POSTER ABSTRACTS

#1 CLEAR CELL ODONTOGENIC CARCINOMA: A CASE REPORT AND DIAGNOSTIC WORK UP

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Background: Clear cell odontogenic carcinoma (CCOC) is an exceptionally rare malignancy affecting the jaws, pre- dominantly the mandible. As the name suggests, the presence of clear cells is usually a striking histologic feature. This fact may lead to a diagnostic confusion with other odontogenic (*e.g.* ameloblastoma, calcifying epithelium odontogenic tumor) and non-odontogenic lesions (*e.g.* salivary gland carcinoma, melanoma, and metastatic renal cell carcinoma) that can also present a clear cell component. In this scenario, the presence of a specific gene rearrangement (EWSR1) in about 80% of CCOC constitutes an important diagnostic tool. **Case description:** We report a case of an 84 year old man presenting with a localized radiolucent lesion involving the left maxilla, extending from the central incisor to the first molar. The floor of the left maxillary sinus appears to be superiorly displaced without any apparent evidence of destruction. The clinical impression was odontogenic myxoma. An incisional biopsy was performed, showing islands of epithelial cells with focal clear cell change. Nuclear hyperchromatism, pleomorphism, multinucleated giant cells, and mitotic figures were also identified. The aforementioned epithelial islands were positive for cytokeratin-19, indicating an odontogenic origin. Tumor cells were also positive for pancytokeratin, Ki-67 (>30%), and mucicarmine (focally). TTF1, PAX8, and PSA were negative, ruling out a metastatic lesion. Additional imaging analysis using *positron emission tomography–computed tomography* (PET-CT) confirmed a solitary lesion involving only the maxilla. The presence of the EWSR1 (22q12) gene rearrangement was proven by *fluorescent in situ hybridization* (FISH). **Conclusion:** Given the fact that clear cell salivary gland carcinoma may also harbor the same gene rearrangement, the present case emphasizes the importance of a comprehensive strategy (*i.e.* microscopic, genetic and imaging studies) to properly establish the diagnosis of clear cell odontogenic carcinoma.

#2 ADENOID AMELOBLASTOMA WITH DENTINOID OF MANDIBLE: A CASE REPORT

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Background: Adenoid ameloblastoma with dentinoid is a rare variant (to the best of our knowledge, only 16 cases have been reported) of ameloblastoma showing histopathological features of ameloblastoma with areas of ductal pattern and dentinoid formation resembling adenomatoid odontogenic tumor (AOT). Although ameloblastoma and AOT have distinct histologic feature, Adenoid ameloblastoma with dentinoid sometimes predominantly demonstrate AOT-like areas, which may overshadow the features of ameloblastoma. As a result, Adenoid ameloblastoma with dentinoid often goes underdiagnosed/misdiagnosed and treated conservatively leading to recurrence.

Case Description: A 65-year-old, healthy male patient presented with grade 3 mobility of right mandibular first premolar. Clinically, cortical expansion in region of interest was noted. CBCT reveals root resorption of right mandibular first premolar, buccal and lingual cortical perforation in area of right mandibular canine and right mandibular first premolar. Also noted was a well circumscribed radiolucent which had been previously treated twice in 2006 and 2014. The previous two biopsies had diagnoses of AOT with a recommendation of close follow-up due to the presence of focal areas suggestive of plexiform ameloblastoma. After reviewing slides from the previous biopsies and current biopsy, a final diagnosis of Adenoid ameloblastoma with dentinoid was rendered.

Conclusion: Adenoid ameloblastoma with dentinoid has some microscopic features that are unusual to ameloblastoma, thus suggesting the diagnosis of AOT. Ultimately, the accurate diagnosis of Adenoid ameloblastoma with dentinoid is important in determining the treatment of choice, enucleation vs resection.

#3 BENIGN FIBROUS HISTIOCYTOMA OF THE JAWBONES. REPORT OF5 CASES WITH REVIEW OF THE LITERATURE

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Introduction: Benign fibrous histiocytomas (BFH) are mesenchymal tumors composed of a mixture of fibroblasts and histiocytes arranged in a storiform pattern. This benign neoplasm most often occurs in the skin of the lower extremities and rarely affects bone. BFH of bone occur most frequently in the femur, pelvis and tibia comprising approximately 1% of all benign bone tumors. Jawbone involvement is extremely rare with only 13 cases having been reported in the literature as of 2016. In 2017, we presented two new cases at the AAOMP annual meeting. Here we present an additional 3 cases.

Materials and Methods: The files of our biopsy service and consultative service were searched from 1984 to 2019 for cases with the diagnosis of benign fibrous histiocytoma of the jawbone. Three additional cases of BFH of the jawbones were identified. These three cases and the two cases presented in 2017 were analyzed for their histologic, immunohistochemical and demographic features.

Results: Of our five cases of BFH of the jawbone, four involved the mandible and one occurred in the maxilla. There was no sex predilection. The age range was 17 to 48 years. The tumors presented as expansile painless radiolucent lesions. Histologically, the tumors consisted of spindle shaped cells arranged in a storiform pattern. Secondary elements were present consisting of inflammatory cells and foamy histiocytes. Immunohistochemical studies revealed CD10, Factor XIIIa and CD68 positivity for three of the five cases.

Conclusions: BFH of the jawbones are rare tumors. The addition of our five cases brings the total to 18 cases in the literature. The lesions cause painless expansion and appear histologically as spindle cells arranged in a storiform patter. Secondary elements may be evident. Staining for CD10, CD 68 and Factor XIIIa may be useful is distinguishing these tumors from other spindle cell lesions.

#4 A CASE REPORT OF LINGUAL BRONCHOGENICCYST

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Bronchogenic cysts are foregut-derived developmental anomalies found along the developmental pathway of the foregut. The putative theory of pathogenesis is abnormal budding or branching of epithelial cells during the development of tracheobronchial tree. The most common sites are mediastinum and lung (75% and 25 % of case respectively) while the head and neck are affected in less than 1% of cases with only rare cases reported in the oral cavity. It is usually asymptomatic but if it becomes large, it may cause feeding and breathing difficulties. This is a report of a case of a bronchogenic cyst arising in a 6-year-old male. The lesion presented as deep mucosal mass in the midline of ventral tongue, measuring $1.1 \times 0.7 \times 0.7$ cm. Microscopically, the cyst was lined by pseudostratified columnar epithelium exhibiting many ciliated and mucous cells. A focus of cartilage and discontinuous bundles of smooth muscle (smooth muscle actin positive) were present adjacent to the lining. Where there was cyst rupture, there was granulation tissue associated with many foamy macrophages and acute and chronic inflammation. Three other cases, two in the tongue and one in the lower lip vestibule with cutaneous extension, all in the midline, have been reported in a 1 day-old, 4 year-old and 3 year-old; all were males. There was no recurrence after excision and this is in keeping with the behavior in previous reports. Other developmental cysts including foregut cysts may be focally lined with respiratory epithelium but the presence of cartilage is the sine qua non for the diagnosis of a bronchogenic cyst.

#5 GENERATIONAL STUDY OF TWO FAMILIES WITH NEVOID BASAL CELL CARCINOMA (GORLIN) SYNDROME

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Objectives: Nevoid basal cell carcinoma syndrome (NBCCS), also known as Gorlin syndrome, is a disorder of autosomal dominant inheritance pattern with high penetrance and variable expressivity. It is diagnosed using a widely agreed upon set of major and minor criteria along with genetic testing. Most cases for which genetic testing has been performed express PTCH1 and SUFU germline mutations, with a subset demonstrating no identifiable variant of these genes. In cases with clear clinical and radiographic evidence of NBCCS, genetic testing is not mandatory for diagnosis. Of note, however, is that patients with mutations in the SUFU gene generally show milder clinical features, but have an increased risk for the development of childhood medulloblastoma when compared to those with PTCH1 mutations. This highlights the potentially important role that genetic testing can serve for those diagnosed with NBCCS, as well as aid in risk assessment for potential offspring. A comparison of genotype and corresponding phenotype through generations may shed light on the interplay between genetic variants of disease and expressivity.

Findings: We present two generational studies of families known to be affected by NBCCS. For each, we discuss genetic variants when available, along with the clinical and radiographic characteristics that satisfy diagnostic criteria for disease in each patient. Previous medical records, imaging studies, as well as patient interviews have been conducted to obtain the necessary data to construct a detailed pedigree.

Conclusions: Our study highlights the variable expression of NBCCS as it is inherited through multiple generations. The variability in expression among patients in the same family demonstrates the importance of major and minor criteria for diagnosis. More frequent genetic testing and further study may help draw stronger connections between genotype and phenotype in patients with this disorder.

#6 A RETROSPECTIVE CASE SERIES OF SECRETORY CARCINOMA OF THE ORAL CAVITY: ANALYSIS OF 4 CASES

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Introduction: Secretory carcinoma (SC) is a salivary gland neoplasm uncommon in the oral cavity. Oral cavity SC has in the past been misdiagnosed as acinic cell carcinoma (ACC) or mucoepidermoid carcinoma (MEC). In this study we describe the spectrum of clinical and histologic presentation of a series of oral cavity SC. **Methods:** An IRB-approved retrospective search for cases of secretory carcinoma (SC), previously known as mammary analogue secretory carcinoma, was performed within the archives of the University of Florida Oral Pathology and Surgical Pathology Biopsy services between 2010 and 2017. Demographic, clinical, histologic, immunohistochemical, and molecular findings were aggregated for the cases. **Results:** A total of 4 cases were included in the study. 2 cases were male and 2 cases female. Age ranged from 30 years to 60 years with an average of 45 years. Two cases were located in the lip, followed by 1 case each on the hard and soft palate. Immunohistochemical (IHC) staining showed mammaglobin positivity in all cases, GATA3 positivity in 2 cases, S100 positivity in 3 cases, and SOX10 positivity in 1 case. Fluorescence in situ hybridization was performed in 1 case demonstrating positivity for ETV6-NTRK3 fusion. **Conclusion:**Though oral SC is rare, pathologists should be cognizant of the histologic overlap of SC with other salivary gland neoplasms especially ACC and MEC and to use IHC staining to aid in diagnosis. This entity should be considered in the differential diagnosis for intraoral salivary gland tumors.

#7 GIGANTIFORM CEMENTOMA: CASE REPORT AND REVIEW OF THE LITERATURE

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Gigantiform cementoma is a rare subtype of a benign fibro-osseous lesion. To date, only a handful of cases have been reported. Because it is often inherited as an autosomal dominant trait it is also known as Familial Gigantiform Cementoma. However, examples of cases without a family history have been described supporting a sporadic in- heritance pattern as well. The condition is believed to have a high penetrance but variable phenotypic expression. Gigantiform cementoma has a propensity for early onset, typically in the first and second decades of life, and demonstrates rapid and extensive osseous expansion of all four quadrants of the jaws which can lead to severe disfigurement. The microscopic features of gigantiform cementoma are similar to other cemento-osseous lesions of the jaws. Clinical features aid in distinguishing gigantiform cementomas from other fibro-osseous diseases. We describe a case of a 17-year-old male with a prior diagnosis of fibrous dysplasia and marked bilateral maxillary ex- pansion. We present this case to help clarify the diagnostic criteria for the differentiation of gigantiform cementoma from other cemento-osseous lesions.

#8 ORAL VERRUCIFORM XANTHOMA: A SERIES OF 212 CASES AND REVIEW OF THE LITERATURE

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Background: Verruciform xanthoma (VX) of the oral cavity is an uncommon, reactive lesion with unknown etiology. To the best of our knowledge, this is the largest series of oral VX with a focus on demographics, clinical appearance, and histologic presentation. **Material and Methods**: Following IRB approval, all diagnosed cases of VX found in the archives of the University of Florida Oral Pathology Biopsy Service (1994-2018) were included. Age, gender, location, clinical appearance, clinical impression, and duration of lesion was collected for each lesion. **Results**: A total of 212 cases were included in our database and the mean age was 61 years (range of 9 - 94), with a female: male ratio of 1.06:1. The most common location in descending order was the gingiva (n=104 49.1%), palate (n=46, 21.7%), buccal mucosa (n=21, 9.9%), tongue (n=20, 9.4%), vestibule (n=13, 6.1%), lip (n=4, 1.9%), floor of mouth (n=3, 1.4%), and not specified (n=1, 0.5%). The lesions were most frequently pink in color, and most often described as bumpy, rough, verrucoid and/or papillary. Clinical impressions in descending order were papillary lesion (n=67, 31.6%) followed by not specified or unknown (n=41, 19.3%), hyperkeratosis (n=24, 11.3%), fibroma (n=20, 9.4%), leukoplakia (n=17, 8.0%), dysplastic lesion (n=13, 6.1%), pyogenic granuloma (n=7, 3.3%), granulomatous reaction (n=5, 2.4%), lichen planus and VX (n=4 each, 2.0%), pigmented and other lesions (n=3 each, 1.4%), and salivary and periapical lesions (n=2 each, 0.9%). Three of the reported lesions were recurrences. **Conclusion**: The demographics and clinical parameters of this series were generally in concordance with that of previously published reports. In this series, only 4 cases were clinically suspected as VX, demonstrating clinicians unfamiliarity of this lesion. This case series demonstrates the need for more effective clinical education of oral health care professionals to expand differential diagnosis of papillary lesions of the oral cavity.

#9 COMPARISON OF SPINDLE CELL LESIONS OF ORAL MUCOSA AND JAWBONES-A RETROSPECTIVE PATHOLOGICAL ANALYSIS

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Introduction: Lesions composed microscopically of spindle cells can be reactive, benign or malignant tumors, derived from a variety of origins. There is sparse specific literature regarding oral lesions.

Objectives: To investigate the spectrum of spindle cell lesions with comparison between oral soft tissue and jaw- bones.

Materials & Methods: Retrospective analyses, archives of oral pathology, 1996-2018.

Results:18,897 biopsies were searched. 877 (4.6%), cases were included, 70% in soft tissues, 30% in jaws. Over 90% of these were benign, with 9 (1%) malignant in soft tissues and 15 (7%) malignant in jawbones. In soft tissues the most prevalent lesions were peripheral ossifying fibroma 271 (44%), peripheral giant cell granu- loma 234 (39%), benign nerve sheath tumor 22 (3%)**,**peripheral odontogenic fibroma 20 (3%), oral focal mucinosis
14 (2%) and nodular fasciitis 8 (1%). 86% of soft tissue lesions were reactive, 14% were neoplastic. 9(1%) cases of malignant soft tissue tumors included 3 melanomas, 3 Kaposi's sarcoma and 1 each spindle cell carcinoma, metastatic rhabdomyosarcoma and malignant histiocytoma.
In the jaws lesions included central giant cell granuloma 79 (30%), fibro-osseous lesions 64 (26%), central ossifying fibroma 38 (15%), central odontogenic fibroma 33(13%), cemento-osseous dysplasia 18 (7%), odontogenic myxoma
7 (2%) and desmoplastic fibroma 3 (1%). Malignant jaw lesions 19 (7%) were all sarcomas.
86% of soft tissue lesions were of odontogenic or periodontal ligament origin and only 33% of central lesions were of odontogenic origin.

