Sexually Transmitted Diseases and Dentistry

Sara Gordon  DDS MS FRCD (Canada) FDS RCS (Edinburgh)
Diplomate, American Board of Oral & Maxillofacial Pathology
Professor of Oral Medicine
Associate Dean for Academic Affairs
• CD4 count < 500
  – Beginning of opportunistic infections
• CD4 count < 200
  – Usually full-blown AIDS
  – However, AIDS is not merely defined by the CD4 count.
Some of the many oral manifestations of HIV/AIDS

- **Infections**
  - Bacterial - especially NUG
  - Fungal - especially Candidiasis
  - Viral - especially Herpes, EBV (Hairy Leukoplakia), HPV

- **Enlargements**
  - Parotid
  - Lymph nodes

- **Aphthous-like ulcers**
- **Dry mouth**
- **Malignancies**
  - Squamous cell CA
  - Lymphoma
  - Leukemia
  - Kaposi Sarcoma
HIV and Salivary Glands

• 5% of HIV+ patients have painless bilateral parotid enlargement
  – Parotid lymph nodes enlarge during HIV disease, may become cystic

• Also, independently, there may be low salivary flow with or without HAART

Kumar and Sharma. *Parotid lymphoepithelial cysts as an indicator of HIV.* J Can Dent Assoc. 2011;77:b28
Lab tests – get latest from MD

• **Infection risks**
  – HIV Status Update: CD4 Count, Viral Load
  – Blood Cell Status: CBC with Differential

• **Bleeding risks**
  – Platelet Count (may be depressed in HIV)
    • Clinical signs of thrombocytopenia including bruising of skin and/or oral mucosa, and prolonged bleeding after a minor cut
  – INR
  – Liver Function Tests
    • Hepatitis, consumption of alcohol or other recreational drugs, are all associated with liver damage
CD4 Count – What’s what?

<table>
<thead>
<tr>
<th>HIV Status</th>
<th>CD4 Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy</td>
<td>&gt;500</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>200-499</td>
</tr>
<tr>
<td>Symptomatic</td>
<td></td>
</tr>
<tr>
<td>AIDS</td>
<td>&lt;200</td>
</tr>
</tbody>
</table>

Adapted from NW-AETEC
<table>
<thead>
<tr>
<th>Normal CD4 Count</th>
<th>Men = 400-1200</th>
<th>Women = 500-1600</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CD4 Count</strong></td>
<td><strong>Associated Problems</strong></td>
<td></td>
</tr>
<tr>
<td>&gt;300</td>
<td>Very few except increased risk of malignancies (KS, lymphoma etc) at any CD4 count</td>
<td></td>
</tr>
<tr>
<td>200-300</td>
<td>Water and food-borne illnesses</td>
<td></td>
</tr>
<tr>
<td>&lt;200</td>
<td>Pneumocystis Pneumonia</td>
<td></td>
</tr>
<tr>
<td>&lt;100</td>
<td>Atypical TB, toxoplasmosis</td>
<td></td>
</tr>
<tr>
<td>&lt;50</td>
<td>CMV, all other infections</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from NW-AETEC
Significance of Viral Load

- Measures the success or failure of retroviral therapy (HAART)
- Indicates the level and rate of viral replication
- Helps predict future immune suppression
- The higher the viral load, the faster HIV disease is progressing, and the worse the chance of longer-term survival

Adapted from NW-AETEC
Need for antibiotic therapy is based on Neutrophil Count, not CD4 count

- Check with MD team if CD4 count is <200
- If Neutrophil Count is 500-1000, then antibiotic therapy is strongly encouraged
- If neutrophil count is <500, antibiotic prophylaxis is mandatory
- Other indications include
  - Needed under AHA guidelines for heart disease
  - Dialysis catheter
  - Indwelling venous access lines

Adapted from NW-AETEC
HAART

• HAART can significantly affect drug-drug interactions, especially through the Cytochrome p450 pathway
• Drug elimination may be faster OR slower.
• There are many side effects of HAART treatment as well as numerous potential drug interactions.
• For current information on the medications that your patient is taking, consult a good drug reference.
Can dentists perform salivary HIV testing?

- 25% of HIV+ patients in USA unaware
- Rapid HIV test using oral fluids
- Results in <20 minutes
- Sensitivity and specificity comparable to blood testing
- Preliminary positive test gets confirmed by Western Blot at MD office

But will we?

- But - who pays?
- Perceived as dentist’s job?
- Are dentists adequately trained?
- Are we able to deliver bad news?
- Do we have the resources for immediate referral to MD for confirmatory testing?

