Water: The Choice is Not Crystal Clear

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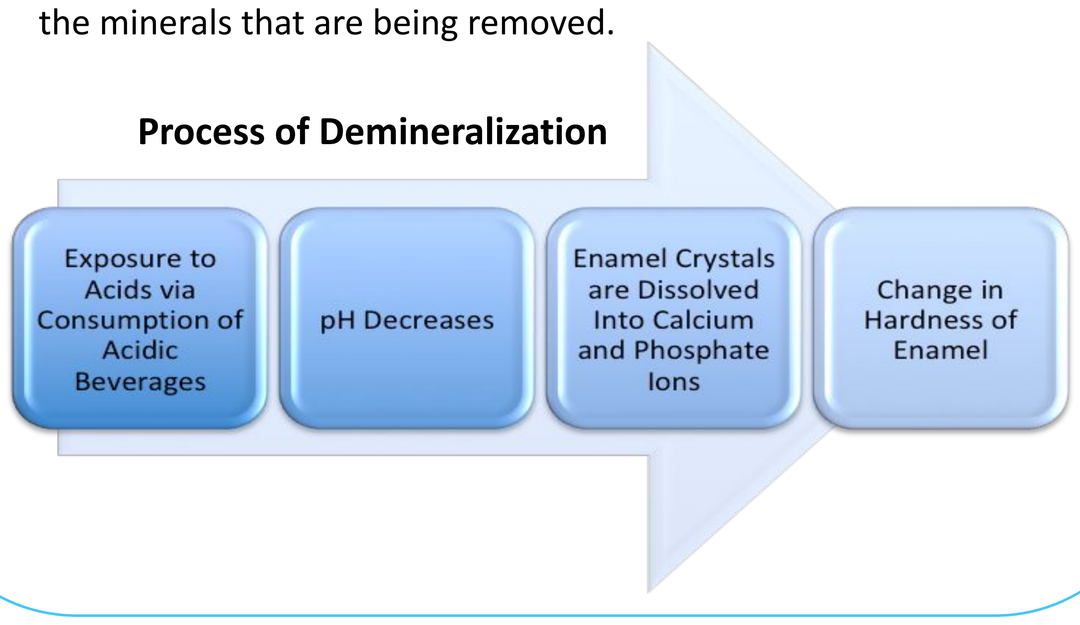
INTRODUCTION

Bottled water has gained popularity in the last decade, as it is a healthier alternative to carbonated drinks (Mathis, 2018). Although water has many health benefits, its pH levels can adversely affect one's oral cavity. Dental erosion and demineralization are two of the main consequences of low pH levels.

WHAT IS DEMINERALIZATION?

- The depletion of minerals from the hard tooth tissues (Salam, 2020).
  - Initially, it appears clinically as a white spot lesion that is reversible.
  - Once the carious lesion becomes cavitated, it is no longer reversible.
- If the teeth are continuously exposed to acids, the demineralization process outpaces the rate of remineralization.
  - Remineralization needs to occur at a quicker rate in order to replace the minerals that are being removed.

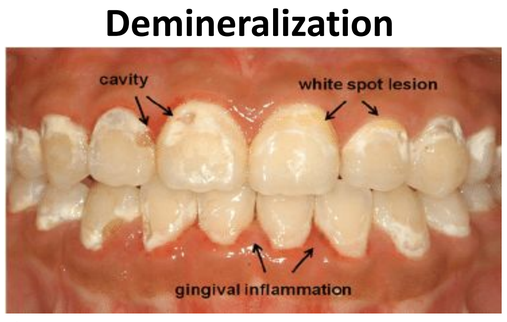
Process of Demineralization



WHAT IS DENTAL EROSION?

- The wearing away of the hard tooth tissues as a result of a chemical substance instead of bacteria (Reddy et al., 2016).
  - May lead to the exposure of dentin, increasing sensitivity.
- Can be a result of intrinsic (e.g. GERD) or extrinsic factors (e.g. food and drinks).
  - Extrinsic factors are the primary source of erosion (Mathis, 2018).
- The severity of erosion caused by water is dependent on the following factors: 1) amount of water consumed, 2) frequency of exposure, and 3) duration between each drink (Mathis, 2018).