Conclusions: *Over 90% of all cases were benign, with a higher prevalence of spindle cell malignancies in the jawbones. The majority (86%) of the soft tissue lesions were reactive. In the jaws, 33% were clearly neoplastic, whereas the remainder were of undetermined nature. Odontogenic/periodontal ligament origin was significantly more prevalent in soft tissue lesions than in jaw lesions.*

#10 EBV-POSITIVE ATYPICAL LYMPHOCYTIC PROLIFERATIONIN AN IMMUNOSUPPRESSED PATIENT WITH SYSTEMIC LUPUS ERYTHEMATOSUS: A DIAGNOSTIC DILEMMA

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Objectives: Immunosuppressed patients, such as those having an autoimmune disease, transplant recipients, acquired immunodeficiencies, and elderly patients exhibiting immunosenescence, are at risk of both lymphoma and infection. Ulcerated lesions in these patient populations with an atypical lymphocytic proliferation and Epstein-Barr virus (EBV) positivity are problematic; the differential diagnosis includes EBV-related lymphomas and EBV-related mucocutaneous ulcers. Often, EBV-related mucocutaneous ulcers resolve with the withdrawal of immunosuppressive agents or restored immunocompetence. However, many patients require the causative immunosuppressive therapy, thus discontinuance of such therapy can be problematic. Stopping immunosuppression to allow confirmation of the suspected diagnosis of EBV-related mucocutaneous ulcer and ruling out a lymphoma is challenging. We hope to highlight the difficulty in differentiating these entities and in counselling these patients to pursue appropriate care, presenting one such case in a patient with systemic lupus erythematosus.

Patients and methods: We describe a case of a palatal ulcer in a 27-year-old female with systemic lupus erythematosus. The histologic exam of the ulcer revealed an atypical and large B cell population that was EBER positive in both perivascular and nested patterns admixed with extensive necrosis. The differential diagnosis includes an EBV-positive diffuse large B-cell lymphoma vs. an EBV-related mucocutaneous ulcer resembling a diffuse large B-cell lymphoma.

Conclusion: Differentiating between an EBV-related lymphoma and an EBV-related mucocutaneous ulcer is difficult from a histologic and molecular standpoint. The WHO describes EBV-related mucocutaneous ulcers that mimic diffuse large B-cell lymphomas, polymorphic post-transplant lymphopoliferative disorders, and Hodgkin-like morphology. Clinical considerations and course must be weighed before advising the best route of care for a patient presenting with an ulcerative lesion and the described histologic and molecular features. Consideration must be given to the patient's underlying conditions that require immunosuppression in planning the best course of action.

#11 IN VITRO AND IN VIVO CHARACTERIZATION OF CANDIDA ALBICANS AND STREPTOCOCCUS MUTANS INTERACTIONS ON ORAL MUCOSAL AND DENTAL SURFACES

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Introduction: The oral cavity is a complex environment harboring diverse microbial species that co-exist often within biofilms formed on oral surfaces. Within biofilms, inter-species interactions can be synergistic in that the presence of one organism generates a niche for another enhancing colonization. Among these species are *Candida albicans* and *Streptococcus mutans,* the etiologic agents of oral candidiasis and dental caries, respectively. Recent studies have reported enhanced prevalence of *C. albicans* in children with early childhood caries indicating that this fungal- bacterial interaction may have clinical implications. In this study, *in vitro* and *in vivo* studies were designed to validate the hypothesis that the presence of *C. albicans* in the oral cavity augments *S. mutans* colonization. *Methods*: Using various *C. albicans* mutant strains and a GFP-producing *S. mutans,* metabolic and fluorescent biofilm assays were performed to assess *S. mutans* recovery from mixed biofilms and to elucidate the mechanisms of interactions. Additionally, to visualize the architecture of formed biofilms confocal scanning laser fluorescent and electron scanning microscopy were used. Importantly, a clinically-relevant mouse model of oral co-infection was developed to demonstrate *C. albicans*-mediated enhanced *S. mutans* colonization in a host. *Results*: The findings demonstrated significantly higher recovery of *S. mutans* from biofilms with *C. albicans.* Images revealed a strong bacterial affinity to *C. albicans* and secreted fungal cell wall polysaccharides were identified as the key factor mediating biofilm formation. Importantly, analyses of harvested tissue demonstrated significantly higher *S. mutans* recovery from teeth and tongues of co-infected mice compared to mice with *S. mutans* alone. *Conclusion:* The findings strongly indicate that the presence of *C. albicans* in the oral environment may impact the development of dental caries and should be considered as a factor in evaluating risks of caries. Animal studies using a rat model of dental caries are currently underway in our laboratory.

#12 BURKITT LYMPHOMA PRESENTING AS BILATERAL PARADENTAL RADIOLUCENCIES

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Burkitt lymphoma is a high grade B-cell malignancy first described in African children. In endemic areas, the mean age is 7 and jaw lesions are characteristic. In contrast, sporadic cases in the US, patients are slightly older and abdominal lesions are typical with jaw involvement seen only 25%. Here, we present an unusual case of sporadic Burkitt lymphoma presenting as bilateral paradental cysts of the mandible.

A 31-year-old male was admitted with a complaint of abdominal and leg pain. An abdominal mass with a necrotic center was found. A biopsy was performed with a diagnosis of Burkitt lymphoma. One week later, the patient complained of right mandibular tooth mobility and pain. The oncologists believed the dental pain was likely an abscess and the patient was referred for a dental consultation. The panoramic radiograph demonstrated bilateral radiolucencies distal to partially erupted teeth 17 and 32. The lesions were semilunar in shaped with smooth borders and no expansion. Both radiolucencies were smaller than 2 cm, findings typical of paradental cysts. Upon examination, tooth #32 had grade 2 mobility in addition to the paradental radiolucency. No erythema, sinus tracts or drainage were noted. It was determined that #32 would be extracted. Upon extraction, a small amount of tissue was identified and submitted to oral pathology. The findings demonstrated sheets of undifferentiated lymphocytes with pleomorphic, mitotically active nuclei. Immunohistochemical analysis revealed positivity for CD20, CD10 and c-MYC supporting a diagnosis of Burkitt lymphoma.

Prior to the oral biopsy, the patient had imaging procedures that did not suggest the presence of extra-abdominal Burkitts. Based on the intraoral biopsy, the patient's treatment regimen was altered. The tissue submitted from the extraction of #32 yielded an incidental finding of Burkitt's lymphoma and demonstrates the necessity to submit all oral tissues removed during the course of dental procedures.

#13 ORAL PATHOLOGY INCIDENCE IN U.S. VETERAN POPULATION FROM 1990-2015: THE SAN FRANCISCO VA HEALTH CARE SYSTEMEXPERIENCE.

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Objectives: The Veterans Health Administration (VHA), is the largest integrated healthcare system in the United States. The predominantly male patient population has been exposed to multiple risk factors, and thus are predisposed to a variety of systemic conditions including oral cancer. The literature exploring the range of head and neck lesions seen within the VA system is scarce. Our objectives were to catalog all oral maxillofacial biopsy diagnoses obtained at a busy VA dental clinic over a 25-year period, determine the incidence of malignant and premalignant lesions, and gain information concerning malignant transformation of premalignant lesions.

Methods: A retrospective review was performed for all patients who underwent biopsy at the San Francisco VA Medical Center Dental Clinic. Data was obtained by review of the computerized patient record system (CPRS) and organized based on several criteria including pathologic classification, gender, and age at the time of biopsy.

Results: A total of 1169 biopsies from 742 unique patients (96% male) were obtained from 1990 to 2015. The age range was 24-88 years (mean 59.3 years). The most frequent diagnosis was squamous cell carcinoma (10.4% of all lesions). There were 181 malignant lesions in 96patients, and 91 premalignant diagnoses in 73 patients. The most common malignancy was squamous cell carcinoma (66.8%) followed by basal cell carcinoma (11.6%), and the most common premalignancy was epithelial dysplasia (51.6%). Malignant transformation occurred in 30.0% of those with premalignant lesions over an average of 14.7 months.

Conclusions: Our results display the scope of oral maxillofacial diagnoses and suggest that there may be a high incidence of oral malignancy and malignant transformation in veterans.Early recognition and diagnosis may reduce morbidity and mortality and improve patient outcomes. The role of dental professionals in identifying a wide variety of oral pathology, including potentially malignant disorders is emphasized.

#14 CHALLENGES IN THE VALIDATION OF DIGITAL MICROSCOPY FOR PRIMARY DIAGNOSIS IN ORAL PATHOLOGY.

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Introduction: The first digital pathology platform receiving FDA approval is leading the development of whole slide imaging systems (WSI) for diagnoses across a variety of diseases. However, concerns about how the introduction of these computational tools will impact the pathologists were raised. To address current challenges in the validation of digital microscopy for primary diagnosis in Oral Pathology and review the main reasons for the occurrence of diagnostic discordances, limitations and pitfalls for WSI primary diagnoses. **Material and methods:** This was a cross-sectional, retrospective study based on the College of American Pathologists Pathology and Laboratory Quality Center guidelines for validation of WSI systems. The sample consisted of H&E-stained glass slides of oral biopsies including a large range of subspecialty specimens, such as potentially malignant disorders, epithelial malignant neoplasms, benign and malignant salivary glands neoplasia, odontogenic cysts and tumors. The glass slides were scanned using the Aperio Digital Pathology System (Aperio Technologies Inc., Vista, CA, USA) with automated focusing and magnification at x20. Two pathologists blindly analyzed, in an independent way, cases with a conventional light microscope (CLM), and after 90 days of washout, with WSI. **Results:** The rate of diagnostic discrepancies was low ($\kappa > 0.8$), however, pathologists pointed out several technical problems including the presence of artifacts and folds, quantity of tissue, stain patterns, blurred focus and color fidelity issues, ranging from 20%-35% for CLM and 18%-24% for WSI. Absence of diagnostic hypotheses was also considered a limitation in the diagnostic validation process. Discrepant diagnoses were mainly due to challenging cases and inadequate tissue quantity. Outlier time values to render diagnoses occurred more frequently in oral dysplasia and malignant salivary gland tumors cases. **Conclusions:** Given the highly specialized nature of Oral Pathology, additional training on WSI may be necessary to overcome limitations in methods of preparation and cases interpretations.

#15 MULTIPLE INTRAOSSEOUS SCHWANNOMAS OF THE MANDIBLE

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Schwannomas, also known as neurilemomas, are benign neoplasms that derive from the myelin sheath-forming cells that encompass neuronal axons. The majority of tumors occur within the soft tissues of the head and neck and extremities. Intraosseous schwannomas are distinctly uncommon and have been postulated to arise de novo or from nerve fibers in pre-existing nutrient canals. We describe a 14-year-old female with a two-year history of asymptomatic mandibular lesions noted on routine examination. Panoramic and cone beam computed tomography imaging revealed a well-defined, multilocular radiolucency of the symphysis and a second, radiographically-similar lesion of the right posterior mandible. No cortical expansion was seen and the right mandibular canal appeared intact. The lesions were completely enucleated through multiple buccal cortical fenestrations and clean dissection from the canal and mental foramina was achieved, allowing preservation of the inferior alveolar nerve. Microscopic examination of both lesions showed a proliferation of palisaded, spindle-shaped cells and Verocay bodies alternating with more disorganized, hypocellular regions. Strong and diffuse staining with S-100 was observed, supporting the diagnoses of intraosseous schwannomas. The patient is currently two months post-surgery and exhibits right-sided mandibular paresthesia which is progressively resolving. Gnathic schwannomas are rare, intraosseous neoplasms that most frequently affect the posterior mandible of patients in their third to fourth decades of life. Although features such as paresthesia and mandibular canal distention may suggest a neural origin, the nonspecific clinicoradiographic presentation of most lesions can pose diagnostic challenges. Histopathologic examination with appropriate immunohistochemical studies is necessary to establish a definitive diagnosis. Surgical excision is indicated and can be achieved through a variety of approaches, ranging from conservative enucleation to segmental mandibulectomy. Factors influencing the choice of therapy include lesion size and location, presence of cortical perforation, and anatomic restrictions that hinder surgical access.

#16 BRAF-V600E AND UNICYSTIC AMELOBLASTOMA: A PRELIMINARY IMMUNOHISTOCHEMICAL STUDY

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Introduction: Unicystic ameloblastoma (UA) is considered a less aggressive subtype compared with solid/multicystic ameloblastoma and sometimes it can present clinical and radiographic similarities with dentigerous and radicular cysts. Although the UA presents a less infiltrative clinical behaviour, mural invasion of the capsule may ocur and, in this case, there is an association with local recurrence. Studies have demonstrated a high frequency of mutated BRAF protein in association with ameloblastoma but only a few focus on the unicystic variant. Thus, the objective of this study was to investigate the presence of the BRAF-V600E mutation by immunohistochemistry in unicystic ameloblastoma by correlating clinical and imaging data on the cases studied. Methods: Nineteen cases diagnosed as UA were selected for analysis. The specimens were submitted to immunohistochemistry for detection of BRAF- V600E mutated protein. Clinical-pathological data such as age, gender, location and subtypes (luminal, intraluminal and mural) were collected. The clinical-pathological parameters were categorised and analysed according to BRAF V600E detection. Results: Of the 19 patients, 84.2% (16 cases) demonstrated positivity for anti-BRAF-V600E antibody, whereas 3 were negative (15.8%). All cases were observed in jaws. The correlation between BRAF expression and variables showed no statistical significance for location (posterior versus anterior, $P = 1.00$) and subtypes (7 luminal, 7 intraluminal and 5 mural, $P = 0.80$), neither for gender (9 female and 10 male, $P = 0.58$) and age (mean age was 22.6 yo for women and 38.3yo for men, $P = 0.08$). Conclusion: BRAF- V600E mutation is common in unicystic ameloblastomas. In addition, this mutation can occur regardless of histological subtype of the tumour, age and gender. The association between clinical-pathological features and BRAF-V600E mutation in unicystic ameloblastomas may provide directions for precise diagnosis of this neoplasia.

#17 BRAF(V600E) MUTATION AS AN EARLY EVENT IN THE PATHOGENESIS OF AMELOBLASTOMA—OBSERVATION FROM A UNICYSTIC AMELOBLASTOMA DERIVED FROM DENTIGEROUS CYST CASE

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Ameloblastoma is the most common odontogenic neoplasm, which is thought to arise from the cells of dental lamina. Recent studies show SMO mutations in sonic hedgehog (SHH) pathway and activating mutations in MAPK(FGFR-RAS- BRAF) pathway play important roles in the pathogenesis of ameloblastomas. In our previous studies in Taiwan, high prevalence of *BRAF(V600E)* mutation, more than 80%, and frequent coexistence of Gli1 overexpression and *BRAF(V600E)* mutation in ameloblastomas revealed by real-time PCR and Sanger sequencing in spite of no detectable SMO mutation were noted. However, it is controversial whether activation of SHH pathway function as secondary events while activating mutations in MAPK pathway being the essential driver of pathogenesis. We reported a case of mural type unicystic ameloblastoma derived from previous dentigerous cyst involving an un-erupted mandibular third molar. Enucleation of the lesion with peripheral ostectomy was performed. The ameloblastic epithelium in cystic lining and the tumor nests in cystic wall showed cytoplasmic staining of BRAF(V600E) mutated protein in immunohistochemical study. The residual non-keratinized squamous epithelium of dentigerous cyst is negative for BRAF(V600E) staining. Interestingly, some remnant of odontogenic epithelium in the cyst wall without ameloblastic differentiation also showed BRAF(V600E) cytoplasmic staining. This result suggested that *BRAF(V600E)* mutation may occurred in early stage of tumorigenesis and is an essential event in the pathogenesis of ameloblastoma.

