Gum Gardeners Study Club
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Early Detection of Oral Cancer

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Role of the Dental Hygienist in Oral Pathology

- Work closely with the dentist to identify and manage soft tissue and bony diseases
- Help to make sure that patients don't "fall through the cracks"
  - Establish oral pathology protocols for your office
    - Ensure appropriate treatment or referral
    - Ensure appropriate short-term and long-term follow-up

Role of the Dental Hygienist in Oral Pathology

- Maintain a complete, accurate and up to date patient history
- Perform a thorough head and neck examination at the appropriate intervals
- Document details of clinical findings
- Bring any abnormalities to the attention of the dentist
- Assist in the monitoring of soft tissue and bony conditions
- Provide patient education

Cancers of the Oral Cavity

- 90% are squamous cell carcinoma
- The remaining 10% are
  - Salivary gland tumors
  - Lymphoma
  - Melanoma
  - Metastatic tumors
  - Sarcomas

Definitions

- Squamous cell carcinoma
  - A malignant neoplasm derived from stratified squamous epithelium
- Epithelial dysplasia
  - A disorder of differentiation of epithelial cells which may regress, remain stable, or progress to invasive carcinoma

Oral Squamous Cell Carcinoma Prognosis

Most important factor is stage at diagnosis

Stage at Diagnosis	Stage Distribution (%)	5-year Relative Survival (%)
Localized (Stage 1 or 2) (confined to primary site)	31	82.7
Regional (Stage 3) (spread to regional lymph nodes)	47	59.2
Distant (Stage 4) (cancer has metastasized)	17	36.3
Unknown (Unstaged)	6	49.3

Screening

- Detection of disease
- A good screening test
  - Simple, safe, acceptable to the public
  - Detects disease early
    - Detect lesions that are treatable or where intervention will prevent progression
  - High sensitivity and specificity
    - Sensitivity- Subjects who have the disease should test positive
    - Specificity- Subject who test positive should have the disease

Oral Cancer Screening

- Conventional oral examination (COE)
  - Head and neck examination
- Adjunctive tests
  - Light-based detection systems
    - Tissue reflectance
    - Narrow-emission tissue fluorescence
  - Toluidine Blue

Adjunctive Tests

- These tools may hold promise in selected clinical settings
- No technique or technology to date has provided definitive evidence to suggest that it improves the sensitivity or specificity of oral cancer screening beyond COE alone

COE Advantages

- Relatively simple to perform
- Inexpensive
- Safe
- Acceptable to the public

COE Problems

- There has been very little research on the efficacy of the conventional oral exam
- 5-15% of general population have oral mucosal abnormalities
  - Most benign
  - Most are white patches or plaques
    - Only a small percentage will progress
- COE cannot discriminate between lesions that will progress and those that won't

Patient Evaluation

- History, History, History
  - Identify and document risk factors
    - Age, sex, occupation
    - Medical history
    - Dental history
    - Social/Behavioral history
  - Document symptoms that may raise concern
- Head and Neck Examination

Oral Cancer Symptoms

- Sore in the mouth or throat that doesn't heal
- Loose teeth
- Lump or thickening in the neck, face, jaw, cheek, tongue or gums
- Difficulty swallowing or the sensation that something is caught in the throat
- Earache or sore throat that does not go away
- Dentures that cause discomfort or do not fit well
- Difficulty chewing, swallowing or moving the tongue or jaw
- Persistent bad breath
- Unexplained weight loss
- Change in voice

Oral Cancer Risk Factors

- Tobacco
- Alcohol
- Human papilloma virus (HPV) infection
- Immune system suppression
- Age
- Gender
- Ultraviolet light
- Poor nutrition
- Genetic syndromes

Tobacco

- 80% of oral cancer patients are smokers compared to about 20% of the general population
- 1 in 3 patients with oral cancer who continue smoking develop second primaries, compared to 1 in 10 who quit
- Risk is dose dependent
  - At lease 5x greater at 40 cigarettes per day
  - Up to 17x greater at 80 cigarettes per day
- For those who have quit risk of oral cancer approaches that of non-smokers after 10 years

Smokeless Tobacco

- Risk of oral cancer ~4x that of non-user
- Dry snuff has higher risk than wet snuff or leaf

