Diabetes and Oral Health

What is our role as healthcare professionals?
Objectives

- Become informed providers
- Educate our patients and staff
- Understand the correlation between oral health and diabetes
- Ensure that our patients understand the oral effects of diabetes
Purpose

This presentation will inform healthcare professionals on the following information:

- Review the definition and types of diabetes
- Provide national statistics on diabetes
- Explain the correlation between diabetes and oral health
- Describe and prevent medical emergencies
Purpose

- This presentation will review scientific evidence regarding the adverse effects of diabetes on periodontal health and how periodontal disease can either cause diabetes complications or diabetes itself.
Definition of Diabetes

- Diabetes is a serious disease, which, if not controlled, can be life threatening. It is often associated with long-term complications that can affect every system and part of the body, including:
  - eye disorders and blindness
  - heart disease
  - stroke
  - kidney failure
  - amputation
  - nerve damage

- It can affect pregnancy and cause birth defects, as well.

Clinical Islet Transplantation Consortium
Types of Diabetes

- Type 1 Diabetes
- Type 2 Diabetes
- Gestational Diabetes
Type 1 Diabetes

- Formerly known as juvenile diabetes
- Typically diagnosed in young adults and children
- The body is unable to make insulin
  - “Beta cells normally produce insulin, a hormone that helps the body move the glucose (i.e., sugar) contained in food into cells throughout the body, which use it for energy. But when the beta cells are destroyed, no insulin can be produced and the glucose stays in the blood instead where it can cause serious damage to all the organ systems of the body.”

Juvenile Diabetes Foundation
Type 1 Diabetes

1. Stomach converts food to glucose
2. Glucose enters bloodstream
3. Pancreas produces little or no insulin
4. Glucose unable to enter body effectively
5. Glucose levels increase
Symptoms of Type 1 Diabetes

Classic signs of untreated diabetes include:

- Polyuria - excessive urine output
- Polydipsia - excessive thirst
- Polyphagia - excessive appetite
- Others symptoms - pruritis, weakness, and fatigue
Treatment of Type 1 Diabetes

- In order to effectively manage Type 1 Diabetes, it is necessary to effectively obtain the support of a healthcare team.

- Special healthcare team members to manage diabetes may include:
  - An endocrinologist – monitor blood sugar levels and prescribe insulin
  - A diabetes educator – teach about diabetes, medications and fitness activity
  - A dietitian – learn about healthy foods and how to plan meals
  - A health psychologist or social worker – help with psycho-social issues
Type 2 Diabetes

- Hyperglycemia resulting from impaired insulin utilization coupled with the body’s inability to compensate with increased insulin production.

*Merriam-Webster Dictionary*
Onset of Type 2 Diabetes

Common Risk Factors include:

- High blood pressure
- High blood triglyceride (fat) levels
- Gestational diabetes or giving birth to a baby who weighs 9 lbs or more
- High fat diet
- Sedentary lifestyle
- High alcohol intake
- Obesity or being overweight
- Ethnicity: African American, Native American, Hispanic American, Japanese American
- Aging - developing diabetes rises significantly about 45 years and considerably after 65 years
Treatment of Type 2 Diabetes

Treatments include:

- Staying Active
- Taking Medications
- Setting up a team of medical professionals
- Eating healthy
Defined as glucose intolerance that begins in pregnancy. The children of mothers with gestational diabetes are at a greater risk of experiencing obesity and diabetes as young adults.
Creating a Team

Who should be involved on this team?

- Family doctor
- Internist
- Endocrinologist
- Dentist
Complications of Diabetes

Why should we be concerned as dental professionals?

- the effects of systemic health on oral health
- uncontrolled diabetes poses the following complications:
  - Microvascular disease
  - Peripheral neuropathy
  - Periodontal disease
Complications of Diabetes

- Related to long-term elevation of blood glucose concentrations – also known as hyperglycemia

- Studies have shown it results from advanced glycation end-products (AGEs).
  - AGEs act to prime endothelial cells and monocytes, making them more susceptible to stimuli that induce the cells to produce inflammatory mediators.
  - As the AGEs accumulate in plasma and tissues of the diabetic patients it in turns cause the previously mentioned complications.
  - Some researchers speculate AGEs have greater permeability therefore creating a greater breakdown of collagen fibers.
Complications of Diabetes

- In a diabetic patient with increase breakdown of collagen fibers, the disease causes an accelerated destruction of both non-mineralized connective tissue and bone.

- Picture b listed below illustrates connective tissue loss.
Microvascular Disease

What is it?