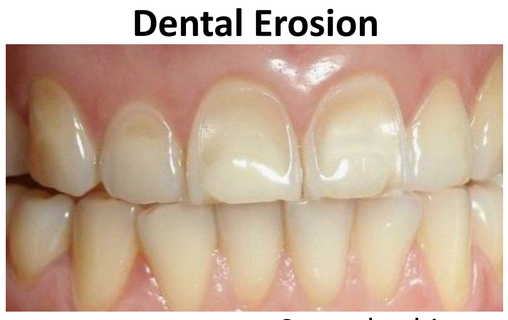
Demineralization



(Jongsma et al., 2014)

VS

Dental Erosion



("All About," 2019)

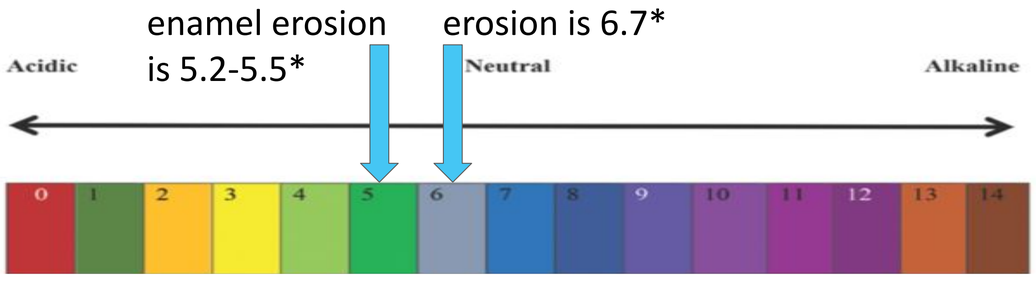
Smooth, shiny, glass-like appearance

UNDERSTANDING pH LEVELS

- The pH of a solution, which is from 0 to 14, is based on the number of free hydrogen ions (Mathis, 2018).
- The pH of saliva in most individuals ranges from 6.8 to 7.2 (Fisher et al., 2017).
  - The neutral pH decreases when acidic drinks are consumed.
- The pH of bottled water varies from 3.5 to 10.

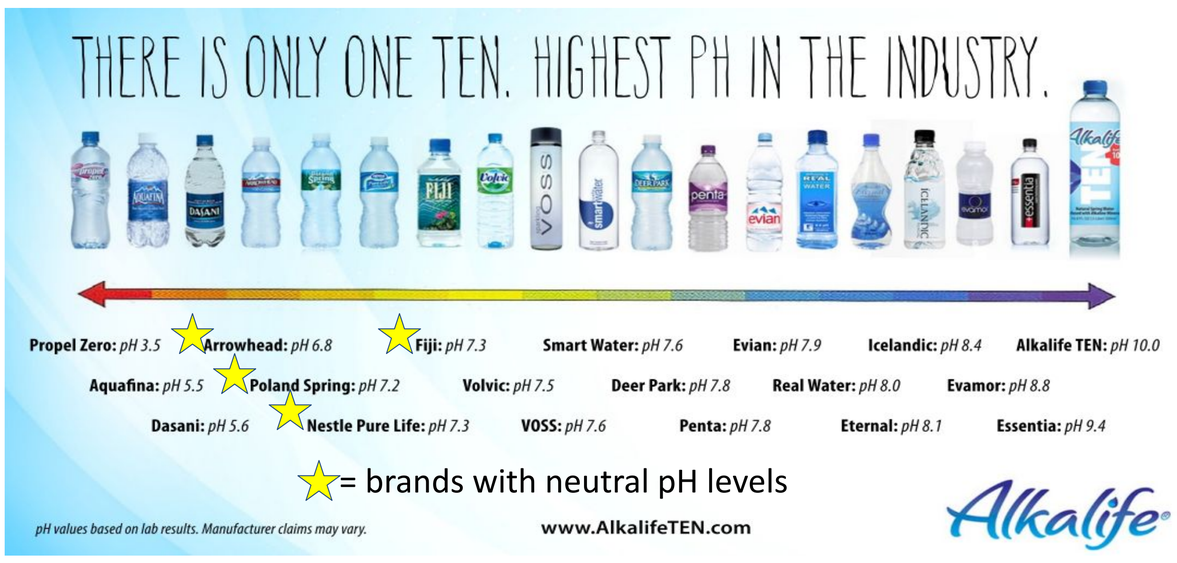
Critical pH for enamel erosion is 5.2-5.5*