#18 GHOST CELL ODONTOGENIC CARCINOMA ARISING IN A PREVIOUS CALCIFYING ODONTOGENIC CYST–A CASE REPORT AND REVIEW OF LITERATURE

Dr. Ioana Ghita (University of Maryland Baltimore), Dr. Michael Nagai (University of Maryland Baltimore), Prof. Kristen Stashek (University of Maryland Baltimore), Prof. John Papadimitriou (University of Maryland Baltimore), Prof. Joshua Lubek (University of Maryland Baltimore), Prof. Donita Dyalram (University of Maryland Baltimore), Prof. Rania Younis (University of Maryland Baltimore)

Introduction: Ghost Cell Odontogenic Carcinoma (GCOC) is a rare malignancy of odontogenic origin. It is characterized by ghost cell aberrant keratinization, dentinoid deposition in variable quantities, and evidence of malignant cellular features. It has unpredictable prognosis due to the wide variety of growth patterns and the limited number of reported cases.

Materials and methods: The clinical, histological and immunohistochemical (IHC) features of a rare case of GCOC are presented, in addition to a summary of literature review.

Results: A 36y/o AA male presented with a long-standing history of right sided facial swelling, difficulty with speech and right sided nasal obstruction. Clinical examination revealed a large mass encompassing the right maxilla with significant palatal expansion and ulcerated overlying palatal mucosa. An incisional biopsy of the lesion was performed which showed a Calcifying Odontogenic Cyst (COC). The patient underwent right subtotal maxillectomy and reconstruction of maxillary defect with fibula-osteocutaneous free flap. The excisional biopsy revealed odontogenic epithelium proliferating in the form of broad sheets and strands with columnar ameloblast-like peripheral cells, central large cells with vesicular nuclei, areas of ghost cell keratinization, in addition to malignant cellular features of abnormal mitotic figures, hyperchromatism, pleomorphism and areas of comedonecrosis. Margins showed invasion into the maxillary alveolar bone and nasal septum. A small area of classic COC was noted on one of the examined sections. The IHC profile showed lesional cells to be strongly positive for beta-Catenin, Ki-67 (proliferative index of ~75%) and focal areas of diffuse nuclear staining of p53. A diagnosis of GCOC arising in a previous COC was determined based on H&E and IHC review.

Conclusion: It is important to recognize this entity to avoid possible underdiagnoses since it is an extremely rare tumor that may arise in otherwise innocuous COC. This case represents less than 50 reported cases in literature.

#19 GHOST CELL ODONTOGENIC CARCINOMA ARISING IN A PREVIOUS CALCIFYING ODONTOGENIC CYST – A CASE REPORT AND REVIEW OF LITERATURE

Dr. Ioana Ghita (University of Maryland Baltimore), Dr. Michael Nagai (University of Maryland Baltimore), Prof. Kristen Stashek (University of Maryland Baltimore), Prof. John Papadimitriou (University of Maryland Baltimore), Prof. Joshua Lubek (University of Maryland Baltimore), Prof. Donita Dyalram (University of Maryland Baltimore), Prof. Rania Younis (University of Maryland Baltimore)

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Conclusion: It is important to recognize this entity to avoid possible underdiagnoses since this is an extremely rare tumor that may arise in otherwise innocuous COC. This case represents less than 50 reported cases in literature.

#20 ATYPICAL PERIPHERAL AMELOBLASTOMA WITH LIKELY MALIGNANT TRANSFORMATION

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Peripheral amelobastoma (PA) is a rare odontogenic tumor, arising from either the basal cell layer of surface epithelium or dental lamina rests. PA presents as an exophytic growth in the soft tissues overlying tooth-bearing areas, with a predilection for the mandibular premolar region (32.6%). PA, unlike intraosseous ameloblastoma, exhibits innocuous biological behavior and requires only conservative surgical excision. This is a case of PA that presented in lingual gingiva of teeth #27 and 28 in a 17-year-old female with marked cytologic atypia. A periapical radiograph of the quadrant was unremarkable. Histologic examination revealed a basaloid neoplasm adjoined with surface epithelium. The tumor islands had two distinct cell populations. In one, the islands consisted of basaloid cells with overlapping nuclei that were pleomorphic and hyperchromatic, with many mitotic figures. The peripheral cells exhibited slight reverse nuclear polarization while other areas had squamoid differentiation. The second population of cells was organized as interlacing narrow cords with small, round, regular nuclei with dispersed chromatin, minimal nuclear crowding and no mitotic activity. These cells were also in continuity with the surface epithelium and transitioned into the first population of atypical cells. The immunohistochemical study for CK 19 was strongly positive within all tumor cells while the studies for Ber-EP4, BCL-2 and smooth muscle actin were negative. The Ki-67 index varied from <1% in the benign-appearing superficial cords of tumor cells to >80% in the hypercellular areas with cytologic atypia. The final diagnosis was that of an atypical PA with marked cytological atypia, suspicious for malignant transformation. Currently, there are three cases of malignant transformation of PA, all of which occurred in males in the 4^{th}-8^{th} decades and in the maxillary canine-premolar region. Two of the three cases showed no recurrence after a year following excision, similar to our patient.

#21 EXPANDING THE CLINICAL PRESENTATION OF SEGMENTAL ODONTOMAXILLARY DYSPLASIA BY REPORTING MANDIBULAR INVOLVEMENT

Dr. Tanya Gibson (University of Missouri - Kansas City), Dr. Ioannis Koutlas (University of Minnesota)

Introduction: Segmental odontomaxillary dysplasia (SOD) was first described by Miles et al (Oral Surg Oral Med Oral Pathol 1987: 445) and its clinicopathologic characteristics further defined by Danforth et al. (Oral Surg Oral Med Oral Pathol 1990:81). Subsequent articles have reported on various cutaneous homolateral lesions and zygomatic involvement as part of the condition. Herein, involvement of the mandible is described to further expand the clinical features of this disorder.

Materials and Methods: An 8-year-old female presented with a two-year history of expansion of the left maxilla and mandible in the area of maxillary and mandibular premolars. A bone biopsy was performed in the mandible. Also, soft tissue biopsy was obtained for molecular evaluation of genes related to overgrowth using next generation sequencing.

Results: A panoramic radiograph revealed congenitally missing left maxillary and mandibular first and second pre- molars and both mandibular canines. All third molars were also congenitally missing. In the area of the contiguous congenitally missing left maxillary and mandibular teeth, ill-defined granular radiopacities highlighting abnormal trabeculation were evident. Biopsy from the mandibular radiodense area revealed woven bone with prominent reversal lines essentially similar to the osseous lesions of SOD. Currently, the soft tissue sample is evaluated for mutations in *PIK3CA, AKT1, AKT3, GNAQ, GNA11, MTOR, PIK3R2 and the results will be presented and discussed.*

Conclusions: Although most frequently presenting with maxillary involvement, patients with SOD may present wider clinical homolateral manifestations including cutaneous, facial and mandibular lesions. The term segmental odontofaciognathic dysplasia (SOFGD) may be better defining this entity.

#22 A DESTRUCTIVE NASAL CAVITY MASS WITH FEATURES OF GHOST CELL ODONTOGENIC CARCINOMA AND CTNNB1 MUTATION

Dr. Yen Chen Kevin Ko (Stanford University Medical Center), Dr. Koah Vierkoetter (John A Burns School of Medicine, University of Hawaii), Dr. Susan Hsiao (Columbia University), Dr. Helen Fernandes (Columbia University), Dr. Catherine Poh (The University of British Columbia), Dr. Gerald Berry (Stanford University Medical Center)

Ghost cell odontogenic carcinoma (GCOC), defined as an odontogenic carcinoma with ghost-cell aberrant keratinization and destructive growth, is one the rarest of the odontogenic lesions. All reported cases have been intraosseous with approximately 40% of cases confirmed to arise from pre-existing calcifying odontogenic cyst or dentinogenic ghost cell tumor. *CTNNB1*mutation has been reported as a common target for the pathogenesis of odontogenic ghost cell tumors. Here, we report a case of sinonasal ghost cell odontogenic carcinoma with *CTNNB1* mutation.

The patient is a 44-year-old woman with 3-year history of nasal congestion. A CT scan showed a left nasal cavity mass deforming the medial wall of the left maxillary sinus and opacification of the left maxillary, ethmoid, and frontal sinuses. No intracranial tumor extension or connection to the skull base was identified. An initial nasal biopsy was diagnosed as a poorly differentiated squamous cell carcinoma. The patient subsequently received a left medial maxillectomy. Intraoperatively, the mass was noted to be pushing through the tissues of the nasal bone. No teeth or intraosseous involvement of the maxilla was seen. Histologic sections show nests and sheets of medium sized cells with round to ovoid nuclei, prominent nucleoli, and dense eosinophilic cytoplasm intermixed in a pink amorphous stroma. Frequent abrupt aberrant keratinization morphologically identical to “ghost cells” are noted. The tumor cells are positive for CK5/6, MCK, LEF-1 (nuclear), and beta-catenin (nuclear) but negative for NUT, INSM1, and CD99. The tumor cells have shown *CTNNB1* D32Y mutation.

We reported an unusual sinonasal ghost cell odontogenic carcinoma developing from a possible remnant of dental lamina from nasal cavity. This case highlights the rarity of nasal cavity presentation and the importance for clinicians to be familiar with this entity.

#23 THE RARE RADIOGRAPHIC SUNRAY APPEARANCE OF ODONTOGENIC MYXOMAS: A CASE REPORT AND REVIEW OF THE LITERATURE

Dr. Jamie White (Mount Sinai Hospital), Dr. Naomi Ramer (Mount Sinai Hospital), Dr. Todd Wentland (Mount Sinai Hospital), Dr. Molly Cohen (Mount Sinai Hospital)

Introduction: Odontogenic myxomas often have distinctive radiographic presentations, many of which are well known and have been termed "soap bubble", "tennis racket", and "honeycomb" patterns, while others are less common such as "sunray" or "sunburst" patterns. The rare radiographic sunray or sunburst appearance of odontogenic myxomas has been infrequently reported in the literature with only 20 cases reported to date.

Objective: The objective of this paper is to report a case of an odontogenic myxoma presenting with a radiographic sunray appearance and present a review of the literature on this uncommon presentation.

Clinical presentation: A 34-year-old male presented with mild expansion of the left posterior mandible. A panoramic radiograph displayed a sunray appearance of the lesion. Surgeons included osteosarcoma in their differential diagnosis due to this distinct radiographic appearance. An incisional biopsy was performed and received a diagnosis of odontogenic myxoma.

Intervention and Outcome: The patient underwent segmental resection of the mandible and the excisional biopsy confirmed the diagnosis of odontogenic myxoma.

Conclusion: Although the radiographic sunray or sunburst appearance is not the most common presentation of odontogenic myxomas, undoubtedly, it is necessary for clinicians and pathologists to be cognizant of it. Very often, the sunray appearance has been associated with a malignant process and prompts a differential diagnosis that gravitates toward malignant entities; therefore, there is value in the awareness that the benign odontogenic myxoma can present in the same manner. 20 cases of odontogenic myxoma in the English literature have presented with this radiographic pattern. To the best of the author's knowledge, this additional case brings the number of cases reported to 21.

#24 DESMOPLASTIC FIBROBLASTOMA OF THE PALATAL MUCOSA: A RARE INTRAORAL PRESENTATION WITH IMMUNOHISTOCHEMICAL ANALYSIS

Dr. Aparna Naidu (University of Missouri - Kansas City), Dr. Steven Prstojevich (University of Missouri - Kansas City), Dr. Bruce Barker (University of Missouri - Kansas City)

OBJECTIVE: Desmoplastic fibroblastoma (DF) is a benign, slow-growing, fibroblastic proliferation that was first described by Evans in 1995. DF most commonly affects the subcutaneous tissues of the limbs, back, and neck. Only 9 cases in the oral cavity have been reported thus far in the English literature. The peak incidence of DF is in the fifth and sixth decade. While 80% of cases affect males, females represent 80% of reported cases in the oral cavity. Cytogenetic studies have shown a consistent gene rearrangement at 11q12, resulting in a higher expression of FOSL1 when compared to desmoid-type fibromatoses. Histopathologically, DF often has a well-delineated periphery, and is composed of sparsely distributed, medium to large spindle to stellate-shaped fibroblastic cells, with rare mitoses, interspersed between dense collagen fibers. The proliferating cells usually express reactivity with vimentin and, focally, with smooth muscle actin (SMA), suggesting their myofibroblastic origin. It is questionable whether DF represents a reactive or neoplastic proliferation.

CLINICAL PRESENTATION: A 37-year-old female was referred to an oral and maxillofacial surgeon for evaluation of a smooth surfaced soft tissue mass of the midline palate that had been slowly increasing in size for 5 years. The mass was firm to palpation, measuring 4.7 x 3.8 x 2.2 cm in size. Radiographic evaluation and a computerized tomography scan confirmed the mass was contained within soft tissue. An excisional biopsy was performed.

RESULTS: Histopathologic examination revealed a well-defined proliferation of stellate shaped fibroblasts in a densely fibrous stroma. Immunohistochemical studies resulted in positivity with vimentin, and focal positivity with SMA. Negative reactivity was seen with CKAE1/3, EMA, S100, desmin, GLUT-I, CD34, SOX-10, Claudin1, p63, and GFAP.

CONCLUSION: The histopathologic features and immunohistochemical studies were compatible with a diagnosis of desmoplastic fibroblastoma. Postoperatively, the patient healed adequately and no recurrence was seen at ten months.

#25 FLORID CEMENTO-OSSEOUS DYSPLASIA IN CRANIOMETAPHYSEAL DYSPLASIA – FIRST REPORTED CASE

Ms. Makayla Gresham (West Virginia University School of Dentistry), Dr. Jerry Bouquot (West Virginia University School of Dentistry), Dr. Hiba Qari (West Virginia University School of Dentistry)

Background: Craniometaphyseal dysplasia (CMD) is a rare autosomal dominant (5p15.2-p14.1) disorder resulting in progressive hyperostosis and abnormal shaping of craniofacial and long bones secondary to osteoclastic dysfunction. Cemento-osseous dysplasia (COD) has a quite different physiology and presentation. **Objective:** To report a CMD patient with a focally expansile mandibular lesion consistent with florid COD and review differences between the two diseases. **Methods:** A 25 year old African American female, previously diagnosed with CMD (prominent forehead, broad nasal bridge, and ocular hypertelorism) was evaluated for multifocal mandibular radiolucencies inconsistent with CMD. **Results:** The patient had noticed slow expansion of the facial cortex of her anterior mandible causing tooth mobility and local tenderness. CBCT imaging showed multiple large, well-demarcated, unilocular and multiloculated radiolucencies, some in apical positions, with centrally located, globular radiopacities in several areas. Biopsy of a lesion showed an uninflamed, cellular, fibroblastic stroma with scattered irregular islands of immature bone with occasional osteoblastic activity and few missing osteocytes; focal areas showed globular cementum- like structures with minimal cellularity. A dense fibrous capsule was noted. A diagnosis of florid cemento-osseous dysplasia, unrelated to CMD, was made. Conclusion:We report the first case of florid COD in a patient with a generalized bone dysplasia, in this case CMD. It is important in such cases to assess all radiographic and microscopic features to ensure a correct diagnosis, since COD lesions have a biological behavior which differs from that of CMD and are managed differently. Distinguishing clinical, radiographic and microscopic features are discussed.

#26 MOLECULARCHARACTERIZATIONOFfiBROOSSEOUSLESIONSAFFECTING ORAL AND MAXILLOFACIAL REGION

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Sciences, New Delhi), Dr. Aanchal Kakkar (All India Institute of Medical Sciences, New Delhi), Dr. Sunny Kala (All India Institute of Medical Sciences, New Delhi), Dr. Rahul Yadav (All India Institute of Medical Sciences, New Delhi), Prof. O.P. Kharbanda (All India Institute of Medical Sciences, New Delhi)

Introduction: Fibro-osseous lesions of the craniofacial complex are a group of developmental bone disorders and neoplasms that share clinical, radiological, and morphological features. Since, the treatment strategies are varied in nature with regard to the wide variety of fibro-osseous lesions, there is need to identify novel specific markers which will contribute to the accuracy of their diagnosis. Hence, the study aims to identify specific immunohistochemical marker, which can improve the accuracy of diagnosis of fibro-osseous lesions.