Human papillomavirus

– 120+ types
– Cause epithelial proliferation - skin or mucosa
– Readily transmissible (casual or sexual)
– Most sexually active people have been exposed to at least one type
  • At least 70 percent of sexually active persons will be infected with genital HPV at some time in their lives, says National Cancer Institute
High Risk HPV

- A growing risk factor: “high-risk” HPV types 16, 18, 31, 33
- Known to be involved in most cervical cancer and often rectal
- Newer: Base of tongue, oropharynx, tonsils and tonsillar pillars - associated with HPV-16
- About 5-10% of tongue cancers are thought to be associated with “high-risk” HPV

- HPV type 16, 33, or 35 was specifically located within tumor cell nuclei of 61% of oropharyngeal cancer patients.
- All patients with laryngeal cancer were HPV negative
A high lifetime number of vaginal-sex partners (26 or more) was associated with oropharyngeal cancer (odds ratio, 3.1; 95% confidence interval [CI], 1.5 to 6.5), as was a high lifetime number of oral-sex partners (6 or more) (odds ratio, 3.4; 95% CI, 1.3 to 8.8), with or without the established risk factors of tobacco and alcohol use.
Is HPV-associated cancer a different disease?

- HPV infected HNSCC patients tend to be younger, nonsmokers, and nondrinkers.
- “There is sufficient evidence to conclude that a diagnosis of HPV-positive HNSCC has significant prognostic implications; these patients have at least half the risk of death from HNSCC when compared with the HPV-negative patient.”
How does “high-risk” HPV cause cancer?

- Small, non-enveloped, circular double-stranded DNA virus
- Attracted to squamous epithelial cells
- Enter into basal cells
- Transported to nucleus
Virus Disables Suppressors

- E6 viral protein
  - Suppressor protein 1
  - Degraded suppressors
  - E7 viral protein
  - Suppressor protein 2

- Cancerous epithelial cells
- Mucus
- Healthy cells
HPV and carcinogenesis

- HPV’s E7 gene can bind to Rb - gatekeeper off duty!
  - uncontrolled cell reproduction
- HPV’s E6 protein can bind to p53
  - Repeated replication of cells with incorrect DNA information
  - No apoptosis of mutated cells
- HPV’s E6 can also activate telomerase
  - maintains a repeated cell cycle that continues to produce viral cells.
  - mutant cells continue to reproduce out of control.
HPV infection can lead to different outcomes depending on the immune response. In a productive infection, HPV DNA integrates into the host genome, leading to the expression of viral proteins that can alter cell function. In a latent infection, HPV remains dormant without causing visible changes.

- **Immune response**: The body's immune system may recognize and respond to the HPV infection, leading to the destruction of infected cells and the regression of lesions.
- **Metaplastic epithelium**: The basal cells differentiate into metaplastic cells, which can undergo further changes.
- **HPV E6 / E7 bind to p53 & pRb**: Viral proteins E6 and E7 interact with the tumor suppressor proteins p53 and pRb, leading to their inactivation and the loss of cell cycle control.
- **Integration of HPV DNA**: This integration can lead to uncontrolled cell proliferation and the development of malignant cells.
- **Co-factors**: STDs, smoking, immunosuppression can increase the risk of HPV-associated diseases.

The diagram illustrates the progression from HPV infection to malignant cell formation, highlighting the role of viral proteins and the immune system in this process.
HPV Vaccines: 2 types

- **BIVALENT**
  - Effective against HPV 16 and 18 ("high risk") but NOT against HPV 6 and 11 (genital warts)

- **QUADRIVALENT**
  - Effective against HPV 16 and 18 ("high risk") as well as HPV 6 and 11 (genital warts)

- But surveillance for cancer is still important
Consensus: Tonsils, Posterior Palate, Base of Tongue

- Competent examination includes attempting to visualize and palpate these areas, BUT we acknowledge that this is often not possible.
- If a lesion is suspected here, referral to otolaryngology or other specialty is recommended.
Consensus, Oral and Maxillofacial Section, ADEA 2010

• The patient history should include a discussion of possible exposure to high-risk types of HPV, and safer sex practices, for all patients judged to be sexually active
Can dentists counsel their patients about safer sex - and will we?

• HPV is issue in oral cancer prevention
• The “Yecch” factor
• No training in most dental programs
• Job for educators
• Embarrassed dentist = embarrassed patient
Verruca vulgaris

- Common wart
- Sessile hairy-looking white lesion/s
- Elevated with discrete borders and a flat verrucous top (Jughead’s hat)
- HPV types 2, 4, and 40
- But – not high risk HPV!

Not Sexually Transmitted

No increased cancer
On skin:
  – surgical excision, liquid nitrogen, or keratinolytic agents.