Alcohol

- 70% of oral cancer patients are heavy drinkers
- People who consume ~3.5 or more drinks per day have at least a 2-3x greater risk of developing oral, pharyngeal or laryngeal cancers than non-drinkers
- Tobacco and Alcohol
  - Synergistic effect, each makes the other more dangerous
  - Combined use risk ~15x that of non-users

Human Papilloma Virus (HPV)

- DNA viruses that infect epithelium of skin and mucosa
- >100 types
- Low risk types → benign epithelial hyperplasia
- High risk types associated with malignancies

Definitions

- HPV-associated = types of cancers that have been shown to be strongly associated with HPV infection
  - Cervical, anal, vaginal, penile, oropharyngeal
- HPV-positive = a cancer that has tested positive for the presence of HPV DNA
- HPV-negative = a cancer that has tested negative for the presence of HPV DNA

HPV and OPSCC

- 50-87% of oropharyngeal cancers are HPV-positive compared to 0-2% of oral cavity cancers
- HPV-16 alone is associated with 85-95% of HPV-positive oropharyngeal cancers

Centers for Disease Control and Prevention Estimates

- 20 million Americans are currently infected with HPV
- 6 million will become infected each year
- At least 50% of sexually active adults will be infected with HPV in their lifetime
- 33,000 men and women will develop an HPV-associated malignancy this year
  - (0.165% of 20 million)
- 12,000 of these cancers will be HNSCC
  - (0.06% of 20 million)

Malignant Transformation

- Virus must…
  - Enter the host cell
  - Integrate into the host genome to replicate
  - Express viral oncogenes E6 and E7 that encode for oncoproteins that inactivate host cell proteins that normally regulate cell division

HPV and OPSCC

- People with HPV-positive OPSCC more often
  - are younger, often between 30-55 years of age
  - are white and male
  - lack a history of significant tobacco and/or alcohol exposure
  - have engaged in "high-risk" sexual behavior
  - have a better prognosis than those with HPV-negative cancers

Risk Factors for HPV-Positive OPSCC

- Number of sexual partners
  - Current and lifetime
  - Oral and vaginal
- Young age at first intercourse
- History of genital warts
- Diagnosis of cervical cancer
- Partner with cervical cancer

The Purpose of the Head and Neck Examination

- To detect and document
  - Abnormalities
    - Malignant and premalignant lesions
    - Oral manifestations of systemic disease
    - Benign lesions and conditions
  - Variations of normal anatomy

The Head and Neck Examination

- Should be performed:
  - At the initial visit for all new patients
    - In every type of dental practice
    - For patients of all ages
  - On any patient of record who has not had one in the previous 6 months
  - As necessary for patients with a lesion or condition that is being treated or monitored

Patient Preparation

- Inform your patient
  - What you will be doing
  - Why you will be doing it
  - Any positive findings
- Be sure that your patient knows that your exam will include oral cancer screening
- Request patient to
  - Remove eye glasses for examination of facial skin
  - Unbutton upper one or two shirt buttons if necessary
  - Remove lipstick

Techniques Used in Performing the Head and Neck Examination

- Visual inspection
- Palpation
- Probing
- Percussion
- Auscultation
- Diascopy

Visual Inspection

- Proper lighting is essential
- Looking very carefully for
  - changes in color
  - changes in texture
  - presence of lesions
    - ulcers
    - blisters
    - enlargements

Visual Inspection

- Use gauze to retract and visualize posterior lateral tongue
- Use mouth mirror for indirect visualization and reflection of light
- Use mouth mirror for soft tissue retraction to enhance visualization

Palpation

- Determining the physical characteristics of tissues by use of the tactile sense
- Feeling for change in texture and mobility
  - Induration- abnormal firmness
  - Fixation- abnormal attachment to underlying or surrounding tissue

Palpation

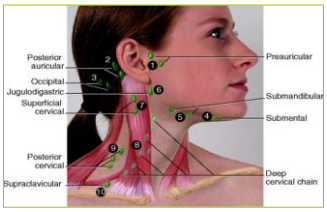
- Digital- feeling with one finger
- Manual- feeling with one hand
- Bi-digital- feeling between two fingers
- Bi-manual- feeling between two hands
- Digital or manual palpation are used when the tissues being examined are pressed against bone
  - E.g. palpating the hard palate, gingiva, alveolar mucosa
- Bi-digital or bimanual are used when the tissues are not pressed against a hard surface
  - E.g. palpating the lips, tongue, floor of mouth