Materials and Methods: Total of 100 histopathologically diagnosed cases of fibroosseous lesions (25 cases of ossifying fibroma (OF), 25 cases of fibrous dysplasia (FD), 25 cases of osteosarcoma(OS) and 25 cases of fibrous hyperplasia) were collected from the archives of Division of Oral Pathology and Microbiology, CDER and Department of Pathology, AIIMS. Histological sections of these samples were subjected to immunoperoxidase procedures. Immunostaining was performed for the panel of MDM2, CDK4 and BCL2 expression and slides were evaluated. The percentage of positive tumor cell nuclei were evaluated and immunostaining positivity was defined: ≤10, 11–25, 26–50 and >50%.

Results: MDM2 positivity was seen in 47% of osteosarcomas, 11% of OF and 0% of FD. CDK4 positivity was seen in 60% OS, 21% of OF and 9% of FD. BCL2 was seen in 33% OS, 24% of OF and 15% of FD. Controls did not show positivity for any of these markers except for CDK4 positivity in one case.

Conclusions: Present study concludes that MDM2 and CDK4 are better markers than BCL2 in differentiating osteosarcomas from benign fibroosseous lesions like fibrous dysplasia and ossifying fibroma, thus they can be used for improving accuracy of diagnosis of fibro-osseous lesions.

#27 AN ANALYSIS OF UTAH'S MOST COMMON ORAL LESIONS

Mr. Carter Bruett (University of Utah School of Dentistry), Dr. Bryan Trump (University of Utah School of Dentistry)

Introduction: Data gathered from the inception of a new oral pathology biopsy database located at the University of Utah (the only oral pathology service in Utah) was used to demonstrate the frequency of submitted lesions and the resultant diagnoses. The main objective was to compare the biopsy data of Utah to nationwide reported data. It could be used to guide clinical presumptive diagnoses.

Materials and Methods: The database was analyzed by cross-sectional comparison of 4,032 submitted biopsies. These biopsies came largely from Utah, with surrounding states also contributing. Results were compiled relative to age, ethnicity, gender, and biopsy location. Prevalence rates per 1000 were also calculated to help guide clinical presumptions.

Results: Fibroma was the most common histopathological diagnosis, followed by hyperkeratosis and then chronic apical periodontitis. Biopsies were most commonly taken from the maxillary alveolar ridge. The contrast between females and males is minor. When compared by age, mucoceles dominate the first two decades of life. This is followed by a rise in dentigerous cysts, which is then followed by a rise in periapical granuloma and fibroma diagnoses. In the last two decades of life, hyperkeratosis, squamous cell carcinoma, and ulcerations become most common.

Conclusions: This ebb and flow of pathology tells an interesting story and can be used to help set expectations clinically. Certainly, the prevalence of cancer warrants a thorough head and neck exam that should be conducted at every visit with a patient and, following appropriate clinical guidelines, biopsied for a definitive histopathological diagnosis. Based on patient age, various atypical tissue types should be closely monitored, and vigilance is of the utmost importance. Importantly, clinicians should submit for histopathological analysis any excised tissue to a board certified oral and maxillofacial pathologist in order to receive an accurate histopathologic diagnosis.

#28 ORAL SQUAMOUS CELL CARCINOMA IN FANCONI ANEMIA: REPORT OF FOUR CASES

Mr. Grayson Cole (University of Minnesota School of Dentistry), Dr. John Wagner (University of Minnesota Medical School), Dr. Margaret MacMillan (University of Minnesota Medical School), Ms. Karla Olesen (University of Minnesota School of Dentistry), Dr. Shanti Kaimal (University of Minnesota School of Dentistry), Dr. Rajaram Gopalakrishnan (University of Minnesota School of Dentistry)

Introduction: Fanconi anemia (FA) is a rare predominantly autosomal recessive condition characterized by progressive bone marrow failure, congenital anomalies, and increased risk of cancer. FA patients have demonstrated a >500 fold increase risk of developing head and neck cancers including oral squamous cell carcinoma (OSCC). These rates increase in FA patients treated by allogeneic hematopoietic cell transplantation (HCT). Risk factors include graft-versus-host disease (GVHD), a common complication that causes immunodeficiency and tissue injury in the oral cavity. The incidence of cancer in such patients is estimated to be >80% by age 50 years with few long-term survivors. The main objective of this study is to describe the clinical presentation and histological characteristics of OSCC lesions in 4 cases that illustrate the diagnostic challenges. **Materials and Methods:** Four FA patients who are seen regularly at the University of Minnesota Medical Center and subsequently developed OSCC were selected. Clinical and histological features of oral lesions were systematically documented over time. **Results:**Two males and 2 females with FA successfully underwent a HCT for severe aplastic anemia (n=3) and advanced myelodysplastic syndrome (n=1). OSCC diagnosis was made 1, 4, 13 and 14 years after transplant. In 3 of 4 cases, abnormal lesions were monitored for a prolonged period of time before SCC was considered. SCCs were found in the sublingual space (n=1), lateral tongue (n=2), and gingiva (n=1). Two had metastatic disease at diagnosis and died rapidly. No patient had evidence of HPV and none had typical OSCC risk factors. **Conclusions**: FA patients develop oral cancer at an extremely high rate and at a much younger age than non FA patients. Lower threshold for biopsy and histological evaluation should be considered. Considering the high incidence, chemoprevention strategies might be considered well before the development of dysplasia.

#29 OVEREXPRESSION OF THE MUTATING ENZYME APOBEC3B CHARACTERIZES THE PROGRESSION OF ORAL CARCINOGENESIS

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Objectives: Oral squamous cell carcinoma (OSCC), a subset of head and neck cancer (HNC), is characterized by increased morbidity and poor patient survival. The molecular events causing OSCC remain poorly defined. The DNA cytosine deaminase APOBEC3B causes C-to-T and C-to-G base substitutions and intratumor heterogeneity in multiple human malignancies, including HNC. Global gene expression analyses have associated APOBEC3B over- expression and dysregulation of the RB/E2F cell proliferation pathway. Herein, we aimed to investigate whether APOBEC3B protein levels change during multiple stages of oral carcinogenesis and whether its expression correlates with the proliferation marker Ki67. **Methods:** APOBEC3B and Ki67 levels were assessed by immunohistochemistry in serial sections of formalin fixed, paraffin-embedded (FFPE) specimens of oral epithelial hyperplasia (OEH, n=12), low-grade oral epithelial dysplasia (OED, n=20), high-grade OED (n=15), and invasive OSCC (n=38). Immunoreactive proteins were visualized with the Aperio ScanScope XT system and quantified with the Aperio Nuclear Algorithm. APOBEC3B H-score and percentage of Ki67(+) cells were calculated for each specimen. Statistical analysis was performed using non-parametric Kruskal-Wallis test. **Findings:** APOBEC3B nuclear immunopositivity increased during the continuum of oral carcinogenesis; high-grade OED and OSCC showed significantly increased APOBEC3B H-scores compared to low-grade OED ($p<0.001$ and $p<0.01$, respectively) and OEH ($p<0.0001$ and $p<0.001$, respectively). Overall, stronger APOBEC3B staining was observed at the basal, suprabasal, and bottom spinous layer of the dysplastic epithelium. In OSCC, APOBEC3B staining was heterogeneous among neoplastic cells. As anticipated, Ki67 expression progressively increased from epithelial hyperplasia to high-grade dysplasia ($p<0.05$) and invasive cancer ($p<0.0001$). Interestingly, the majority of Ki67(+) cells also stained positive for APOBEC3B. A positive linear correlation is evident between the percentage of Ki67(+) cells and APOBEC3B nuclear H-scores (Pearson r=0.54). **Conclusions:** Levels of the mutating enzyme APOBEC3B increase during advanced stages of oral cancer development and correlate with elevated expression of cellular proliferation markers (Ki67).

#30 EFFECTS OF EXTRACELLULAR MICROVESICLES DERIVED FROM ORAL SQUAMOUS CELL CARCINOMA ON TUMORIGENESIS ASSOCIATED GENE EXPRESSION IN MYOEPITHELIAL CELL CULTURES

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Introduction: Carcinoma ex pleomorphic adenoma (CXPA) is a rare malignant salivary gland tumor derived from a pre-existing pleomorphic adenoma (PA). Many factors can be involved during the malignant transformation of PA, such as cytokines and growth factors, produced by both epithelial and myoepithelial cells. A great interest has emerged regarding the mechanism of cell-to-cell communication through extracellular microvesicles (MV). These structures are produced by many different cell types and can modulate cellular activity by induction of epigenetic alterations. Among the biological mechanisms modulated by MV, the tumorigenesis process of different neoplasms has been highlighted in recent studies. In this context, the aim of the present study was to evaluated the effects of MV derived from oral squamous cell carcinoma (OSCC) on the expression of genes associated with tumorigenesis in myoepithelial cell cultures. **Materials and Methods**: For this purpose, MV from OSCC cultures were collected and then myoepithelial cell cultures were exposed to them. Myoepithelial cell cultures not exposed to MV were used as control. After 24 h, the total RNA of myoepithelial cells was extracted and submitted to PCR array analysis. The cutoff for the fold-change in gene expression was 3, and the level of significance was set at 5 %. **Results**: The results indicated that myoepithelial cells exposed to MV from OSCC over-expressed genes involved in proliferation and migration (*EREG*), cell survival (*IL-1A*, *IL-1B*, and *SSP1*) and immune response (*CSF*and*CXCL1*); and under-expressed pro-apoptotic (*FIGF*) genes. **Conclusion**: The results suggested that MV of OSCC can modulate the expression of a group of genes associated with tumorigenesis and, consequently, contribute to the establishment of CXPA.

#31 CELL CYCLE PARAMETERS IN DYSPLASTIC LESIONS OF THE ORAL MUCOSA

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Introduction: Risk assessment of oral potentially malignant disorders (OPMD) using ploidy analysis is based on cell cycle parameters, such as the proportion of cells in G1, S-phase, G2, as well as the percentage of cells with a DNA content beyond G2. Although aneuploidy has been associated with a high risk of malignant transformation, little is known on the contribution of individual cell cycle parameters to the prognosis of OPMD. The aim of this study was to compare the distribution of the aforementioned cell cycle parameters between grades of dysplasia (OED) and carcinoma (SCC). Methods: Nuclei suspensions were enzymatically prepared from formalin-fixed paraffin embedded tissue and stained with propidium iodide for flow-cytometry. Histograms were analysed for the proportion of nuclei in G1, S-phase, G2 and 5c-exceeding rate (5cER), according to published criteria. Epithelial dysplasia was graded prior to preparing the suspensions and DNA ploidy was established for each OED (none, mild, moderate and severe) as well as SCC (positive control). Results: A positive correlation was observed between the degree of OED and ploidy, with higher degrees of dysplasia tending to be aneuploid (Spearman r= 0.54, 95%CI 0.35 - 0.68, p <0.0001). Severe dysplasias showed the highest elevations in fractions of S-phase, G2 and 5cER (ANOVA and Tukey tests, $p<0.05$) when compared to the lesions without dysplasia, which were very similar to SCC ($p>0.05$). G2 and 5cER were the most relevant parameters, though the highest S-phase fraction was observed in mild and severe OED. Conclusion: Individual cell cycle parameters, especially S-phase fraction, may be able to identify different risk levels between lesions. Follow-up data to establish sensitivity and specificity are currently underway.

#32 ORAL MUCOSAL MELANOMA IN PREADOLESCENT IDENTIfiES LI-FRAUMENI SYNDROME.

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Introduction: Li-Fraumeni Syndrome (LFS) is a rare entity leading to cancer development at a young age with the potential for multiple primary cancers, caused by TP53 mutation. Typically, in children, LFS is characterized by adrenocortical carcinoma, brain tumors, and sarcomas.

Clinical Presentation and Pathology Findings: An 11-year-old female presented with a pigmented right maxillary gingival enlargement. Biopsy showed mucosal melanoma (ovoid to spindled tumor cells, positive for S100, HMB45, MelanA, Ki67 proliferation index=60%). Next generation sequencing (NGS) of tumor (somatic) and peripheral blood mononuclear cells (constitutional) revealed TP53 mutation. Parents sought alternative therapy for oral tumor. Approximately 6 months later, patient returned with intraoral tumor progression and bilateral cervical lymphadenopathy. Right posterior maxillectomy and bilateral lymph node dissection showed primary intraoral melanoma with lymph node metastases. One lymph node showed microscopic focus of metastatic papillary thyroid carcinoma (PTC). A 3cm right thyroid nodule showed PTC on fine needle biopsy. Total thyroidectomy was performed. Oncologic management for melanoma was completed. Left ovarian mass was noted 3 years later with oophorectomy demonstrating melanoma (positive for S100, HMB45, MelanA). Oncologic management was completed. Two years later, a right femur mass was diagnosed as chondroblastic osteosarcoma (COS) on biopsy. Following oncologic management and limb salvage, tumor had a poor histologic response (35% tumor necrosis) and chemotherapy was intensified. Two years later, right lung single 0.5 cm nodule, left femur 0.6 cm intramedullary nodule, and L5 vertebral lamina lesion were identified on radiologic examination. Resection proved to be COS, and the child underwent oncologic management.

Conclusion: Mucosal melanoma is rare in the pediatric population. NGS utility in identifying TP53 somatic and constitutional mutations and in the diagnosis of LFS is demonstrated with the current case. LFS diagnosis allowed for close surveillance and oncologic management of multiple primary and metastatic tumors.

#33 MACROPHAGE MIGRATION INHIBITORY FACTOR (MIF) AS A POTENTIAL ORAL MUCOSITIS BIOMARKER.

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Introduction: This study aimed to characterize the salivary proteomic profile of patients treated for oral squamous cell carcinoma (OSCC) and to further correlate it with the risk of developing severe radiation-related oral mucositis (OM).**Material and methods:** 41 OSCC patients submitted to adjuvant radiotherapy (RT) or chemoradiotherapy (CRT) were included in this study. OM and OM-related pain were daily evaluated during RT and graded according to the *Common Toxicity Criteria for Adverse Events*(NCI, *Version*4.0, 2010) and the Visual Analogue Scale (VAS). For the molecular analysis, whole saliva was collected immediately prior to RT and subjected to proteomic by means of liquid chromatography coupled to mass spectrometry (LC-MS/MS) (LTQ Orbitrap Velos MS/ Thermo Fisher Scientific, Bremen, Germany) and label-free protein quantification. The results obtained from the targeted proteomic analysis were compared to OM clinical outcomes. Statistical analysis was performed using the Wilcoxon test. **Results:**58% of the patients were submitted to CRT protocols with a mean RT dose of 66Gy; 44% of the patients presented grade 2 and 32% presented grade 3 as highest OM grade during RT, with a mean highest reported VAS of 3.53. For the target proteomics analysis, a total of 65 proteins were observed mostly related to biological processes, such as immune responses, peptidase inhibitor activity, and inflammatory system. The Macrophage migration inhibitory factor (MIF HUMAN) was statistically significant when correlated to OM grade. MIF was observed in higher abundance for OM grades 3/4 when compared to grades 1/2 (p=0.04). **Conclusions:** This seems to be the first study to describe MIF as a potential salivary marker of high-grade OM in OSCC patients. Additional future studies are needed to validate these results and to better understand the role of MIF in the pathogenesis of OM.