Intraoral:
  – surgical excision, cryotherapy or electrosurgery.

2/3 disappear spontaneously
Papilloma

- Common benign pedunculated lesion
- Cauliflower-like surface BUT often indistinguishable from Verruca Vulgaris
- Soft palate, tongue, uvula - or anywhere
- Usually pink in colour

Not Sexually Transmitted

No increased cancer
Condyloma acuminatum

• Also known as Venereal Warts
  – HPV 6 and 11; (sometimes 16 and 18)
  – But – not high risk HPV!
• Infectious - can spread to other people and other sites
• Small and sessile to large
• Papillary proliferations with a cauliflower-like shape
• Larger than papillomas, often multiple
• Should be surgically excised.
  – Some types of laser removal may spread the virus to other sites or surgical personnel through aerosol.
But – not high risk HPV!

**Verruca**
Upside down V
HPV 2, 4

**Condyloma**
Sideways C
HPV 6, 11

**Papilloma**
Pedunculated like P
Heck’s Disease
Focal Epithelial Hyperplasia

• First described in 1965 in Native Americans
• In some isolated populations up to 40% of children have been affected
• Adults usually have minimal symptoms
• Caused by HPV 13 and 32
• But – not high risk HPV!

Not Sexually Transmitted
No increased cancer
• Flat, smooth, soft, papules
• Same color as surrounding mucosa usually
• No ulceration
• No malignant transformation potential
• Usually a self-limiting viral infection

• Can mimic condyloma acuminatum
• Important distinction in children: sexual abuse
• Can be more florid and persistent in HIV+ patients
• May be removed surgically if they interfere with function
HPV Significance for Dentistry

• Growing numbers of HPV+ cancers in oropharynx and in non-smokers
• Careful exam including entire tongue, tonsils, base of tongue, posterior pharynx
• Consider referral to general health team for positive extraoral findings
• Preventive counseling – including oral safer sex
• Encourage younger patients to have HPV vaccine
• Continue to stress tobacco as #1 cause of intraoral CA
Gonorrhea

• Common sexually transmitted infection
• Caused by Neisseria gonorrhoeae, Gram-negative intracellular diplococcus
• Risk factors:
  – Multiple or new sex partners, inconsistent safer sex
  – City living in areas with disease prevalence
  – Adolescents, females particularly vulnerable
  – Lower socio-economic status
  – Use of drugs
  – Exchange of sex for drugs or money
Transmission

• Efficiently transmitted by
  – Male to female via semen
  – Vagina to male urethra
  – Rectal intercourse
  – Fellatio (oropharyngeal infection)
  – Perinatal transmission (mother to infant)

• Gonorrhea associated with increased transmission of and susceptibility to HIV infection
Gonococcal Infection in Men

- Urethritis – Inflammation of urethra
  - Purulent or mucopurulent urethral discharge
  - Often dysuria – painful urination
- Epididymitis – Inflammation of epididymis
- Asymptomatic in a minority of cases
- Incubation period: usually 1-14 days for symptomatic disease, but may be longer
Gonococcal Infection in Women

• Most infections are asymptomatic
• Cervicitis – inflammation of the cervix
• Urethritis – inflammation of the urethra
  – Dysuria (painful urination) but most women are asymptomatic
  – 70%–90% of women with cervical gonococcal infection may have urethral infection
• Accessory gland infection
  – Bartholin’s glands
  – Skene’s glands
• Pelvic Inflammatory Disease (PID)
Oral & Pharyngeal Infection

- May be sole site of infection if oral-genital contact is the only exposure
- Most often asymptomatic, but symptoms may include pharyngitis, tonsillitis, fever, and swollen lymph nodes
Partner Management

• This is a reportable disease – all confirmed cases must be reported to the local Health Department, which will take care of partner notification.

• Partners need to be tracked down, checked for disease, and offered appropriate treatment and/or counseling.
Syphilis

- Common
- Sexually acquired infection
- Etiologic agent: Treponema pallidum
- Disease progresses in stages
- May become chronic without treatment
- Can have significant oral lesions
Microbiology

- Etiologic agent: *Treponema pallidum*
  - Corkscrew-shaped, motile microaerophilic bacterium
  - Cannot be cultured in vitro
  - Cannot be viewed by normal light microscopy
- Most contagious to sex partners during the primary and secondary stages
Pathology

• Penetration:
  – *T. pallidum* enters the body via skin and mucous membranes through abrasions during sexual contact
  – Transmitted transplacentally from mother to fetus during pregnancy

• Dissemination:
  – Travels via the lymphatic system to regional lymph nodes and then throughout the body via the blood stream
  – Invasion of the CNS can occur during any stage of syphilis
Figure 9-13. Clinical characteristics of the various stages of syphilis.
Primary Syphilis