Extraoral Head and Neck Examination

- Best performed with patient sitting upright
- Facial form, skin, eyes, ears, hair
- Vermilion border
- Structures of the neck, submandibular, submental, buccal and preauricular regions
  - Lymph nodes
  - Salivary glands
  - Thyroid gland
  - Trachea
  - Carotid arteries
  - Muscles
  - Temporomandibular joints

Superficial Lymph Nodes of the Head and Neck

- Anterior Cervical
- Supraclavicular
- Posterior cervical
- Occipital
- Submental
- Submandibular
- Parotid
- Pre-auricular
- Post-auricular (Mastoid)



Lymph Nodes Worrisome Features

- Larger than 1 cm
- Non-tender
- Rubbery or hard
- Fixed to surrounding tissue
- Matted together

Intraoral Head and Neck Examination

- Best performed with patient reclined
- Labial mucosa
- Buccal mucosa, mucobuccal folds, and parotid glands
- Tongue
- Floor of mouth
- Hard palate
- Soft palate and oropharynx
- Maxillary tuberosities and retromolar areas
- Gingiva and alveolar mucosa
- Saliva- quantity and quality

Clinical Description of Abnormalities

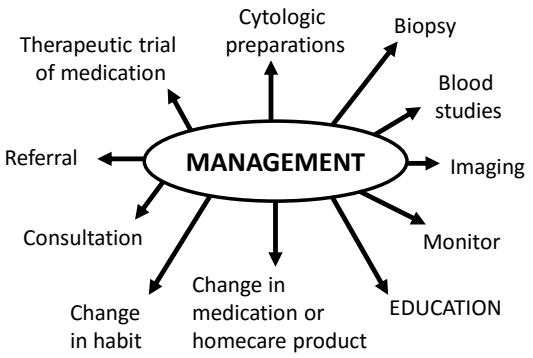
- Location
- Distribution
- Size
- Color
- Shape
- Borders
- Surface contour
- Surface texture
- Consistency
- Blanchable
- Fixed or moveable
- Drainage/bleeding
- Association with dental or periodontal disease
- Association with xerostomia
- Radiographic findings

Photo Documentation

- High quality photographs provide excellent supplementary documentation
- Use to
  - Document presenting condition
  - Document procedures
  - Monitor for changes
  - Patient education

Diagnosis and Management

- Integrate historical, clinical and radiographic features
- Make a clinical diagnosis
  OR
- Develop a differential diagnosis (DDx)
- Plan appropriate management for that patient



When is a biopsy indicated?

- **Malignancy cannot be ruled out**
- Lesion exhibits clinical features suspicious for dysplasia or carcinoma
- Clinical diagnosis cannot be confidently made
- Cause for a lesion cannot be identified
- Lesion persists following elimination of suspected cause
- Lesion does not respond to treatment

Clinical Presentation of Oral Cancer and Pre-cancer

- Most common sites
  - Tongue- ventrolateral
  - Floor of mouth
  - Soft palate/tonsillar pillars
  - Retromolar trigone
- May occur anywhere!
- Varied clinical presentations
  - Red and/or white
  - Ulcerative
  - Exophytic
    - Likely already SCC

Clinical Presentation of Oral Cancer and Pre-cancer

- Epithelial proliferation typically results in some degree of surface irregularity
  - Granular
  - Rough
  - Verrucous
  - Papillary

Leukoplakia

- Clinical term for a white plaque or patch
  - NOT A DIAGNOSIS
- 5-25% show dysplasia on biopsy
- 4% progress to squamous cell carcinoma
- May be the result of mechanical, thermal or chemical irritation or may be idiopathic
- Biopsy is indicated if
  - a source of irritation cannot be identified
  - a lesion persists following removal of suspected irritant

Conditions Presenting with Leukoplakia

- Epithelial dysplasia
- Carcinoma in situ
- Squamous cell carcinoma
- Hyperkeratosis
- Smokeless tobacco lesion
- Lichen planus
- Hyperplastic candidiasis
- Nicotine stomatitis
- White sponge nevus

