infected at either oral or genital sites, results of this study suggest that the site of primary infection is important in driving the overall humoral immune-protective response. Findings of this study will have direct implications for the future development of a glycoprotein-epitope–based HSV-1 vaccine.

DISTRIBUTION OF HUMAN PAPILLOMA VIRUS 16 IN ORAL SITES AFFECTED BY SQUAMOUS CELL CARCINOMA

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Objectives: Studies have indicated that cases of HPV-associated squamous cell carcinoma (SCC) in the oropharynx and the oral cavity are on the rise. However, the distribution of human papilloma virus (HPV) in different sites of the oral cavity affected by oral SCC (OSSC) has not been well characterized. The present study was designed to investigate the anatomic sites of HPV-16 infection associated with OSCC in the oral cavity and correlate HPV-16 positivity with tumor suppressor gene expression and clinical/pathologic features of OSCC.

Methods: The archives of oral pathology at the University of Florida College of Dentistry were accessed for demographic, clinical, and histologic data of 97 OSCC cases, and their histologic slides were obtained under the approved institutional review board protocol. Histologic specimens were stained for HPV-16 by immunohistochemistry (IHC), and the positive samples were further analyzed for HPV DNA by in situ hybridization (ISH).

Results: Ninety-seven patients with OSCC comprising 53 (54.63%) males and 44 (45.36%) females with ages ranging from 40 to 95 years were included. Twenty (20.6%) had a history of smoking, and 16 (16.49%) drank alcohol; the information for the rest of the sample was unavailable. The oral sites of OSCC include the following: gingiva 34 (35%), palate 25 (25.77%), tongue 16 (16.49%), buccal mucosa 14 (14.43%), and floor of the mouth 8 (8.24%). The degree of OSCC differentiation showed 34 (35%) for well differentiated, 32 (32.98%) for moderately differentiated, and 31 (31.95%) for poorly differentiated. Of 14 p16-positive cases detected by IHC (14.43%), 12 (85%) were positive for ISH specific for HPV DNA. The tongue and the palate showed the highest prevalence of HPV-related OSCC (4 of 16 [25%] and 6 of 25 [24%], respectively), followed by the gingiva (4 of 34 [12%]). Strong positivity for p16 detected by IHC and HPV DNA by ISH was found in well and moderately differentiated OSSC (7 of 34 [20%] and 5 of 32 [15%], respectively).

Conclusions: Our study identified 14% of cases of OSCC to be associated with HPV, with the tongue and the palate being the most prevalent sites. This finding may indicate that the route of the viral transmission for OSCC may be similar to the one associated with oropharyngeal cancer.

ANTIFUNGAL DRUG SUSCEPTIBILITY OF FUNGAL ISOLATES IN PATIENTS WITH HUMAN IMMUNODEFICIENCY VIRUS RECEIVING HIGHLY ACTIVE ANTIRETROVIRAL THERAPY

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Objectives: Given the evolving drug therapy options and consequent opportunistic infections, antifungal drug resistance is a major concern in patients with human immunodeficiency virus (HIV) undergoing highly active antiretroviral therapy (HAART), prompting the need for clinically relevant antifungal susceptibility testing. The goals of the present study were to determine the asymptomatic oral fungal carriage and species distribution in patients with HIV infection receiving HAART in Kerala State, India, and to evaluate the antifungal susceptibility/resistance profile of these oral fungal isolates. We also sought to identify any correlation between antifungal susceptibility/resistance with respect to the duration of HAART therapy and if there was an association between oral fungal colonization, CD4 counts, and risk factors.

Methods: Thirty HIV-positive patients receiving HAART were divided into 2 groups based on duration of HAART (group 1, <2 years; group 2, >2 years). A detailed history, including demographic characteristics, treatment details, and presence of any risk factors for candidiasis, was taken before saliva sample collection by the oral rinse method. Candidal growth and colonies were evaluated on the Sabouraud slope. Germ tube, sugar assimilation, and fermentation tests were used for identification of species. When conventional methods failed to identify any fungal isolates, they were verified using the automated VITEK-2 YST system (bioMérieux, Marcy l'Etoile, France). The Wilcoxon signed-rank test was used to compare the $CD4^+$ lymphocyte count before and after initiation of HAART. The association of risk factors with candidiasis was analyzed using the chi-square test.

Results: Overall culture positivity was 83.3%. *Candida albicans* was the most prevalent species (57.7%), followed by *Candida tropicalis* (26.9%). All except for 1 patient had a single fungal isolate. In vitro antifungal susceptibility testing of the isolates revealed that all candidal species were sensitive to amphotericin B. *Candida krusei* showed 100% resistance to fluconazole. All candidal species except *Geotrichum klebahnii* showed increased resistance to itraconazole. Comparison between initial and recent $CD4^+$ counts revealed improvement in the $CD4^+$ count after HAART, but no change in fungal population. Of the study sample, 63.3% had risk factors for candidiasis other than being immunocompromised, and colonization was increased in those with risk factors compared with those without risk factors.

Conclusions: The present study showed the distribution of yeast species and the antifungal drug susceptibility of fungal isolates in patients with receiving HAART.

ASSOCIATION OF PSYCHOSOCIAL STRESS AND TEMPOROMANDIBULAR DISORDERS IN THE ADOLESCENT POPULATION

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Objectives: Research has shown an increasing number of adolescent patients who present with somatization of pain disorders. The importance of assessing a patient's psychological and behavioral status in diagnosing temporomandibular disorder (TMD) has been explored in adults; however, its application in adolescents is unclear. The objectives of this study are to determine the association between psychosocial stress and TMD

among adolescents and to further investigate the type of psychosocial stress that has the highest impact on this population.