Critical pH for root erosion is 6.7*



(Mathis, 2018)

*(Enam et al., 2017)



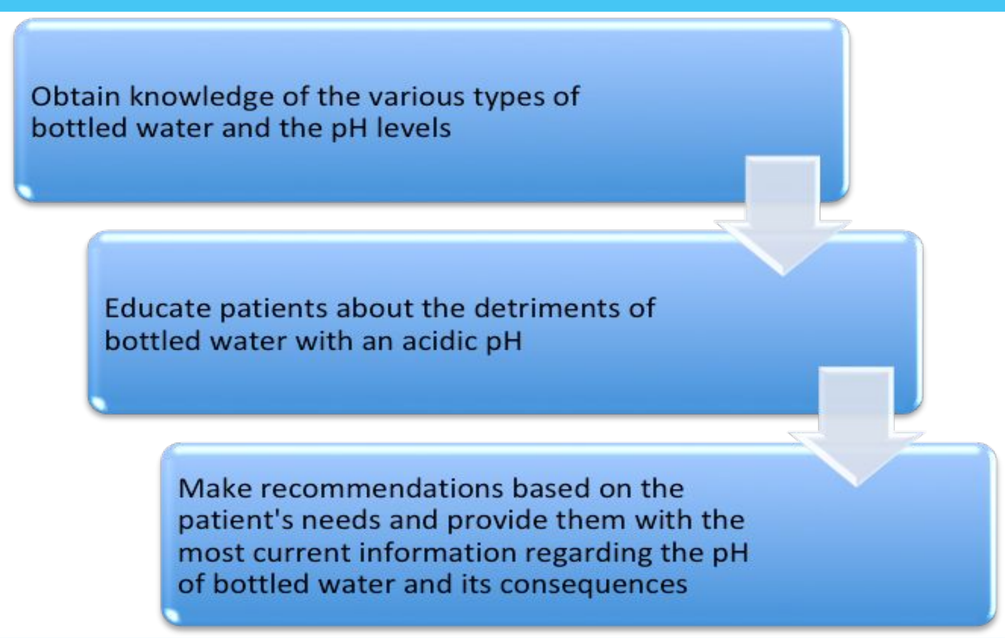
- Benefits of alkaline ionized water, where the pH is artificially made:
  - Can be used as a mouthwash (Wright, 2015).
  - Reduces the amount of plaque in the oral cavity (Pasig and Akbar, 2019).
  - Increases energy and hydration (Wright, 2015).
  - Decreases aging (Wright, 2015).

- Benefits of alkaline mineral water, which naturally contains minerals (e.g. magnesium and calcium):
  - Decreases bone resorption (Wright, 2015).
  - Increases bone density (Wright, 2015).
  - Improves hydration (Wright, 2015).
  - Adjunctive treatment for gastric reflux disease (Wright, 2015).

ORAL CONDITIONS WORSENED BY LOW pH LEVELS

Xerostomia	High Caries Risk	Perio Patient	Ortho Patient
Exacerbates the erosive process due to the lack of saliva to buffer acids	Low pH levels weaken the tooth structure, placing an individual at a greater risk for developing caries	Exposed cementum or dentin due to recession has a lower mineral content and a critical pH that is near the neutral pH	Demineralization around brackets

ROLE OF THE DENTAL PROFESSIONAL



CONCLUSION

Dental professionals and patients may assume that bottled water is harmless. However, the low pH levels of bottled water can cause dental erosion and demineralization. It is imperative for dental professionals to be educated and spread awareness to patients about the disparity in pH levels found in different water bottle brands. Individualized recommendations should be made based on each patient's needs to promote health and prevent disease.

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