- A heart condition that affects the smallest coronary arteries where plaque has formed.
- These coronary arteries spasm or become diseased.
- The spasm prevents oxygen-rich blood from reaching the muscles.
- Over a period of time the arteries and surrounding muscles then become damaged or diseased.
Microvascular Disease

A microvascular disease

B Atherosclerosis
Complications of Microvascular Disease

- Xerostomia (dry mouth)
- Greater susceptibility of oral tissue trauma
- More opportunistic infections (e.g. candidiasis)
- Greater accumulation of plaque
- Greater risk of caries
- Delayed wound healing
- Greater susceptibility of periodontal disease
- Decreased salivary flow
- Oral mucosa is red, edematous and ulcerated
- Chelosis and tendency towards drying and cracking
Xerostomia and its effects
Xerostomia

- Some people with diabetes have dry mouth (Xerostomia) and problems with healing.
- A dry mouth can cause soreness, ulcers, increase your risk for cavities, and may lead to salivary gland infections.
- If your mouth is dry, try drinking more water or chewing sugar-free gum. You can also use a saliva substitute, which is available in most drug stores.
Alveolar Bone Loss
Lichen Planus
Pseudomembranous Candidiasis
Additional Complications of Diabetes

- Increased bleeding
- Enlarged gingiva
- Sessile or predunculated gingival polyps
- Increased attachment loss
- Tendency towards abscess formation
People with Diabetes face a higher risk of:

- **Dry mouth**
  - Uncontrolled diabetes decreases saliva flow, resulting in dry mouth, which can further lead to soreness, ulcers, infections, and tooth decay.

- **Gum inflammation** *(gingivitis and periodontitis)*
  - Besides impairing white blood cells, diabetes causes blood vessels to thicken, which slows the flow of nutrients to and waste products from body tissues, including the mouth. This reduces the body's ability to fight infections. Since periodontal disease is a bacterial infection, diabetics may experience more frequent and more severe gum disease.

- **Poor healing of oral tissues**
  - People with uncontrolled diabetes do not heal quickly after oral surgery or other dental procedures because blood flow to the treatment site can be impaired.

- **Thrush**
  - Frequent use of antibiotics to fight various infections promotes fungal infections of the mouth and tongue. Fungus thrives on the high levels of sugar in the saliva of diabetics.

- **Burning mouth and/or tongue**
  - This condition is caused by the presence of thrush.
Predunculated Gingival Polyps
Attachment Loss
Abcess
High blood sugar from diabetes causes saliva and fluids around the teeth and under the gums to contain more sugars. This can cause gum disease or periodontal disease by contributing to a buildup of plaque around your gums.

Plaque causes irritation and infection around the gums that can lead to gum disease, tooth decay, and eventually tooth loss. Gum disease causes the gums to bleed, look red, and be swollen.
Other Complications

- Retinopathy → may lead to blindness
- Renal disease → may lead to kidney failure
- Nephropathy → nephrons thicken and slowly become scarred over time; kidney leaks proteins, such as albumin, and passes through the urine
- Neuropathy → a collection of disease which damages the peripheral nervous system, therefore, putting patients at risk for numbness and pain of hands or feet.
Peripheral neuropathy

What is it?
- a condition which may eventually lead to loss of limbs and dysthesias (burning sensation).

What are the complications involved?
- Oral paresthesia: including burning mouth or tongue; may also cause altered taste sensation.
Periodontal Disease

- Periodontitis is often described as the sixth complication of diabetes.
  - A number of studies found a higher prevalence of periodontal disease among diabetic patients than among healthy controls. In fact, in a large cross-sectional study, which was performed by Dr. Zamon Grossi and others, showed that diabetic patients were twice as likely as non-diabetic subjects to have attachment loss.

- Periodontitis is the most consistent finding in poorly controlled diabetic patients.
  - In fact, approximately 75% of diabetics have periodontal disease with increased alveolar resorption and inflammatory gingival changes.
The Patient’s Role

- Keep blood sugar as close to normal as possible.
- At each dental care visit, tell dentist about the status of their diabetes.
- Ask PCP to talk to your dentist or periodontist about overall medical condition before any dental treatment is performed.
- If oral surgery is planned, the doctor or dentist will inform the patient of any pre-surgical antibiotics or need to change meal schedules or the timing and dosage of insulin, if taken.
- Provide dentist with diabetes doctor's name and phone number to include in the personal file.
- Bring dentist a list of all the names and dosages of all medications being taken.
- Postpone non-emergency dental care procedures if blood sugar is not in good control. However, acute infections such as abscesses, should be treated asap.
Patients can take steps to protect their teeth and oral health

Minimize the risks by:

- Taking care of oral hygiene at home every day
  - Brush twice a day and floss once a day
- Examine mouth for inflammation or signs of bleeding gums
- Experts recommend having teeth professionally cleaned every six months, or even every three or four months
- Tell dentist about diagnosis of diabetes
- May want to see a periodontist -- a dentist who specializes in gum disease -- if your gum problems persist or seem to get worse.
Studies

- A cross-sectional study performed by Dr. Bridges found that diabetes affected all periodontal parameters, including bleeding scores, probing depth, loss of attachment and missing teeth.