#34 IS PHOTOBIOMODULATION THERAPY USE FOR PREVENTION AND TREATMENT OF TOXICITIES INDUCED BY CANCER TREATMENT SAFE? A SYSTEMATIC REVIEW.

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Introduction: Photobiomodulation therapy (PBMT) also known as low-level laser therapy has been increasingly used for the treatment of toxicities related to cancer treatment. One of the challenges for the universal acceptance of PBMT use in cancer patients is whether or not there is a potential for the light to stimulate the growth of residual malignant cells that evaded oncologic treatment, increasing the risk for tumor recurrences and the development of second primary tumors. Current science suggests promising effects of PBMT in the prevention and treatment of oral mucositis and breast cancer-related lymphedema among other cancer treatment toxicities. Nevertheless, this seems to be the first systematic review to analyze the safety of the use of PBMT for the treatment of cancer-related toxicities. **Material and methods:** This study aimed to evaluate the current literature regarding the safety of PBMT use in the prevention and/or treatment of complications related to antineoplastic therapies. Scopus, MEDLINE/PubMed, and Embase were searched electronically. The protocol for this systematic review was registered in the International Prospective Register of Systematic Review (PROSPERO) database (registration number CRD42018094364) to avoid duplicate publications of systematic reviews and to enable comparison among methods as they are reported in the review protocol. **Results:** A total of 27 articles met the search criteria. Selected studies included the use of PBMT for prevention and treatment of oral mucositis, lymphedema, radiodermatitis, and peripheral neuropathy. Most studies showed that no adverse events were observed with the use of PBMT. **Conclusions:** The results of this systematic review, based on current literature, suggest that the use of PBMT in the prevention and treatment of cancer treatment toxicities does not lead to the development of safety issues.

#35 "RING AROUND THE COLLAR" (CIRCULAR MARGINAL GINGIVAL LEUKOPLAKIA) IS ASSOCIATED WITH PREMALIGNANT AND EARLY MALIGNANT CHANGES

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Introduction: Premalignant and malignant lesions of the gingiva frequently present as a white ring or cuff initially involving the crevicular gingival margin of the tooth. This phenomenon is not well-recognized or documented in the literature. The objective of this study is to report a case series of premalignant and malignant lesions presenting as peri-gingival leukoplakic cuffing - "ring around the collar" so as to raise awareness of this phenomenon.

Materials and Methods: An IRB approved retrospective search of UF Oral Pathology Biopsy Service, from 1994 – 2018, for diagnoses of premalignant or malignant lesions of the gingiva that had accompanying clinical images was performed. Inclusion criteria comprised of cases (a) with premalignant or malignant diagnosis, and (b) exhibiting clinical presentation of peri-gingival cuffing. Cases that lacked accompanying clinical image were excluded.

Results: A total of 18 cases involving the marginal gingiva, especially the buccal aspect, were included. Patient age ranged from 46 years to 90 years, with equal distribution between males and females. Duration of the lesions varied from a few months to 10 years. A large majority of the cases presented as asymptomatic lesions, with 2 patients reporting tenderness or soreness in the area. All lesions clinically presented as a distinct thick white peri-gingival cuff or band around the cervical collar of involved teeth. Three patients had recurrent lesions. The surgeon's clinical impression included: benign traumatic lesion, hyperkeratosis, leukoplakia, verrucous carcinoma and squamous cell carcinoma. The histologic diagnoses ranged from verruco-papillary hyperkeratosis (VPHK), atypical verrucoid epithelial proliferation, with or without dysplasia, to verrucous carcinoma.

Conclusion: This study aims to raise awareness that peri-gingival leukoplakic cuffing - "ring around the collar" phenomenon may be a clinical warning sign of premalignant or early malignant lesions of the gingiva. Because of their asymptomatic nature, biopsy and close clinical follow-up are necessary.

#36 ERP57 EXPRESSION IN LOCAL ADVANCED LARYNGEAL CELL CARCINOMA

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Introduction: Laryngeal Squamous Cell Carcinoma (LSCC) is a malignant neoplasm with high morbidity and mortality, which often proceeds silently to advanced stages. As a consequence, there exist diverse therapeutic protocols with different results and varying effectiveness; currently there are no predictive biomarkers which could help to guide these therapeutic protocols. ERp57 has been recently associated with the more aggressive biological behavior of some cancers. Here, we explore ERp57 expression on advanced LSCC.

Materials and Methods: Analytical cross-sectional study approved by Centro Médico Nacional de Occidente (R- 2018-1301-47) and Universidad de Guadalajara (CI-00819) on patients older than 18 years with diagnosis of primary LSCC, selected by a consecutive non-probabilistic sampling. We retrieved 16 cases of stage III and IV LSCC over a period of six years (2010-2016). Clinicopathological data collected included: gender, age, laryngeal site, smoking history, and treatment modality. On histological sections from laryngectomies; immunohistochemistry to detect ERp57 was performed. The expression was subjectively evaluated by three specialists: two in Surgical Pathology and one in Oral Pathology in an independent, calibrated, and blind manner.

Results: 94% of the cases were men, with an average age of 60 (SD ± 9 years). The transglottic extension was the most frequent presentation (88%), and 2, 7 and 7 cases were well, moderately and poorly differentiated, respectively. 7 cases presented an intense/high smoking index. ERp57 was positive in 11 cases (7+, 4++); however, no correlation was identified with clinical variables analyzed and ERp57 level expression (Chi square and Fischer's exact tests).

Conclusions: Although no association could be identified in this study, there is evidence in the literature that supports ERp57 as a potential biomarker. The number of cases in this work should be increased, in order to either establish an accurate relationship or discount one.

#37 EFFECT OF FOUR CARDIAC HORMONES ON ORAL SQUAMOUS CELL CARCINOMA PROLIFERATION

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Introduction: In addition to its vascular efforts, the human heart is a refined endocrine gland, synthesizing four naturitic peptide hormones: long-acting natriuretic peptide (LANP), vessel dilator (VDL), kaliuretic peptide (KP) and atrial natriuretic peptide (ANP), via the ANP gene. These cardiac hormones are known for blood pressure regulation and maintenance of plasma volume in animals and humans. They have also shown ability to control the growth of several solid tumors including human pancreatic adenocarcinoma, human breast cancers, and small-cell lung cancer, in vitro and in vivo. The growth-regulatory properties of ANP peptide hormones have been studied in vitro and in vivo and are suggested to have broad anti-cancer effects.
Materials and Methods: Dose-dependent experiments were carried out using two oral squamous cell carcinoma (OSCC) cell lines (SCC9 and SCC25). Triplicates of each cell line were seeded in 96-well plates, allowed to attach for 24h, starved overnight and then treated with the four hormones at concentrations of 1μM, 10μM, 100μM and 1000μM. Proliferation assay, using MTS, was performed at an incubation time of 24h in order to determine the effect of each peptide on the OSCC cells.
Results: For all tested hormones, 1,000μM was the most effective concentration. Results showed that VD, LANP, KP and ANP were able to reduce, respectively, 42%, 48%, 34% and 53% of SCC9 cells and 36%, 41%, 27% and 33% of SCC25 cells, compared to untreated cell lines.
Conclusions: All four tested cardiac hormones were able to control proliferation of OSCC cell lines. Future experiments are ongoing to assess the effect of these cardiac hormones on apoptosis and cell cycle in order to provide more insight about their mechanisms of action and possible use as therapeutic agents in OSCC.

#38 MINOR SALIVARY GLAND SECRETORY CARCINOMA. A CASE REPORT

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Objetive: To present the case of a minor salivary gland origin secretory carcinoma with heterogeneous histological pattern and review of the literature.
Case report: We report the case of 33 YO male patient with a nodule in the upper labial mucosa on the right side; in the macroscopic study, a solid tumor was observed with small cystic areas covered by mucosa. The histologic analysis revealed a heterogeneous proliferation of polygonal cells with moderate and granular cytoplasm, the formation of cystic spaces with pseudopapillary projections was predominantly filled with eosinophilic-protein content; nodular-solid areas and pseudotubular structures was observed. A comprehensive panel of immunohistochemistry reactions was performed only with significant positivity for S-100 protein and mammaglobin; the tumor sent for molecular studies.
Discussion: The secretory carcinoma (SC) of the salivary gland origin is a rare entity that frequently affects the major salivary glands. These tumors have a higher incidence in the fifth decade of life, and similar distribution among men and women. The cases reported in minor salivary glands is uncommon, furthermore, the histologic appearance is similar to the mammary secretory carcinoma, the immunophenotype corresponds to positivity for mammaglobin, S-100 protein, STAT5a and GCDFP-15 markers, with negative reaction to DOG-1; molecularly the SC harbors a recurrent translocation t (12; 15) (p13; q.25) which results in fusion of the ETV6 gene.
Conclusion: The SC is a low-malignant cancer of the salivary glands; this neoplasm have histologic similarities with the acinic cell carcinoma because its variety in histologic patterns and cytologic features, the morphologic appearance in addition with the immunohistochemical analyses is necessary to confirm the diagnosis of SC. When the morphologic and immunophenotype are unspecific, molecular studies are necessary to confirm the translocation.

#39 PRIMARY INTESTINAL-LIKE ADENOCARCINOMA OF THE MINOR SALIVARY GLANDS: CLINICOPATHOLOGIC ANDIMMUNOHISTOCHEMICAL CHARACTERISTICS OF 2 CASES

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Objective: Intestinal (colonic)-like adenocarcinoma (ILAC) of salivary gland (SG) origin represents a rare type of salivary gland tumor with remarkable histopathologic similarity to intestinal-type adenocarcinoma of the sinonasal tract and base of the tongue with examples reported in the major salivary glands. Immunohistochemically, intestinal-type adenocarcinoma features strong positivity for CK20, CDX-2 and variable reactivity for CK7, whereas ILAC is CK7(+), CDX-2 and CK20 negative. We report two ILACs affecting intraoral minor SGs.

Findings: Case 1: A 79-year-old male presented with a 1.2-cm submucosal mass of the right posterior buccal mucosa. Histopathologically, the neoplastic cells were high columnar or cuboidal, characterized by large nuclei with prominent nucleoli, nuclear pleomorphism and rare mitoses, and formed cystic or cribriform structures. **Case 2:** A 60-year-old male presented with a firm, asymptomatic, deep submucosal, nodular lesion of left upper lip, measuring 1.5x1.0 cm. Microscopic examination revealed a cyst-like space lined by columnar, intestinal-type, epithelium. Mucinous differentiation was also seen. The neoplastic epithelium demonstrated intraluminal papillary folds. Neoplastic cells featured cellular pleomorphism with hyperchromatic enlarged nuclei and prominent nucleoli. Both patients did not have history of colonic adenocarcinoma. By immunohistochemistry, both cases of ILAC were strongly and diffusely positive for CK7, β-catenin and e-cadherin, focally or rarely positive for CK5/6, CK8/18 (in areas with apocrine features), and negative for CDX-2, CK20, EMA (MUC-1), S100, calponin, α-SMA, p40, mammaglobin, TTF-1, CD34 and mitochondria. Interestingly, notwithstanding the absence of nuclear staining, fine and granular CDX-2 paranuclear staining was noticed in one case. Ki67 nuclear index was 15% for the first case and 30% for the second.

Conclusions: ILAC is a rare type of salivary gland neoplasm exhibiting intestinal features, prominent nuclear pleomorphism and increased proliferation rates mimicking high-grade intestinal-type adenocarcinomas of the head and neck. Ancillary CDX-2, CK20 and CK7 immunostains can aid in the diagnosis.

#40 CANALICULAR ADENOMA WITH A UNICYSTIC MORPHOLOGY. REPORT OF A RARE CASE AND REVIEW OF THE LITERATURE.

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Objectives: Canalicular adenoma (CA) represents a benign salivary gland tumor, which usually appears as a slowly growing submucosal nodule with a clear predilection for the upper lip. Histopathologically, it is typically characterized by monomorphic cuboidal or columnar cells, forming anastomosing or beading structures arranged in a highly vascular, loose stroma. However, peculiar histopathologic findings and significant overlap with other similar entities, such as basal cell adenoma (BCA), may be observed complicating the diagnostic process. Herein, we present a rare case of CA with histopathologic similarities to BCA, exhibiting a solitary cystic morphology. Also, the literature on unicystic CA is reviewed.

Findings: A 74 year-old female patient with unremarkable medical history presented for evaluation of a painless mass on the upper lip. The clinical examination revealed a soft, fluctuant submucosal nodule, covered by normal appearing mucosa. With a provisional diagnosis of benign salivary gland tumor, excisional biopsy was performed. Histopathologic examination demonstrated an encapsulated solitary cystic formation, lined by monotonous basaloid or cuboidal cells, arranged in solid or trabecular patterns. Differential diagnosis included BCA or unicystic CA and immunohistochemical positivity for S-100, CD117 and CK7, as well as negativity for GFAP, SMA and p63, was noted. A final diagnosis of unicystic CA was rendered, which, to our knowledge represents only the 11th case reported to this date.

Conclusions: Cystic morphology has been described in various benign or malignant salivary gland tumors and is associated with clinical aspects, as well as the biologic behavior of certain neoplasms. Regarding CA, the presence of multiple cystic spaces has been observed in several cases; however, the occurrence of a true unicystic lesion is considered extremely rare.

#41 SECRETORY CARCINOMA OF THE MINOR SALIVARY GLAND IN A 9-YEAR-OLD: REPORT OF A CASE

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Introduction: Secretory carcinoma (SC), previously known as mammary analog secretory carcinoma of the salivary glands, is a recent addition to the WHO Classification of Head and Neck Tumors and is a distinct salivary gland malignancy characterized by a morphological resemblance to mammary secretory carcinoma of the breast and an *ETV6-NTRK3* gene fusion. SC typically presents in adults (mean patient age of 46.5 years, range: 10-86 years) as a painless, slow growing mass, with an equal sex distribution. The most common site of occurrence is the parotid gland, followed by the minor salivary glands, and submandibular gland. **Case Report:** A firm movable nodule adjacent to the first molar was noted in the left mandibular buccal vestibule of a nine-year-old male. The clinical differential diagnosis included mucocele, mucous retention cyst and salivary gland tumor. Microscopic examination revealed a non-encapsulated tumor composed of medium-sized, round-to-polygonal cells with moderate amounts of pale, eosinophilic, bubbly cytoplasm arranged in solid, microcystic, macrocystic, tubular, and focally papillary growth patterns. S-100, mammaglobin, and SOX-10 stains were positive, supporting a diagnosis of SC. **Conclusions:** The histological differential diagnosis of SC includes acinic cell carcinoma, low-grade cribriform salivary duct carcinoma, and mucoepidermoid carcinoma. Acinic cell carcinoma is negative for S-100 and mammaglobin. Low-grade cribriform salivary duct carcinoma, like SC, is positive for S-100 and mammoglobin, but is an intraductal tumor. Mucoepidermoid carcinoma contains epidermoid and mucous cells, but is S-100 negative and positive for *MECT1/3-MAML2*. All entities on the histological differential, other than SC, are negative for *ETV6-NTRK* gene fusion. This case highlights SC occurring in a pediatric patient.

