

## ***Dental Decay is an infectious disease***

- Combination of acid producing bacteria, frequent supply of carbohydrates, reduced salivary flow
- These bacteria thrive in an acid environment, where beneficial oral bacteria die off.
- As the pH drops (more acidic environment), these bacteria multiply and take over
- These bacteria colonize after the first tooth erupts, establishing significant numbers somewhere between 18 to 36 months
- Mothers, as primary caregivers, pass their existing beneficial or harmful bacteria to their children
  - This process is well-documented and known as vertical transmission
  - Children of high cavity risk mothers are at much greater risk of decay than the general population

## ***How do cavities develop?***

- Begins with colonization of acid producing, harmful bacteria. No bacteria = No cavities!
- These bacteria ferment carbohydrates in the diet, producing organic acids
- These acids diffuse into the tooth, partially dissolving the mineral crystals (composed of carbonated hydroxyapatite) of the enamel
- Mineral (calcium and phosphate) diffuses out of the tooth, eventually causing a break in the surface of the tooth, or a cavity
- Re-mineralization occurs when calcium and phosphate in the saliva, together with fluoride, bathe the tooth and deposit new minerals in the enamel
- The new mineral crystal surface is much more resistant to acid as compared with the original carbonated hydroxyapatite mineral
- The process of demineralization and re-mineralization generally occurs numerous times daily, leading either to cavitation, to repair and reversal, or to maintenance of the status quo

## ***What does this mean for me?***

- Cavities are not binary, meaning you don't suddenly go from zero to a cavity
- Decay is a process, that can be reversed...up to a point
- Once that process causes a break in the surface of enamel, dental surgery is needed to repair the tooth (i.e. a filling)
- Re-mineralization can only occur at a neutral pH, usually provided by the buffering action of saliva
- Frequent sugary liquids or snacks prolong the demineralization phase
- Sugar free gums and healthy snacks stimulate the re-mineralization phase

## ***Changing the dental model***

- We need to move beyond "fillings", they do not stop the decay process
  - Decay is a symptom and not the cause
- Treatment should diagnose the cause of the demineralization
- Treatment should move the patient back towards re-mineralization or balance
  - Improve salivary function to buffer against acid challenge
  - Increase availability of calcium, phosphate and fluoride in the saliva
  - Suppress the growth and action of the acid-producing bacteria
- Recommend Xylitol products for home use to suppress bacteria and stimulate saliva