- Appears 1-3 weeks after contact
- Primary lesion "chancre" develops at site of inoculation
- Chancre:
  - Progresses from macule to papule to ulcer
  - Typically painless, indurated, and has a clean base
  - Highly infectious
  - Heals spontaneously within 1 to 6 weeks
  - 25% present with multiple lesions
- Regional lymphadenopathy: classically rubbery, painless, bilateral
- Serologic tests for syphilis may not be positive during early primary syphilis
Primary Syphilis Lesion - Tongue

Source: CDC/ NCHSTP/ Division of STD Prevention /STD Clinical Slides
Secondary Syphilis

- Secondary lesions occur 3 to 6 weeks after the primary chancre appears; may persist for weeks to months
- Primary and secondary stages may overlap
- Mucocutaneous lesions most common
- Manifestations:
  - Rash (75%-100%)
  - Lymphadenopathy (50%-86%)
  - Malaise
  - Mucous patches (6%-30%)
  - Condylomata lata (10%-20%)
  - Alopecia (5%)
- Serologic tests are usually highest during this stage
Secondary Syphilis: Palmar/Plantar Rash

Source: Seattle STD/HIV Prevention Training Center at the University of Washington, UW HSCER Slide Bank

Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides
Secondary Syphilis: Generalized Body Rash

Source: Cincinnati STD/HIV Prevention Training Center

Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides
Tertiary (Late) Syphilis

• ~ 30% of untreated patients progress to tertiary stage within 1 to 20 years

• Rare because of the widespread availability and use of antibiotics

• Manifestations
  – Gummatous lesions
    • Gummatous necrosis at the center of granulomas
    • Many different sites
    • Can cause perforation of hard palate
  – Cardiovascular syphilis
  – Neurosyphilis
Neurosyphilis

- Occurs when T. pallidum invades the CNS
- May occur at any stage of syphilis
- Can be asymptomatic
- Early neurosyphilis occurs a few months to a few years after infection
  - Clinical manifestations include acute syphilitic meningitis, meningovascular syphilis, ocular involvement
- Late neurosyphilis occurs decades after infection and is rarely seen
  - Clinical manifestations include general paresis, tabes dorsalis, ocular involvement
**Aortic aneurisms**
- In ascending aorta (unusual site)
- Can lead to Aortic Valve insufficiency
- Can rupture and cause death

**Luetic Glossitis**
- Dorsal tongue
- Reported increase in cancer risk
- Uncommon now: Arsenic no longer used, and antibiotics very effective
Congenital Syphilis

• T. pallidum transmitted from a pregnant woman to fetus
  – Transmission can occur during any stage of syphilis; risk is much higher during primary and secondary syphilis
  – Fetal infection can occur during any trimester of pregnancy
• May lead to stillbirth, neonatal death, and infant disorders including deafness, neurologic impairment, and bone deformities
• Wide spectrum of severity; only severe cases are apparent at birth
Orofacial changes in congenital syphilis

- Mucous patches
- Rhagades: fissures at commissures
- Frontal bossing
- Short maxilla
- Increased cleft palate
- Saddle nose

Hutchinson’s Triad – classic for Congenital Syphilis

- Deaf - VIII nerve damage
- Blind - corneal scarring, interstitial keratosis
- Teeth
  - Hutchinson’s Incisors (screwdriver)
  - Mulberry Molars (complex occlusal)
Reporting

- Laws and regulations in all states require that persons diagnosed with syphilis are reported to public health authorities. Reporting can be provider or laboratory based.
- The follow-up of patients with early syphilis is a public health priority.
Conclusions

• HIV, HPV, Syphilis, and Gonorrhea are all STDs that can have significant oral findings and significance for dental management
• Dentists do not need to “do it alone” and should work with the medical team
• We need to do a great job in detecting these diseases
• We should consider our expanding role in preventing them
• We need to be able to educate our patients about them
For more information on:

- HIV and Dentistry
  - HIV/AIDS Training for General Dentistry, by Sara Gordon and Mark Schubert 2015 at [https://softchalkcloud.com/lesson/qr96e1aKv5Th8I](https://softchalkcloud.com/lesson/qr96e1aKv5Th8I)

- Safer Oral Sex Techniques
  - Brown University [http://www.brown.edu/Student_Services/Health_Services/Health_Education/sexual_health/safer_sex_and_contraceptives/dental_dams.php](http://www.brown.edu/Student_Services/Health_Services/Health_Education/sexual_health/safer_sex_and_contraceptives/dental_dams.php)

- Viral Infections of the Mouth