

Clear plastic braces: what lies beneath?

Researchers at the HKU Faculty of Dentistry have for the first time revealed the architectural profile of microbial habitats on plastic braces.

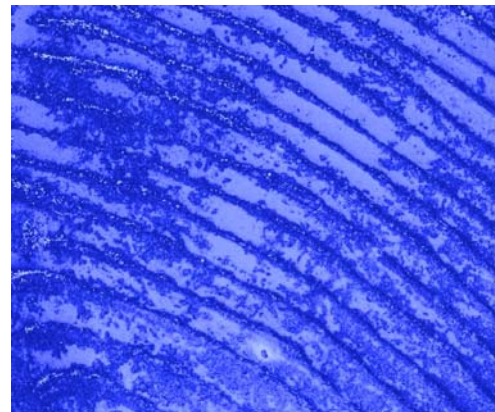
Clear plastic braces, or tooth positioners or occlusal overlays, are custom-made, removable orthodontic appliances that are used to straighten teeth by patients who do not want their braces to be immediately noticeable. Treatment requires a series of braces, with each one in the sequence being worn for 2 weeks. So far, no studies have examined in fine detail the inner surface of a plastic brace just after use.

In a preliminary investigation performed by B Low, W Lee, LP Samaranayake, and EUO Hägg, the underside of a typical clear plastic brace (Invisalign®, Align Technology Inc.) that had been worn by a patient for 2 weeks was coated with a thin layer of gold. Using scanning electron microscopy to magnify the inner surface by 30 to 4000 times, the researchers found ripple-like corrugated sheets that contained biological material, especially in sheltered regions of the brace.

These microbial habitats, known as 'biofilms', contained a variety of bacteria exhibiting a range of shapes and sizes (coccal, bacillary, and filamentous). Some bacterial colonies were made up of one species, while some were made up of more than one.

These findings were presented at the HKU Faculty of Dentistry's 19th Annual Scientific Meeting, held on 16 January 2006 at the Prince Philip Dental Hospital. Apart from developing during infections of animals and humans, biofilms can form wherever microbes are found in nature, such as in hulls of ships, in water pipes, and in water tanks, the researchers commented.

Further information on biofilms and their clinical and industrial implications can be obtained from the website <www.erc.montana.edu>.



Making waves in dental research: biofilm on the underside of a clear plastic brace

Pseudo-colour image based on a scanning electron micrograph