Methods: This is a prospective study targeting patients aged 10-19 years old who visit the oral medicine clinics at the University of Pennsylvania Health System. The study was approved by the University of Pennsylvania Institutional Review Board. All patients with complaints of jaw pain, headache, and/or earache were assessed using the same TMD evaluation form, including a validated psychosocial questionnaire, the modified 4-item Patient Health Questionnaire for anxiety and depression (PHQ-4), in the electronic medical record system. The information in the initial TMD evaluation form and relevant demographic information, such as age and sex, were used in statistical analysis, including chi-square tests, to identify trends within populations.

Results: To date, 30 patients (18 females, 12 males) aged 10-19 years have enrolled and participated in the study. On the basis of preliminary data analysis, patients who had a formal diagnosis of depression or anxiety or who had a moderate or severe score on the PHQ-4 (categorized as normal, mild, moderate, or severe) had moderate or severe myofascial pain upon clinical examination (69.1%; $P < .05$). Headache was found to be the most frequent coexisting pain condition with jaw pain (78.5%; $P < .05$).

Conclusions: There is a statistically significant association between psychosocial stress and TMD symptoms in adolescents. Depression and anxiety had the highest impact on the severity of temporomandibular joint myofascial pain, with headache being the most frequent coexisting pain condition.

ROLE OF SALIVARY BIOMARKERS FOR DETECTION OF SYSTEMIC DISEASES

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Objectives: Analysis of inflammatory biomarkers in saliva could offer an attractive opportunity for the diagnosis of different systemic conditions specifically in epidemiologic surveys. The aim of this study was to investigate if certain salivary biomarkers could be used for detection of common systemic diseases.

Methods: A randomly selected sample of 1000 adults living in Belgaum, India, were invited to participate in a clinical study of oral health. A total of 451 individuals were enrolled in this investigation, and 50% were women. All participants were asked to fill out a questionnaire. Their histories were taken, clinical examinations were performed, and stimulated saliva samples were collected. Salivary concentrations of interleukin (IL)-1b, IL-6, IL-8, tumor necrosis factor-α, lysozyme, matrix metalloproteinase (MMP)-8, and tissue inhibitor of metalloproteinase (TIMP)-1 were determined using enzyme-linked immunosorbent assay.

Results: Salivary IL-8 concentration was found to be twice as high in patients who had tumor diseases. In addition, IL-8 levels were also elevated in patients with bowel disease. MMP-8 levels were elevated in saliva of patients after cardiac surgery or in those with diabetes and muscle and joint diseases. The levels of IL-1b, IL-8, and MMP-8, as well as the MMP-8/TIMP-1 ratio, were higher in patients with muscle and joint diseases.

Conclusions: Biomarkers in saliva have the potential to be used for screening purposes in epidemiologic studies. The relatively unspecific inflammatory markers used in this study cannot be used for diagnosis of specific diseases but can be seen as markers of increased systemic inflammation.

POTENTIAL PROGNOSTIC IMPLICATION OF α-SMOOTH MUSCLE ACTIN (A-SMA) IN ORAL SQUAMOUS CELL CARCINOMA COMPARED WITH BASALOID SQUAMOUS CARCINOMA

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Objectives: Oral squamous cell carcinoma is the most common multistep malignant tumor affecting the oral cavity. One of the most aggressive variants of this neoplasm is the basaloid squamous carcinoma. The cancer-associated fibroblasts in the tumor microenvironment are now the focus of intense research and are believed to correlate with poor prognosis. They are characterized by α-smooth muscle actin (α-SMA) expression, which is a myofibroblast marker. The aims of the present study were as follows: (1) to evaluate the role of α-SMA in the progression of both neoplasms, (2) to study the prevalence of this marker with different grades of this neoplasia, and (3) to determine the immunoreactive localization of α-SMA in the lymph nodes of patients with these tumors.

Methods: Twenty-one cases of squamous cell carcinoma and 7 cases of basaloid squamous carcinoma were included in this study, among which were 5 cases with cervical lymph node metastasis. These were distributed as 9 well-differentiated, 7 moderately, and 5 poorly differentiated cases. Immunohistochemical analysis using labeled streptavidin, biotin, and monoclonal antibody for α-SMA.

Results: Intense immunoexpression of α-SMA was observed in the anaplastic neoplasms that also was correlated with lymph node involvement. In contrast, well-differentiated cancer revealed only a mild reaction.

Conclusions: According to these findings, one could conclude that α-SMA can be used as a prognostic marker and potential target for cancer therapy.

A SERVICE EVALUATION OF PEDIATRIC ORAL MUCOSAL DISEASE EXPERIENCE IN A TERTIARY JOINT PEDIATRIC-ORAL MEDICINE CLINIC

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Objectives: The true global prevalence of pediatric oral mucosal disease has historically proved difficult to determine, based on heterogeneity and inherent limitations in study designs and a largely descriptive narrative. The 2019 World Workshop on Oral Medicine VII: Relative Frequency of Oral Mucosal Lesions in Children, a Scoping Review quantified pediatric oral mucosal disease experience globally based on pooled and region-specific data from clinical studies and biopsy reports. The aim of this investigation was to retrospectively review clinical data to compare pediatric disease experience in a tertiary joint pediatric-oral medicine clinic at the Royal National ENT and Eastman Dental Hospital, UCLH, London, UK, with published global data from the world workshop.