountered various rare malignant tumors like Amelanotic melanoma, Non-Hodgkin's lymphoma, Osteosarcoma, Malignant peripheral nerve sheath tumor, Inflammatory myofibroblastic tumor, Follicular variant of papillary thyroid carcinoma in lingual thyroid.

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