#42 PLASMACYTOID MYOEPITHELIOMA OF THE HARD PALATE: TWO CASES

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Background: Myoepitheliomas are benign salivary gland tumors that comprise approximately 1-1.5% of all salivary gland tumors. These tumors commonly involve the parotid glands or the minor salivary glands of the palate. There are no known age or gender predilections noted with myoepitheliomas and the risk factors are poorly understood. Over the past twenty years, the Diagnostic Pathology Laboratory at New York University College of Dentistry (NYUCD) has signed out 27,416 cases, with 28 cases of benign salivary gland tumors and 45 cases of malignant salivary gland tumors. Two cases of myoepitheliomas were identified, a localized prevalence of 2.73% of all salivary gland tumors at NYUCD.

Cases: The first case of plasmacytoid myoepithelioma from 2015 was in a 79-year-old African-American male, and the second case from 2018 was in a 63-year-old African-American female. The tumor locations for both cases were on the hard palate, with the 2015 case being left of the midline and the 2018 case being right of the midline. Both myoepitheliomas were of the plasmacytoid subtype, a rare form. The microscopic features shared for both tumors included collections of plasmacytoid myoepithelial cells supported with a markedly myxoid stroma and adipose tissue. The microscopic description from the 2015 case noted a localized area of salivary gland ductal structures (less than 5% is acceptable for the diagnosis of myoepithelioma). The description from the 2018 case noted no ductal structures and focal atypia including enlarged nuclei and pleomorphism. The tumors were excised in both patients and there has been no report of recurrence throughout their follow-up.

Conclusion: It is important for clinicians to be aware of the myoepithelioma as a variant of a benign salivary gland tumor. Due to their rarity, additional investigation is required to document their clinical, histological and immunological features.

#43 RENAL CELL CARCINOMA METASTASIS TO THE PAROTIDGLAND.

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Introduction**:** Renal cell carcinoma [RCC] is the most common kidney malignancy in adults, representing 3% of malignancies. The clear cell variant comprises up to 70% of all RCCs. The tumor often exhibits an unpredictable behavior. While approximately 20-30% of patients present with evidence of metastasis at initial diagnosis, late metastasis-up to 20 years following curative nephrectomy- is also well documented. We report an example of late metastasis of a clear cell RCC to the parotid gland 11 years following initial diagnosis and management. Materials & Methods: A 52 year old female presented with a complaint of 4 month history of an asymptomatic left parotid swelling. Review of his medical history revealed a previous diagnosis of clear cell RCC that was managed with total nephrectomy 11 years prior. A CT scan with contrast delineated an irregular, enhancing 1.2x0.9 cm mass within the left parotid gland. The mass was excised and demonstrated CD10, RCC and PAX-2-positive malignant epithelial cells with clear cytoplasm and an admixture of compact-alveolar (nested) and acinar growth patterns in an intricate, arborizing vascular background. Discussion: It has been reported that 40% to 50% of RCC exhibit distant metastasis. The most common metastatic sites include lung, regional lymph nodes, liver and bone. Between 14- 16% of RCC patients may develop supraclavicular metastases, including to thyroid, cervical lymph nodes, paranasal sinuses, tongue, mandible, facial muscles. larynx and the salivary glands. We describe the clinicopathologic and radiographic features of a metastatic clear cell RCC to the parotid gland.

#44 REFLECTANCE MEASUREMENTS OF GOLD NANORODS BIO-CONJUGATED TO ANTI-EGFR MONOCLONAL ANTIBODY DISCRIMINATE BENIGN FROM MALIGNANT SALIVARY GLAND TUMORS

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Objective. Epidermal growth factor receptor (EGFR) has been found to bedysregulated in malignant salivary gland tumors (MSGT) and can be served as anideal target for nanoparticle-based contrast agents using gold nanoparticles (GNPs)bio-conjugated to anti-EGFR monoclonal antibodies. We aimed at evaluating thedetection sensitivity of reflection measurements of gold nanorods (GNRs)bio-conjugated to anti-epidermal growth factor receptor (GNRs- EGFR) monoclonalantibodies in discriminating benign from MSGT.

Methods. Tissue sections of 20 cases of MSGT and 10 cases of benigntumors were incubated with GNRs-EGFR and the reflectance spectrum was measuredusing hyperspectral microscopy.

Results. Reflectance intensity was significantly higher in cases of MSGTcompare with those of pleomorphic adenoma. Add numbers.

Conclusion. The GNRs reflection measurements were able to discriminatebenign from MSGT suggesting an objective, non-technique-sensitive method thatis not dependent on the qualification of a technician and with fewer interpretation errors in comparison to what.

#45 A CASE OF A RECTAL NEUROENDOCRINE CARCINOMA METASTASIZING TO THE PAROTID GLAND

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We report a case of a neuroendocrine carcinoma of the rectum that metastasized to the parotid gland of a 48-year old male. The patient presented with a parotid mass. The patient had a history of squamous cell carcinoma of the forehead, a neoplasm of uncertain behavior of the head of the pancreas, and a neuroendocrine carcinoma of the rectum. Attempts were made to obtain the slides for the rectal neuroendocrine carcinoma without success. The parotid tumor was divided into lobules by fibrous connective tissue bands. The neoplastic cells were predominantly polyhedral with abundant eosinophilic cytoplasm, often plasmacytoid in appearance. The nuclei ranged from small hyperchromatic and pyknotic to more vesicular. Stains for chromogranin, creatinine kinase, muscle (MCK), insulinoma-associated protein 1 (INSM1), S100, and synaptophysin were positive. Alpha-1 antitrypsin (A1AT), cytokeratin (CK) 7, melanoma antigen (melanA), tumor protein 63 (p63), smooth muscle actin (SMA), and smooth muscle myosin (SMM) stained negatively. There was a low Ki-67 proliferative index of approximately 5%. The report of the rectal neuroendocrine adenocarcinoma showed that the tumor cells were positive for Cytokeratin (CK) AE1/AE3 and synaptophysin and had patchy positive staining for prostatic acid phosphatase (PSAP). Staining was negative for CK7, CK20, Caudal Type Homeobox Type 2 (CDX2), thyroid transcription factor 1 (TTF-1), chromogranin, prostate specific antigen (PSA), and Prostate-specific membrane antigen (PSMA). The Ki-67 was reported as low. The diagnostic challenges of this rare metastatic neuroendocrine carcinoma will be presented as well as a discussion of primary versus metastatic neuroendocrine carcinomas of the parotid.

#46 DIATOM-ASSOCIATED FOREIGN-BODY REACTION MIMICKING AN INflAMMATORY ODONTOGENIC LESION: A REPORT OF TWO CASES

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Foreign body reactions in the oral cavity are common and are often the result of exogenous material introduced following either iatrogenic or traumatic injury provoking a distinctive immune response. To the best of our knowledge we describe the first two cases of a granulomatous foreign-body reaction to diatoms, single-celled algae belonging to the taxonomic phylum Bacillarophyta, involving the jaws. In both instances the clinical presentation mimicked a lesion of inflammatory odontogenic etiology. The morphologic features of diatoms and a comprehensive literature review are provided. The diagnosis of a diatom-associated foreign body reaction necessitates familiarization with the histopathologic features, a sufficient degree of suspicion, and clinicopathologic correlation.

#47 INTRANEURAL PERINEURIOMA OF THE MANDIBLE: A CASE REPORT.

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Perineuriomas are neural lesions that rarely occur in the oral cavity. Once considered reactive, a neoplastic process is favored now based on the finding of cytogenetic abnormalities involving chromosome 22 and other sites. Depending on the presentation of the lesions, they are classified as either intraneural (developing within nerves) or extraneural. Overall, in the oral cavity, only 22 cases of extraneural and 17 cases of intraneural perineuriomas have been reported in the literature. To our knowledge, we present only the fifth reported case of intraosseous, intraneural perineurioma presenting within the jawbones, and all in the mandible. A 71-year-old male patient complaining of right-sided paresthesia presented with a large, well-circumscribed, unilocular radiolucent lesion involving the posterior right mandible. There was also evidence of mild regional root resorption. An incisional biopsy was performed and the specimen was submitted for microscopic evaluation. The sections revealed a relatively well-circumscribed mass composed of short, interlacing fascicles and whorls of spindle cells with serpentine- and fusiform-shaped nuclei with inconspicuous cytoplasm. Large nerve bundles were noted mostly at the periphery of the tumor. Immunohistochemical studies revealed strong and diffuse reactivity of the lesional cells with epithelial membrane antigen and scattered positivity for S100, compatible with the profile of perineurial cells. The lesional cells also showed positivity for CD163. SSTR2, STAT6, CD34, β-catenin and muscle markers were either negative or stained only appropriate internal controls, thereby ruling out potential mimics such as neurofibroma, schwannoma, extracranial meningioma, solitary fibrous tumor, desmoplastic fibroma, and myofibroma. Based on the cumulative findings, a final diagnosis of perineurioma was rendered. A recommendation was made to have the residual tumor completely excised. As the case is relatively recent, follow-up has been limited but the patient has had no apparent complaints.

#48 MESENCHYMAL CHONDROSARCOMA OF THE MAXILLA WITH HEY1-NCOA2 FUSION

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Introduction: Mesenchymal chondrosarcoma (MC) represents up to 10% of all chondrosarcomas. It may involve craniofacial bones including the jaws as well as soft tissues in the head and neck region. MC presents with pain and swelling as a poorly demarcated lytic lesion with calcifications. MC is characterized by small, round to ovoid cells with malignant chondroid. MC tumor-defining fusion (*HEY1-NCOA2*) has been identified recently.

Clinical Presentation and Pathology Findings: A 15 year-old female presented with progressive left posterior maxillary swelling of 4 months' duration . Her general dentist prescribed antibiotics for suspected infection associated with prior tooth extraction. With no improvement, a biopsy was performed that demonstrated ovoid to slightly spindled malignant cells, focal hemangiopericytoma-like areas, and focal malignant chondroid. Tumor cells immuno- histochemical profile showed: diffuse NKX2.2 (nuclear), diffuse SOX9 (nuclear), diffuse S100 (nuclear), retained INI-1 (nuclear, tumor and non-tumor cells), infrequent to rare MyoD1 (nuclear), rare Desmin (cytoplasmic), and rare Myogenin (nuclear). Tumor cells were negative for Pancytokeratin (AE1/AE3), TLE1 and CD99. Based upon histopathologic features and immunoprofile, a diagnosis of MC was rendered. Tumor fusion panel identified *HEY1- NCOA2* fusion, further confirming MC diagnosis. Oncologic management consisted of ifosfamide and doxorubicin, followed by left posterior hemimaxillectomy with radiation therapy 2 months after diagnosis. No significant clinical or histopathologic response occurred. Patient is disease free 10 months following initial diagnosis.

Conclusion: MC tends to be an aggressive malignancy with a protracted, relentless clinical course and distant metastases that may occur even after 2 decades, necessitating long-term follow-up. Jaw MCs have more indolent behavior with survival of 80% at 5 years and 55% at 10 years, compared with survival of 50% at 5 years and 25% at 10 years for MCs at other sites. Children, adolescents and young adults also tend to have better prognosis.

49 CLINICOPATHOLOGICAL FEATURES AND PREVALENCE OF ORAL SOFT TISSUE SARCOMAS: A SINGLE-CENTER EXPERIENCE OF 80 CASES

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Introduction: Sarcomas are rare malignant and usually aggressive neoplasms that rarely involve the soft oral tissues. They are solid tumors of mesenchymal cell origin and exhibit a variety of clinical and pathologic characteristics. They correspond to less than 1% of all oral cancers and comprise only around 10% of all sarcomas of the body. However, it is known that rhabdomyosarcomas are more frequent in the head and neck regionthanin any other part of the body. **Objective:** the aim of the present study was to analyze the prevalence and clinicopathological features of soft tissue sarcomas. **Patients and methods:** Data of the patients and of their tumors were obtained from the records of the histopathological diagnosis requirement and included patient data (sex, age, and race) and tumor data (site, clinical aspect, size, time of evolution). Cases of bone and cartilage sarcomas were excluded. **Results:** One-hundred and ninety-five cases diagnosed as sarcomas were retrieved from a total of 54,561 biopsies between January/2002 and December/2018 of which 80 cases were soft tissue oral sarcomas. All hematoxylin-eosin stained slides were reviewed for all cases. Male patients were the most affected (60%) and white patients comprised 46.25%. The mean age was 35 years (range: 1-86). The palate was the most common site (27.5%), followed by gingiva (13.75%), buccal mucosa (11.25%), tongue (10%), upper and lower alveolar ridge (7.5%). Clinical presentation varied among a nodule or solid mass (35%), ulcer (5%) and a color change (3.75%) and lesions were asymptomatic in 23.75% of the cases. Kaposi sarcoma, rhabdomyosarcoma, leiomyosarcoma and liposarcoma made up 70% of the cases with 84.61% diagnosed as Kaposi Sarcoma. **Conclusions:** Oral soft tissue sarcomas are rare lesions representing only <1% of all oral lesions diagnosed in the studied period. Kaposi sarcoma was the most frequent followed by rhabdomyosarcoma and leiomyosarcoma.

#50 SOLITARY FIBROUS TUMOR IN FLOOR-OF-MOUTH: A CASE REPORT AND REVIEW OF LITERATURE

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Objective: Solitary fibrous tumors (SFTs) are rare proliferations of mesenchymal derivation which may develop in the oral cavity, but seldom present in the floor of mouth. The goal of this case study is to report and review the literature regarding the rare appearance and surgical management of an SFT occurring in the floor of mouth with lingual frenum involvement.

Methods: An Electronic PubMed search of the English language literature was performed using keywords "solitary fibrous tumor" AND "floor of the mouth", "oral cavity". References were selected from systematic reviews, reviews, and case reports. Eleven cases satisfied the selection criteria.

Results: A 76-year old male patient was referred to the OMFS Department due to an exophytic tissue formation interfering with his prosthetic rehabilitation. The lesion spontaneously appeared approximately 3 years ago without a history of trauma and has been gradually increasing in size over the past 3 months. The painless, mobile and spherical- shaped mass was located in the midline of the anterior mandible between a prominent lingual frenum and the alveolar ridge. The lesion was covered with normal non-ulcerated mucosa. An excisional biopsy along with a frenectomy was performed. Based on histopathological and immunohistochemical evaluation, a final diagnosis of SFT was established.

Conclusion: SFT with involvement of the midline lingual frenum has rarely been reported in the literature. An immunohisto- chemical examination is essential for the definitive diagnosis of this pathological entity. Excisional biopsy is the curative treatment of choice. Recurrence rates are extremely low for oral cases of SFT.

#51 ORAL LYMPHOMATOID PAPULOSIS: REPORT OF A CASE

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Introduction: Lymphomatoid papulosis (LyP) is one of the three primary cutaneous CD30+ T-cell lymphoproliferative disorders. This group also includes primary cutaneous anaplastic large cell lymphoma (PC-ALCL) and borderline CD30+ lesions. Differentiation between these disorders may be difficult due to overlapping clinical and histologic features. LyP is characterized by chronic, recurrent, papulonodular lesions of cutaneous surfaces, which spontaneously regress. Oral involvement of LyP is uncommon, but well-documented, and is a diagnostic challenge. **Case Report:** A 59-year-old Caucasian female with a history of spontaneously resolving papulonodular cutaneous lesions, presented with an extensive ulceration of the right anterior palatal mucosa. At a two week re-evaluation, no resolution was noted, necessitating an incisional biopsy. Histologic examination revealed ulcerated and intact mucosa with an underlying proliferation of large, atypical lymphocytes in a perivascular pattern. Marked stromal eosinophilia with an admixture of neutrophils was also observed. Neoplastic cells were positive for CD2, CD3, CD4, CD5 (partial), and CD30. Molecular studies showed a clonal T-cell population. A diagnosis of LyP was established pending resolution of the lesion. Gradual improvement occurred over a two month period supporting the diagnosis of LyP.
Conclusions: LyP, PC-ALCL and borderline CD30+ lesions represent a continuous spectrum of lesions that may not be clearly defined by clinical or histologic appearance. The differential diagnosis of oral LyP also includes secondary lesions of systemic ALCL, mycosis fungoides, angiolymphoid hyperplasia with eosinophilia, and atypical histiocytic granuloma. The prognosis of LyP is excellent, however, patients require long-term follow up due to increased risk of developing a cutaneous or nodal lymphoid malignancy, including cutaneous or nodal ALCL, mycosis fungoides and Hodgkin lymphoma.

