Nutrition and Oral Health

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Disclosure Statement

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Neither I nor my immediate family has any financial interests that would create a conflict of interest my independent judgment with regard to the content of this course.

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“This whole damn health-care system is a mess.”
Nutrition & Dental Health

- Interdependent relationship throughout life cycle
- Bi-directional
  - diet impacts oral health
  - dental health impacts nutritional status

Tooth Development & Nutrition

- Tooth mineralization begins during 1st trimester of pregnancy
- Formation of alveolus and cementum occur at 16 weeks in utero
- Optimum nutrition during pregnancy is needed for healthy teeth and oral structures throughout life

Nutrition during Pregnancy

- Key crucial nutrients for healthy teeth and oral structures (as both primary and permanent dentition are affected by mother’s diet)
  - protein
  - calcium
  - phosphorus
  - vitamin K, D
  - magnesium
Nutrient Deficiencies

- Result in oral manifestations
  - mucous membranes
  - teeth (enamel defects)
  - periodontal tissues
  - salivary glands
  - perioral skin

Dental Enamel Defects

Oral Signs/Nutrient Deficiency

- Recurrent apthous ulcers (vitamin B12, folic acid, iron)
- Xerostomia (vitamin A)
- Angular cheilitis (folic acid, riboflavin)
- Glossitis (niacin, riboflavin)
Aphthous Ulcers in the Buccal Mucosa

Elderly at Risk for Deficiency

- Edentulous patients
- Decline in intake of
  - vitamin A
  - fiber
  - calcium

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### Nutrition and Periodontal Health

- **Periodontitis**
  - chronic inflammatory disease
  - involves supporting tooth structure (gingiva, periodontal ligament, alveolar bone)
  - not treated, leads to tooth loss

### Nutrients & Periodontal Health

- Ca, vitamin D build density in alveolar bone
- Vitamin C maintains periodontal tissue
- Zinc reduces severity diabetes-induced periodontitis
- Vitamin K deficiency may lead to gingival bleeding

### Dental Caries

- Demineralization of tooth enamel
- Largely preventable
- The most common chronic disease in pediatric population
  - children 6-11 years old (25%)
  - adolescents 12-19 years old (59%)
Cariogenicity of Food

- Differs in patients with similar diets
- Influenced by sugar intake
- Affected by
  - frequency
  - form
  - sequence
  - combination

Fluoride & Dental Caries

- Supplementation helps to prevent caries
  - grapefruit
  - cocoa
  - tea
  - dried fruit
  - nuts
  - fluoridated water

Cariostatic Foods

- Do not contribute to acid production, reduced oral pH and subsequent decay
  - protein
  - sugar-free gum
  - non-starchy vegetables
  - fats
Protective Foods

- Foods protective against caries (milk, aged cheese, apples, cranberries)
- Gustatory stimulus for increasing saliva flow
- Mechanical stimulation of saliva flow
- Eat whole, not processed foods
- Avoid carbonated soft drinks
- 100% fruit juice in moderation with meal

What is a Healthy Diet?

- Provide nutrients
  - for normal growth and development
  - for healthy teeth and gums
  - to prevent nutrient deficiency
- Calories to maintain a healthy weight
- Reduce intake of foods high in solid fats, salt and sugar

Source: USDA
My Plate, My Health

- Based on 2015 Guidelines for Americans
- Message is “eat healthfully”
- This includes
  - variety of fruits
  - variety of vegetables
  - calcium-rich foods
  - whole grains
  - lean proteins
Source: ChooseMyPlate.gov © 2018 Karlin, MMSc, RDN, LDN, FADA

Dairy & Optimum Oral Health

- Milk following sugar challenge
  - high oral pH, anticariogenic
  - J Am Dent Assoc 2013
- Dairy foods with lactic acid
  - 60% lower risk for periodontal disease
  - 50% lower risk for tooth loss
  - J Periodontology 2008
- Cheese/Protection against dental caries
  - stimulate saliva flow, inhibit plaque bacteria
  - promote re-mineralization of tooth enamel
  - J Dentistry 2013 © 2018 Karlin, MMSc, RDN, LDN, FADA

