

## Real images for prevention campaigns: A three dimensional model showing dental biofilm

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The four most important chronic diseases worldwide and the major causes of death, especially in developing countries are cardiovascular diseases, cancer, chronic obstructive pulmonary disease, and type 2 diabetes (1). However, periodontal disease is a health problem that should be considered in prevention programs, due to its 50% prevalence in the worldwide adult population, with 10-15% of them suffering a severe form of the disease (2). Periodontal disease is also associated with numerous human health problems, such as diabetes, preterm births, low birth weight, and recently with oral and pancreatic cancer and cardiovascular disease (1-6).

Gingivitis and periodontitis are chronic inflammatory diseases involving bacteria that destroy the attachment system of teeth, causing a variety of symptoms, such as gum inflammation, bleeding, and dental mobility. If the symptoms do not receive treatment, they may cause the loss of teeth (1).

Poor dental hygiene cause the biofilm to grow and become more complex, including calcium ions which form calcareous concretions, called dental calculus or tartar, which evolves into chronic inflammation that may have local and systemic effects if isn't removed with adequate tooth brushing and flossing (1,6).

In some segments of the population, especially in developing countries, oral health

campaigns do not yield the expected results, as shown by the high prevalence of periodontal disease. This led us to consider a better way to communicate the urgency of establishing prevention programs that show how the dental biofilm grows in the grooves and surfaces of the teeth. For this reason, a three dimensional model of teeth was obtained by filling a dental alginate impression with melted trypticase soy agar supplemented with triphenyltetrazolium chloride, and taking it off from the alginate when the culture media solidified. This was incubated for 24 hours at a temperature of 35°C (7,8). This model obtained demonstrates growing bacterial colonies in fuchsia due to the metabolism of triphenyltetrazolium chloride as shown in **Figure 1**.

The above method gives real images of bacterial colonies growing on tooth surfaces instead of the caricatures that are commonly used. These real images are very motivating in dental hygiene campaigns, because they call the attention of the areas that need more tooth brushing and flossing. Real images show why regular frequent dental hygiene is important, as the key objective of the prevention programs.

This method can also be used as a “hands on” experience for dental students who are not often exposed to microbiology concepts, which could help them develop important new understandings. Likewise, this technique could be

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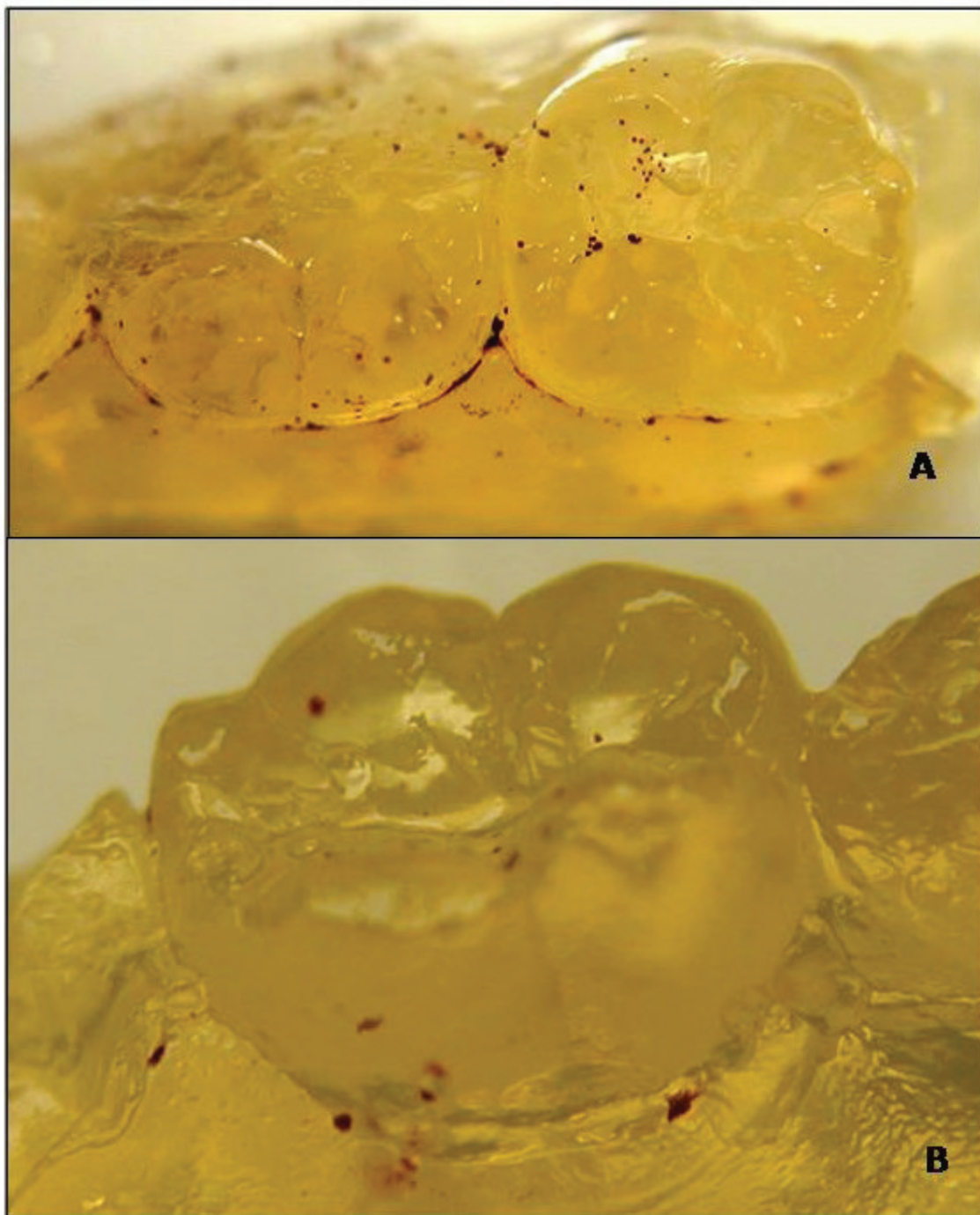


Figure 1. A and B: Three dimensional model made of trypticase soy agar supplemented with triphenyltetrazolium chloride; the colonies tinted in fuchsia are located principally on the occlusal surface and the gingival edge.

used to evaluate the effect of different disinfectants applied to dental impressions, to compare which works better, or when testing a new substance (8).

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