#52 A CD30+ ATYPICAL LYMPHOPROLIFERATIVE LESION OF THE ORAL MUCOSA ASSOCIATED WITH FINGOLIMOD TREATMENT.

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Introduction: Fingolimod is an antagonist of sphingosine-1-phosphate type 1 receptor and prescribed for multiple sclerosis (MS). Recently, primary cutaneous CD30+ lymphoproliferative disorders (anaplastic large cell lymphoma and lymphomatoid papulosis) have been reported as a rare side
Materials and Methods: Microscopic and immunohistochemical preparations of an incisional biopsy of a rapidly growing ulcerated proliferative lesion on the right maxillary vestibule in a 55 year old female were reviewed. A comprehensive medical history was also obtained.
Results: The patient presented with a 22-year history of MS. She has been treated with oral fingolimod (FTY720) for the last 2 years. Besides the oral lesion there were no other lesions. There was no prior history of malignancy. Microscopically the ulcerated lesion revealed proliferation of large cells with abundant cytoplasm and irregular vesicular nuclei with angiocentric arrangement and insinuating in between skeletal muscle. Abundant eosinophils were present and necrosis was noted. Immunohistochemically, lesional cells were T-cells decorated by CD2, CD3, CD4, CD5, CD8, CD30 and CD45. Lesional T-cells showed partial loss of CD7 expression. Lastly, the cells were negative for EBER. Clonal T-cell rearrangement was confirmed by molecular studies. The rendered diagnosis was CD30+ lymphoproliferative disorder probably related to oral fingolimod use. The lesion regressed spontaneously without discontinuation of fingolimod. **Conclusions**: a) We report, to the best of our knowledge, the first intraoral case of mucosal CD30+ lymphoproliferative disorder associated with fingolimod. b) Contrary to reports of cutaneous lesions associated with the use of fingolimod, in our case spontaneous regression without discontinuation of the medication.

#53 CD30-POSITIVE T-CELL LYMPHOPROLIFERATIVE DISORDER: A CHALLENGING DIAGNOSIS OF A COMPLEX ENTITY

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CD30-positive lymphoproliferative disorder is an enigmatic entity that consists of a spectrum of pathologic processes that span from self-healing mucocutaneous nodular ulcerations to lymphoma. Combined clinical, histopathological, and molecular features are necessary to further subclassify this disease process. We report a case of a 49 year- old Caucasian male who presented with recent onset of oral mucosal ulcerations. Clinical examination revealed multiple large indurated ulcers affecting the tongue as well as buccal and labial mucosal surfaces. The patient's medical history was significant for type II diabetes, hypertension, hypercholesterolemia; and the patient admitted to tobacco, alcohol, and marijuana use. Incisional biopsies were taken from the lower labial mucosa and ventral tongue. The histologic findings revealed ulcerative lesions with an atypical inflammatory cell infiltrate consisting of clusters of large cells, occasional mitoses, and infiltration deeper within the skeletal muscle. Special stains for AFB and PAS, along with immunohistochemical studies for CD30 as well as in-situ hybridization (ISH) for EBER were performed. AFB and GMS revealed no evidence of causative organisms, and EBER ISH was negative within the inflammatory cell population. However, CD30 was positive in the large atypical cells. Therefore, a hematopathology consult was requested and the case was subsequently referred to the National Cancer Institute for further classification. Further immunohistochemical studies revealed that the atypical cells were positive for CD2, CD3, CD4, CD5, CD30, TIA1, Granzyme B, and Perforin. Additionally, molecular analysis for T-cell receptor gene rearrangements were performed and revealed a significant clonal T-cell population. A final diagnosis of CD30-positive T-cell lymphoproliferative disorder was rendered. The patient was referred to a medical oncologist for further evaluation. Interestingly, all of the lesions showed evidence of healing during the patient's post-operative visits, without initiation of therapy. Herein, we discuss CD30-positive T-cell lymphoproliferative disorder, the diseases it encompasses, their histopathologic features, and their prognoses.

#54 EXTRANODAL PALATAL MANIFESTATION OF A FOLLICULAR LYMPHOMA: A CASE REPORT

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Background: Follicular lymphoma (FL) is a low-grade subtype of Non-Hodgkin's lymphoma (NHL), making up approximately 20% of all lymphomas. Follicular lymphomas predominantly affect adults and are named for the follicular growth pattern of the cells. While FL is an indolent variant of non-Hodgkin's lymphoma, transformation into a more aggressive, high-grade subtype, typically diffuse large B-cell lymphoma (DLBCL), is seen in approximately 30% of cases. As with most cancers, FL may be assigned a grade of 1, 2, or 3 based on the number of centroblasts identified under the microscope at highest power. FL most commonly involves the lymph nodes, with presentation in the oral cavity being rare. When present in the soft tissues of the oral cavity, lesions typically occur on the hard palate, soft palate, tongue, buccal mucosa, and gingiva. Current treatment options, depending on the grade, include: immunomodulators, immunotherapy with or without chemotherapy, and involved-site radiation therapy.

Case: An 89-year-old male presented to his oral surgeon with a right palatal swelling measuring 3.5 x 3.0 cm. The patient reported this swelling to be present for greater than five months and had been told previously by an ENT that "it's not cancer". The lesion was firm to palpation. Upon obtaining a CBCT, no bone lysis was noted, confirming the lesion was confined to the soft tissue. Scalpel biopsy results confirmed the diagnosis to be follicular lymphoma, follicular pattern, grade 1-2 of 3.

Conclusion: This case emphasizes the need for proper diagnosis including medical history and appropriate biopsy techniques. Since follicular lymphoma has a risk of transformation into more aggressive types of lymphomas, early diagnosis is imperative. Clinicians should be aware of the various extranodal presentations of lymphomas and unusual lesions and swellings should not be ignored/prematurely dismissed.

#55 ANGIOLYMPHOID HYPERPLASIA WITH EOSINOPHILIA IN THE UPPER LIP: A CASE REPORT WITH IMMUNOHISTOCHEMICAL ANALYSIS

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Angiolymphoid hyperplasia with eosinophilia (ALHE) is a cutaneous tumor uncommon in the oral region. Its etiopathogenesis remains unknown although some studies suggest abnormal vascular proliferation with secondary inflammatory response. Clinically, it appears as a red-brown subcutaneous swelling mostly in patients aged 20–50 years in Asian and Caucasian populations. Here a 52-year-old man was referred for treatment of a painless mass on the lip. Clinical examination showed a slow-growing, nontender, mobile, well-defined nodule, located in the upper lip and measuring 1 cm in diameter. Microscopically, the excised lesion showed proliferation of small blood vessels surrounded by eosinophils, lymphocytes, and plasma cells. Negative immunostaining for CD1a and absence of lymphoid follicular structures discarded Langerhans cell histiocytosis and Kimura's disease, respectively. No recurrence was noted in 1-year follow-up. Here, we present a case of ALHE in the upper lip and a review of 22 cases of ALHE in the oral cavity.

#56 ORAL MANIFESTATIONS OF LEUKEMIA: A RETROSPECTIVE CASE SERIES.

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Introduction: Oral manifestations of leukemia are rarely seen, often subtle and overlap with numerous entities. The varied nature and general lack of familiarity of clinicians with oral presentations of leukemia makes the diagnosis challenging. We present a case series of leukemias manifesting in the oral cavity. **Methods:** Upon IRB approval, the University of Florida Oral Pathology Biopsy Service archives spanning 1994-2018 was queried for oral biopsies diagnosed as atypical hematological proliferation compatible with leukemia. Cases with insufficient diagnostic information and/or extraoral manifestations were excluded. Demographic, clinical, and histological findings were analyzed. **Results:** Ten cases with 12 biopsy sites were included from 4 female and 6 male patients, mean age of 58.4 years (range 17-88). The most common biopsy sites were the gingiva (50%), palate, tongue, and buccal mucosa. Fifty percent of the cases had no prior diagnosis of leukemia, and 50% of lesions were present for unknown duration. Typical oral manifestations of leukemia included: spontaneous gingival hemorrhage, with diffuse, boggy, non-tender enlargement, unusual ulcerations, petechial hemorrhage , diffuse candidiasis and generalized herpetic ulcers. In our case series, mass formation, white lesions with erythema as well as non-healing extraction site were seen. The clinical impression of submitting clinicians included gingival hyperplasia, pyogenic granuloma, granulation tissue, deep fungal infection, ANUG, and leukemic infiltrate. Immunohistochemical stains including those for B and/or T cells, myeloperoxidase, plasma cells and leukocyte common antigen marker were performed on some cases. Myeloperoxidase and LCA yielded positive results in most cases whereas studies delineating B, or T- lymphocytes and plasma cells yielded mostly negative results. **Conclusions:** This study documents the clinical and immunohistochemical findings of leukemia in the oral cavity. Clinicians and pathologists should be aware of these findings in order to ensure prompt, accurate diagnosis and likely save lives.

#57 MARJOLIN'S ULCER INVOLVING THE UPPER LIP: A CASE REPORT

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Marjolin's ulcers are uncommon and represent malignant transformation of scar tissue. Such ulcers tend to develop mainly in burn scars but have also been reported at other traumatized tissue sites such as vaccination scars, amputation stumps, and chronically traumatized wounds. A majority of Marjolin's ulcers represent squamous cell carcinoma at biopsy and less commonly basal cell carcinoma. Rarely, Marjolin's ulcers can represent a melanoma or sarcoma. The most common location for squamous cell carcinoma arising from a burn scar is the extremities followed by the head and neck area. Although most patients are adults at the time of diagnosis, Marjolin's ulcers can develop in any age group. Burn injury that is left to heal by secondary intention without skin graft, incompletely- healed burn wounds, or repeated trauma to a burn scar resulting in ulceration are considered to be some of the risk factors for development of a Marjolin's ulcer. We present a case of a Marjolin's ulcer involving the left upper lip in a 49 year-old male with a history of burn at that site and with a histopathologic diagnosis of poorly differentiated squamous cell carcinoma. The etiopathologic factors, clinical presentation, treatment, and prognosis of this uncommon lesion are discussed.

#58 PALE (CLEAR) CELL ACANTHOMA OF THE PALATE

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Objective: Clear Cell Acanthoma (CCA), also known as pale cell acanthoma, represents a rare benign epidermal tumor with strong predilection for the lower extremities of middle-aged and elderly individuals (50-70 years of age), and no frank gender preference. The etiology of CCA is poorly understood, although recent clinical and immuno- histochemical evidence favors a localized psoriasiform reaction. Well-documented intraoral CCAs are scarce with only one previously reported example, affecting the vermillion mucosa of the lower lip. Herein, we report the clinicopathologic and immunohistochemical features, and HPV status of an ostensible example of oral CCA. **Findings:** A 58-year-old female presented with a well-circumscribed, asymptomatic, exophytic, pedunculated and erythematous nodule of the right hard palate, measuring 0.7 cm in greatest dimension. The clinical differential diagnosis included papilloma and verruca vulgaris. Microscopically, the lesion featured parakeratosis and acanthosis with neutrophilic microabscesses and broad elongated rete pegs. In areas, epithelial cells within the spinous cell layer exhibited pale or clear cytoplasm without nuclear pleomorphism, mitoses or cytologic atypia. The supporting connective tissue revealed mild chronic inflammation with few scattered neutrophils. P.A.S histochemical stain with and without diastase disclosed the presence of cytoplasmic glycogen in the pale cells. Additionally, glycogen-rich epithelial cells stained strongly for EMA and were negative for podoplanin (D2-40). Ki-67 immunostaining was confined to the basal cell layer of the epithelium. A diagnosis of CCA was rendered. The lesion was negative for human papillomavirus (HPV) infection, as assessed by HPV-DNA PCR using the MY09/11 primers for the L1 conserved region.
Conclusions: CCA is an uncommon probably reactive cutaneous lesion with distinctive histopathologic features. Intraoral involvement is rare, although the possibility of underdiagnosis seems plausible. Transcriptionally active HPV infection does not appear to contribute to the pathogenesis of oral CCA.

#59 ORAL LESIONS IN MUCOCUTANEOUS LEISHMANIASIS

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Mucocutaneous leishmaniasis is an infectious disease transmitted by protozoa of the genus *Leishmania*, which causes ulcers in the skin and mucous membranes of the upper airways. The aim of this study is to report on 2 cases of oral mucocutaneous leishmaniasis. The first case is from a healthy 17-year-old caucasian male, presenting with a 4-month history of an ulcerative erythematous lesion in the lower lip, which was bleeding, swollen and painful at presentation. The differential diagnoses were carcinoma or infectious disease. The second case was a 35-year-old male, who was HIV+, smoker, presenting with an erythematous ulcerative lesion in the gingival mucosa of the lower right anterior alveolar ridge, similar to moriform stomatitis, with intense burning symptoms. The diagnostic hypothesis was paracoccidioidomycosis. In both cases, an incisional biopsy was taken. Histopathological evaluation revealed macrophages containing particles resembling amastigote forms of Leishmania in the conective tissue of the oral mucosa. The patients were refered for treatment and subsequent tests confirmed the diagnosis of leshmaniasis. The cases reported herein presents two cases of mucocutaneous leishmaniasis manifesting solely in the oral cavity, thus highlighting difficulties with diagnosis.

#60 THERAPEUTIC EVALUATION OF A NOVEL TOPICAL ANTIMICROBIAL FORMULATION AGAINST CANDIDA-ASSOCIATED DENTURE STOMATITIS IN AN EXPERIMENTAL RAT MODEL

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Introduction: Oral candidiasis caused by the fungal opportunistic pathogen *Candida albicans* is a common pathological condition affecting oral mucosal surfaces. *Candida*-associated denture stomatitis (DS) specifically, is the most prevalent manifestation which tends to be recurrent and refractory to antifungal therapy due to the ability of *C. albicans* to adhere to dentures and form persistent biofilms. However, there are currently no effective therapeutic strategies for the prevention of this recurrent condition. Antimicrobial peptides have attracted significant attention as alternative therapeutics due to their lack of toxicity and potent antimicrobial and anti-inflammatory properties. Specifically, Histatin-5 (Hst-5) has demonstrated potent activity against *C. albicans*including strains resistant to traditional antifungals. However, since we previously identified potential vulnerability for Hst-5 to proteolysis by *C. albicans* proteases, we engineered a variant with double amino-acid mutations (*K11R-K17R*) which proved to be highly resistant to proteolysis. **Materials and Methods:** A bioadhesive polymer-based hydrogel was designed as a peptide delivery system in order to develop a therapeutic topical formulation for prevention of DS. To evaluate *in vivo* efficacy, state-of-the-art 3D digital imaging and printing technology was utilized to design and fabricate an acrylic intraoral device for rats. **Results:** Evaluation of the novel animal model demonstrated its suitability for developing DS mimicking the clinical manifestations in humans. Importantly, the 3D-printed device was specifically digitally designed for precise universal fit on all rat palates. Based on clinical, microbiological and histopathologic analysis of infected animals receiving oral treatment, our findings established the efficacy of the formulation in inhibiting *C. albicans* adherence and biofilm formation on denture acrylic, and importantly, in protecting the associated palatal tissue against infection. Further, we showed that the formulation lacks toxicity to mammalian cells. **Conclusion:** Collectively, these findings establish the clinical utility of the newly developed antimicrobial bioadhesive oral topical formulation for the prevention of DS development.