Leukoplakia

- Impossible to clinically differentiate among hyperkeratosis, epithelial dysplasia, carcinoma in-situ and squamous cell carcinoma
- Clinical features raise suspicion for dysplasia or carcinoma
  - Irregular thickening
  - Areas of ulceration or erythema
  - Induration
  - Fixation to underlying tissues
  - “High-risk areas” (floor of mouth, ventrolateral tongue, soft palate and retromolar trigone)

Proliferative Verrucous Leukoplakia (PVL)

- WHO defines PVL as a distinct clinical form of oral leukoplakia, defined by
  - a progressive clinical course
  - changing clinical and histopathologic features
  - potential to develop into cancer

PVL

- More common in elderly women who have had lesions of leukoplakia for many years
- High rate of recurrences after treatment
- Malignant transformation in about 70% of cases

PVL

- Begins as one or more homogeneous leukoplakic areas
- Over time lesions enlarge and affect other locations
- Lesions are often rough to verruciform
- Involvement of gingiva and alveolar mucosa are most common but any oral mucosal location may be involved
- The diagnosis of PVL is a clinical-pathologic correlation

Erythroplakia

- Clinical term for a red plaque or patch
  - NOT A DIAGNOSIS
- 90% show severe dysplasia, carcinoma in situ, or superficially invasive squamous cell carcinoma on biopsy

Erythroleukoplakia (Speckled Leukoplakia)

- Clinical term for a mixed white and red plaque or patch
  - NOT A DIAGNOSIS
- Many show severe dysplasia, carcinoma in situ, or superficially invasive squamous cell carcinoma on biopsy

Conditions Presenting with Erythroplakia or Erythroleukoplakia

- Epithelial dysplasia
- Carcinoma in situ
- Squamous cell carcinoma
- Smokeless tobacco lesion
- Lichen planus
- Erythema migrans

DDx of Chronic Oral Ulcerative Lesions

- Squamous cell carcinoma
- Deep fungal infection
  - Histoplasmosis, cryptococcosis, mucormycosis
- Chronic viral infection
  - Herpes simplex, cytomegalovirus
- Oral tuberculosis
- Syphilis
- Trauma
  - Traumatic ulcerative granuloma, facticial injury
- Foreign body response
- Major aphthous
- Erosive lichen planus

Smokeless Tobacco Lesion

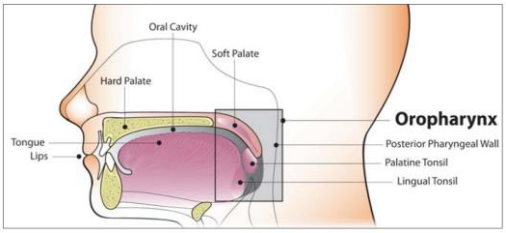
- Early stage is wrinkled white lesion in area where product is placed
- More advanced lesions are thick and furrowed and may be tan due to tobacco staining
- Biopsy indicated
  - Erythema at base of furrows
  - Nodular thickening
  - Ulceration
  - Induration
  - Fixation
- Lesions that persist following discontinuation of habit should also be biopsied

Actinic Cheilosis

- Caused by long-term sun exposure of the lip
- Starts as localized or diffuse, patchy white change and loss of distinction between skin and vermilion
  - May be reversed by diligent sun protection
- Areas of recurrent or persistent ulceration, induration or fixation are suspicious for squamous cell carcinoma

HPV and Oropharyngeal Squamous Cell Carcinoma (OPSCC)

- HPV-positive oral cancers primarily involve base of tongue and tonsils



Clinical Presentation of HPV-Positive OPSCC

- Not typical of oral SCC
- Usually present as a mass
  - Arise from tonsillar crypts
  - Are not associated with dysplasia of surface epithelium
  - Do not produce clinically significant keratinization
  - Show lobular growth
- Most present at stage III or IV

Clinical Presentation of HPV-Positive OPSCC

- Possible signs and symptoms
  - Sore throat
  - Earaches
  - Hoarseness
  - Enlarged lymph nodes
  - Pain when swallowing
  - Unexplained weight loss

Recommended Text

Oral and Maxillofacial Pathology
4th Edition

Authors: Brad W. Neville, DDS, Douglas D. Damm, DDS, Carl M. Allen, DDS, MSD and Angela C. Chi, DMD

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