Fruits, Vegetables & Dental Health

- Antioxidants
  - oral cancer prevention
  - prevent cell damage
  - inhibit oxidation
- Vitamins A, C, E, beta-carotene, lutein, lycopene
- Also in whole grains, red wine, cocoa

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Berries & Dental Health

- Anthocyanins (color pigment red, blue, purple)
  - anti-inflammatory
  - anti-cariogenic
- Polyphenols (blueberry extract)
  - anti-bacterial
  - fusobacterium nucleatum (cause of bacterial plaque and periodontitis)

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Mediterranean Diet

- Emphasizes:
  - activity
  - whole grains
  - vegetables
  - fruits
  - beans, legumes, nuts
  - healthy fats
  - low fat dairy
  - occasional eggs, poultry, fish
  - wine in moderation
  - low sodium

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Mediterranean Diet & Oral Health

- Protects against oral cancer (Br J Cancer 2014)
- Protects against dental caries:
  - limits sugars, processed foods
  - whole grain, unrefined foods are protective
    (chewing results in increased salivary production)
- Reduced incidence of diabetes and heart disease
  - decreased associated oral issues

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Omega-3 Fatty Acids

- Effect dental health
  - Antibacterial effects on common oral pathogens
  - streptococcus mutans
  - porphyromonous gingivalis
  - candida albicans

Mol Oral Microbiol 2010
Nih.gov

Probiotics

- Fermented foods that establish a healthy gut
- Associated with immune function
- Prevent caries and periodontal disease
  - may help inhibit oral biofilm development
  - stopping inflammatory reactions

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Avoid “Fad” Diets

- Effect dental health
- Drinking liquids as “cleanse”
  - contain acidic ingredients
  - erosion of dental enamel and dentin
  - increase risk of caries and tooth loss

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Soda, Juices & Dental Erosion

- "chemical dissolution of tooth structure….environment is acidic (pH < 4)"
- Acids added for flavor (phosphoric acid, citric acid, malic acid)
- Frequent consumption is leading cause of dental erosion in children, teens, adults
  - primary teeth thin enamel layer, more susceptible to rapid erosion

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Xylitol

- Sugar alcohol, safe, plant derived, tastes like sugar, low calorie
- Reduces acid production of plaque, plaque mass, plaque adherence, number of MS
- Inhibits growth of bacteria
- No conclusive data that xylitol gum prevents caries
- GI distress common (patients sensitive to FODMAPS)

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High FODMAP Foods

- 5 types FODMAPS (lactose, fructose, fructans, galacto-oligosaccharides, polyols)
- High FODMAP foods (certain fruits, legumes, vegetables, dairy, grains, sweeteners)
- Sweeteners/sugar free gum (sorbitol, xylitol, mannitol, erythritol, maltitol, isomalt)

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**Nutritional Counseling**

- Identify eating behaviors that put patients at high risk for dental disease
  - breath mints throughout day
  - young child to bed with feeding bottle
  - drinking soda, juice, sports beverages
  - fad diets with “cleanse beverages”
  - frequent snacking, processed foods

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**Nutrient-dense Snacks**

- Fruit
- Vegetables
- Cheese
- Yogurt
- Milk
- Popcorn

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**Elderly Population**

- Promote healthy eating, proper home care, regular dental visits in order to prevent tooth loss
  - linked to physical and mental decline in elderly
  - linked to decline in memory and walking performance

*Journal of the American Geriatric Society 2014*  © 2018 Karlin, MMSc, RDN, LDN, FADA
Recommendation/Summary

- Children and adults should reduce added sugars to < 5-10% of total energy intake
- Frequency < 4x/day (WHO)
- Improving oral health (maintain healthy teeth and gums throughout a lifetime) = better general health outcomes (improved systemic health)

References

- www.eatright.org
- www.mouthhealthy.org
- www.aapd.org
- www.aap.org

Discussion

- How can nurse practitioners impact the oral health of their patients?
- How will you educate your patients regarding the critical role of good nutrition to promote optimum oral health and disease prevention?

Thank you
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