- Another study found that smoking increases the risk of periodontal disease by 10 times in diabetic patients.

- Many studies have been published describing the bidirectional inter-relationship exhibited by diabetes and periodontal disease. Studies have provided evidence that control of periodontal infection has an impact on improvement of glycemic control evidenced by decrease in demand for insulin and decreased hemoglobin A-1c.
Assessment of Risk Factors

During maintenance visit the risk factors we need to examine include:

- Family history of diabetes mellitus
- Dyslipidemia
- Infertility, hirsutism
- Obesity
- Smoking
Maintenance

- Prevent periodontal disease in diabetic patients
- Periodontal disease and diabetes is bidirectional so the role of a dentist is crucial
- To screen, patients should be divided in two categories - well controlled diabetics and poorly controlled diabetics
- Subdivide patients into four components:
  - Healthy Periodontium: no or minimal localized gingivitis
  - Healthy Periodontium, generalized gingivitis
  - Chronic, mild to moderate periodontal disease
  - Advanced attachment loss or aggressive (early onset) periodontal disease
Stages of Periodontal Disease

Early Periodontitis
Moderate Periodontitis
Advanced Periodontitis
Stages of Periodontitis

- Healthy
- Gingivitis
- Moderate Periodontitis
- Severe Periodontitis
The Dentist’s Role

- Schedule patients every six months or more frequently based on evaluation
- Patient’s medical history should be updated at every visit
- Recommend patients brush for two minutes twice a day with toothpaste
- Recommend patient contact dental practice if:
  - Gingiva bleeds, is red, puffy, swollen, or sore
  - Gingiva is pulled away from teeth
  - Changes in their bite
  - Suppuration appears between teeth and gingiva
  - Constant bad breath or bad taste in their mouth
Suppuration
Progression of Inflammation
ADA Guidelines for Treating Diabetic Patients

- When treating diabetic patients, it is important that the dentist and staff understand the patient’s glucose status - controlled or not.

- Level of control may affect the timing and advisability of any particular dental procedure.
  - Consult with the patient’s physician as appropriate.
What happens when blood glucose is not controlled and patient develops periodontal concerns?

- A more frequent recall schedule, if indicated
  - Consider a 3-4 month cycle for checkups (and cleanings) to keep gingivitis and periodontitis in check

- Emphasis on soft tissue management
  - Scaling and root planing as indicated
  - Antibiotic treatment where indicated

- Emphasis on home care
  - Brush teeth twice a day and clean between teeth daily with floss or interdental cleaner per dentist instructions
  - Consider recommending products, such as toothpaste and mouth rinse, that have been shown to be effective in reducing plaque and gingivitis*
  - In-office hygiene training
Surgical Procedures for Diabetic Patients

Morning appointments – or whenever insulin is at its peak
- Diabetic patients are often more stable and better able to tolerate dental procedures in the morning
- Shorter, rather than longer, appointments are often better tolerated

Treatment breaks
- Use of the bathroom
- Availability of small snacks

Antibiotic coverage
- Possibly test plasma glucose levels
- Consider systemic antibiotics for uncontrolled diabetic patients who have frequent infections or heal poorly

Patient/Physician discussion
- If oral surgery is planned, discuss with patient or patient’s physician about meal schedule and timing/dosage of insulin
Recap of Dental Maintenance of Diabetic Patients

Place emphasis on soft tissue management
- Given the propensity of patients with diabetes to develop infections, aggressive soft tissue management may be indicated

Establish a more frequent recall schedule, if indicated
- Consider a 3-4 month recall cycle for checkups and cleanings to keep gingivitis in check

Emphasize proper home care
- Proper home care is important, including brushing twice a day and cleaning between teeth daily with floss or interdental cleaners

Patients with diabetes are known to have greater incidence of gingivitis
- There are products, such as toothpaste and mouth rinse that have been shown to be effective in reducing plaque and gingivitis.* Your patients with diabetes may benefit from these products.
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