#61 HISTOPATHOLOGIC SPECTRUM OF INTRAORAL IRRITANT AND CONTACT HYPERSENSITIVITY REACTIONS: CASE REPORTS AND REVIEW OF THE LITERATURE

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INTRODUCTION: Contact hypersensitivity stomatitis (CHS and irritant contact stomatitis (ICS) are often caused by flavoring agents and additives in dentrifices and foods.

CASE REPORTS: We report 7 cases of CHS and ICS that exhibited distinct histopathologic patterns, although two were from the same contactant. Case 1 from a diffuse erythematous and fissured lesion of the buccal mucosa that began after professional teeth-whitening, and that continued to be in contact with Sensodyne Extra-whitening™ toothpaste exhibited sheets of polyclonal plasma cells with scattered eosinophils within the lamina propria typical for plasma cell stomatitis. Case 2 from a white plaque on the buccal mucosa in contact with cinnamon-flavored gum showed peri and paravascular lymphoid nodules and a lymphocytic band at the interface. Case 3 from a maxillary vestibule in contact with mint-flavored gum revealed a lichenoid and diffuse granulomatous inflammation at the interface, and deep peri- and paravascular nodular lymphoplasmacytic infiltrates with focal germinal center formation and rare eosinophils. Case 4 from a diffuse keratotic plaque on the hard palatal mucosa in contact with Listerine Fresh Breath Strips™ exhibited a mild lymphohistiocytic infiltrate and subtle non-necrotizing granulomas in the superficial lamina propria. Refractile foreign material was not identified. Case 5 from a white plaque on the buccal mucosa in contact with Nicorette™ gum revealed lichenoid mucositis with subtle non-necrotizing peri- and para-vascular granulomatous inflammation. Case 6 from a white plaque of the lateral border of the tongue in contact with Nicorette™ lozenges exhibited prominent keratinocyte edema and acanthosis, similar to changes seen in smokeless tobacco lesions. Case 7 from white plaques on the ventral tongue in contact with Tums™ revealed coagulative necrosis, intraepithelial microabscesses, spongiotic pustules and a mild lymphocytic infiltrate.

CONCLUSION: There are a spectrum of histological patterns of CHS and ICS associated with oral contactants.

#62 HEMIOROFACIAL ASYMMETRY (HYPERPLASIA/HYPOPLASIA) WITH ASSOCIATED PERINEURIAL HYPERPLASIA AND PERINEURIOMATOUS PSEUDO-ONION BULB PROLIFERATIONS IS A SEGMENTAL OROFACIAL VARIANT OF THE PIK3CA-RELATED OVERGROWTH SPECTRUM(PROS).

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Introduction: Somatic *PIK3CA* mutations have been encountered in a group of conditions characterized by combinations of skeletal and soft tissue overgrowth, vascular malformations, epidermal nevi, megalencephaly and skin lesions. They are collectively referred to as *PIK3CA*-related overgrowth spectrum (PROS). Patients with facial infiltrating lipomatosis with hemifacial overgrowth, macrodontia and hemimacroglossia (clinical variant of PROS) have been reported to also have "multiple mucosal neuromas" (Couto et al. Pediatr Res. 2017). The purpose of this study was to investigate the possibility of *PIK3CA* mutations in hemiorofacial asymmetry with associated perineurial hyperplasia and perineuriomatous pseudo-onion bulb proliferations.

Materials and Methods: Five unrelated female patients, ages 3-27 at the time of first encounter presented with unilateral segmental orofacial asymmetry of soft and hard tissues, characterized by soft tissue and bony over- growths, occasional tissue atrophy, dental abberations, and, histopathologically, perineurial hyperplasia and multiple pseudo-onion bulb neural proliferations (oral pseudoperineuriomas, OP).

Results: Two patients evaluated for *PIK3CA* mutations revealed point mutation *PIK3CA*c.3140A>G; p.H1047R and in-frame PIK3CA c.1353_1364del, p.Glu453_Leu456del, respectively.

Conclusions: 1) The diagnosis of PROS-orofacial asymmetry can be histopathologically established or at least supported by the presence of perineurial hyperplasia and/or OP in the appropriate clinical setting. 2) Two other patients reported in the literature by Siponen et al (OOOOE 2007) and Vargo et al (Head and Neck Pathol 2016) as having multiple orofacial intraneural perineuriomas with hemifacial hyperplasia, and hemimandibular hyperplasia and intraoral pseudo-onion bulb intraneural proliferations, respectively, should also have PROS. The histopathologic differential diagnosis of neuromas includes multiple endocrine neoplasia syndrome, type 2B (MEN2B) which, however, has different clinical presentation and causative gene mutation. Clinically, PROS-related hemifacial asymmetry should be differentiated from PTEN-related overgrowth syndromes and Proteus syndrome, an *AKT-1* somatic disorder. Such conditions do not reveal perineurial hyperplasia or OP to the best of our knowledge.

#63 PERSISTENT HYPERKERATOTIC LESIONS IN ORAL PEMPHIGUS VULGARIS: REPORT OF 4 CASES.

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Objective: Pemphigus Vulgaris (PV) is a mucocutaneous autoimmune disorder characterized by intraepithelial blistering that commonly affects the oral cavity. Oral PV manifests clinically with short-lived vesicles that rupture forming extensive ulcerations. Herein, we report our observation that occasionally cases of oral PV with typical initial clinical presentation may exhibit white hyperkeratotic lesions that persist despite remission of ulcerations, still showing microscopic features of intraepithelial cleft formation. Pertinent to these findings, we review the dermatology literature correlating excessive keratinization and blistering disorders due to alterations of molecular signaling.

Findings: Four female patients with a diagnosis of oral PV, confirmed by histopathologic examination and direct immunofluorescence, developed white hyperkeratotic plaques over the course of their disease. The lesions most commonly involved the gingiva and persisted despite overall disease remission achieved by systemic corticosteroid treatment. The possible overlap of blister formation and white plaque development was underlined in a patient with a gingival hyperkeratotic lesion that desquamated after application of pressure to the affected area. Additionally, in two patients, incisional biopsy of non-wiped off white plaques was performed with histopathologic features of epithelial hyperplasia along with intraepithelial clefting.

Conclusions: To the best of our knowledge, the presence of keratotic lesions in patients with oral PV has not been explicitly described. We hypothesize that PV autoimmune deregulation, in addition to typical desmosome targeting destruction and blister development, could evoke specific molecular signaling/regenerative processes to epithelial cells, causing hyperplasia, especially during phases of diminished disease activity typically induced by pharmacologic treatment. Future investigations in the field of keratinizing and blistering disorders are required, to identify possible complex relationships and provide further understanding of PV pathogenesis.

#64 ORAL MANIFESTATION OF PYODERMA GANGRENOSUM: A REPORT AND REVIEW OF THE LITERATURE

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Objectives:

Pyoderma gangrenosum (PG) is a rare ulcerative condition that affects the skin and mucosa. While any body site can be affected, the ulcers tend to develop on the lower extremities or around surgical sites. PG can occur at any age, but most commonly affects individuals in their 4^{th} and 5^{th} decades of life. Although the exact cause is unclear, a majority of cases are associated with an underlying systemic condition, most frequently inflammatory bowel diseases or autoimmune processes. Rarely, PG can manifest as ulcerations involving cutaneous and mucosal surfaces of the head and neck. Herein we present the case of a 63-year-old female with oral manifestations of PG.

Findings: A 63-year-old female patient was referred to the Oral and Maxillofacial Surgery Clinic at the Columbia University Irving Medical Center for evaluation of an ulceration of the right maxillary vestibule. The patient's medical history was significant for recent onset PG. Extraoral examination revealed a deep, indurated ulcer of the right cheek skin measuring 3x2 cm in size. Intraorally, a red to tan-yellow, partially exophytic soft tissue lesion was identified in the right maxillary vestibule. Based on the clinical presentation, the most likely diagnosis was an intraoral manifestation of the patient's PG via direct extension from the skin lesion of the right cheek. An incisional biopsy of the intraoral lesional tissue was performed which confirmed this diagnosis.

Conclusions: PG represents an uncommon, albeit important mucocutaneous ulcerative condition. Oral involvement is infrequent, with only approximately 20 reported cases to date. After exclusion of infectious and neoplastic entities has been performed, patients with a diagnosis of PG should be evaluated for any associated underlying systemic conditions. Management of PG requires an interdisciplinary approach, in which the dental practitioner may serve an important role.

#65 INFLAMMATORY FIBROID POLYP OF THE ORAL MUCOSA: UNDER-REPORTED LESION OR A NOVEL PRESENTATION OF A BENIGN GASTROINTESTINAL TUMOR?

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Inflammatory polyps have been described in a number of anatomic locations including the gastro-intestinal (GI) tract, sinonasal region and larynx. Their prevalence within the lower GI tract of adults (including non-neoplastic and adenomatous variants), is approximately 30%. Among the recognized subtypes, inflammatory fibroid polyp has occurred in various segments of the GI tract, particularly the stomach antrum and colon, and rarely the esophagus. Cases affecting the oral cavity; however, have not previously been reported. We present a 61-year-old male with a six year history of a slowly enlarging, asymptomatic, pedunculated, pink, 1.2 cm nodule of the left buccal mucosa. Following excisional biopsy, histopathologic examination revealed a uniform, hypocellular proliferation of bland spindle to dendritic-shaped cells admixed with delicate strands of collagen and dilated vascular channels as well as patchy aggregates of inflammatory cells including plasma cells, lymphocytes and neutrophils. Prominent perivascular lamellar collagen deposition was frequently observed. Immunohistochemical analysis revealed the lesional cells to be positive for expression of calponin, SMA and Factor XIIIa. Overall, the microscopic and IHC findings were considered unusual for the oral cavity and most consistent with inflammatory fibroid polyp of the GI tract. While unique in our experience, similar oral lesions may have been observed by others but remain under-reported. Further studies are needed to elucidate the true prevalence, distribution and patient characteristics associated with oral cases of inflammatory fibroid polyp.

#66 GRANULAR CELL TRAUMATIC NEUROMA

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Granular cell traumatic neuroma is a rarely described lesion. To date, two cases have been reported in postsurgical mastectomy scars, and one additional case located in the parotid gland was described in a letter to the editor. Here we present the first case of granular cell traumatic neuroma found within the oral cavity. This lesion was described as an exophytic mass of the buccal mucosa in an otherwise healthy 16-year-old male. The lesion was asymptomatic with an intact overlying mucosa.

The histologic findings of this lesion resemble a neuroma composed of numerous small nerve trunks which contained intraneural collections of granular cells. Additional collections of granular cells were also found in the fibrous stroma of the lesion. Granular cell traumatic neuromas have the combined histology of two rather common lesions, granular cell tumors, and traumatic neuromas, but when found intermingled compose a more elusive entity. The etiologies of both traumatic neuromas and the granular cell variant have been linked to local tissue trauma such as surgery or other injuries. Granular cell tumors were originally thought to have a myoblastic origin, however, a Schwann cell origin is now generally accepted. Granular cells can be found in a range of tumors, and have been noted associated with traumatized tissue in surgical sites. Traumatic neuromas develop when tissue is injured (e.g. surgery), nerves are severed and the nerve attempts to regenerate via the proliferation of Schwann cells which form tubes for the axon to grow through. Fibrous scar tissues resultant from the injury allows the development of small masses of nerve bundles. *Our case, like the previously reported lesions, revealed positivity with S-100, CD68, and PAS staining.* Identification of both elements of the lesion as well as knowledge of this unusual entity will help one establish the correct diagnosis.

#67 THE LINK BETWEEN ORAL LICHEN PLANUS AND SYSTEMIC DISEASES

Ms. Anjali Dave (Columbia University College of Dental Medicine), Dr. Elizabeth Philipone (Columbia University College of Dental Medicine)

Introduction: Oral lichen planus (OLP) is a chronic inflammatory disease that is seen in 2% of the general population and presents clinically as white striations and plaques or as erythematous or erosive lesions. Although the pathologic mechanism of OLP is not yet established, it is accepted that immune dysregulation plays a critical role. Various researchers have reported associations between OLP and systemic conditions including: thyroid disease, hepatitis C infection, hypertension, dyslipidemia, diabetes mellitus, and a genetic predisposition to cancer. The goal of this study was to investigate the association between OLP and the following systemic conditions: thyroid disease, hepatitis C infection, hypertension, dyslipidemia, diabetes mellitus, and cancer prevalence.

Methods: This retrospective case-control study was based on patients diagnosed with OLP at Columbia University from 2000-2013. 156 OLP patients matched the selection criteria. An odds ratio with a 95% confidence interval was calculated to determine the association between OLP and the systemic diseases examined.

Results: The OLP subjects were 2.77 times more likely to have thyroid disorders than the controls (95% CI 2.23 to 3.31). An association between the occurrence of OLP and prevalence of any type of cancer was observed. Specifically there was a strong association between OLP and head and neck squamous cell carcinoma. The other systemic diseases showed no positive association with OLP.

Conclusions: To the best of our knowledge, this is the only study correlating thyroid disorders and OLP on a U.S. population. Our findings confirmed that thyroid disorders had a higher association with OLP than that of the control group. The results from this study suggest there is a correlation between OLP and the occurrence of oral cancer and all types of cancer in general. We speculate that immune dysregulation plays a role in this association. Further research with larger sample size is needed.

#68 LOCALIZED JUVENILE SPONGIOTIC GINGIVAL HYPERPLASIA - REPORT OF SEVEN CASES AND REVIEW OF THE LITERATURE

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INTRODUCTION: Localized juvenile spongiotic gingival hyperplasia (LJSGH) is an entity of unknown etiology that presents clinically as a red papillary lesion of the attached gingiva. This gingival pathology was first described by Darling et al. in 2007 as "juvenile spongiotic gingivitis". They noted the prevalence of LJSGH in children and young adults, as well as the characteristic histopathology of epithelial hyperplasia with prominent spongiosis, neutrophilic exocytosis, and increased vascularity of the lamina propria. Subsequently, Chang et al reported 52 additional cases and proposed the term LJSGH. The pathogenesis remains to be elucidated, but origin from gingival sulcular epithelium has been proposed as CK19 immunohistochemical stain, a marker of sulcular epithelium, demonstrates full-thickness positivity. This article presents 7 new cases of this entity, discusses our immunohistochemical findings, and reviews the current available literature.

METHODS: 7 Cases of LJSGH were retrieved from the files of the Mount Sinai Oral Pathology Biopsy Service. A review of the literature found an additional 158 cases. Clinical and demographic data were collected and recorded in a database. RESULTS:

All seven of our cases were localized. 165 total cases were reviewed with 28 multifocal cases noted and the remainder(83%) being solitary. No significant sex predilection was noted in our cases or in the literature. Similar to the literature we noted a predilection for the anterior maxilla. Four of our cases involved children under 20-years-old while 3 were adults. In the literature, 90.3% of cases affected children under 20. CK19 stain demonstrated full-thickness, diffuse positivity in our seven cases and all were excised with no recurrence at follow-up of 1-27 months.

CONCLUSION: We present seven new cases of LJSGH and reviewed 158 cases reported in the literature to date. Interestingly, multiple cases that were neither localized nor juvenile were noted.