

TECH OFFER

Enhanced Biogel Formulation for Dental Clear Aligner



KEY INFORMATION

TECHNOLOGY CATEGORY:

Materials - Bio Materials

TECHNOLOGY READINESS LEVEL (TRL): **TRL5**

COUNTRY: **SINGAPORE**

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OVERVIEW

In dental treatment, clear aligners are successful alternatives to the conventional fixed appliances or braces in achieving physiological orthodontic tooth movement (OTM). However, its control of dental movement is not absolute and attachments, usually made of tooth-coloured dental composite resins, are inserted at precise locations to allow the aligners to grip the teeth and guide them into their new locations. This procedure takes up clinical time and increases the cost to the clinicians. Moreover, these attachments protrude off from the surface of the teeth making the appliance obviously visible and may also potentially increase patient's discomfort as they scratch the insides of the patient's mouth. Upon completion of treatment, these attachments need to be removed and the enamel surfaces of the teeth may potentially be scratched or damaged.

This invention introduces a Biogel material that will be applied and act as an interface layer between the clear aligner and the clinical crowns of the teeth. As a base and catalyst, the Biogel, a 2-part mixture sets into a semi-solid form after the clear aligner is inserted onto the teeth. The Biogel is a thin interface that engages the undercuts of the teeth, grips the dentition to enhance the transfer of active orthodontic forces from the clear aligners onto the teeth without the need for placement of attachments.

The Biogel does not adhere to the teeth but rather the internal surfaces of the clear aligners and can be easily peeled off clean and replaced as required.

TECHNOLOGY FEATURES & SPECIFICATIONS

The Biogel is a 2-part mixture that chemically sets within minutes upon contact. It provides sufficient curing time for the user to insert the gel onto the internal surfaces of the clear aligners. It is packaged into a dispenser with a partition that separates the 2-part mixture. A mixing tip allows the correct ratio and homogenous mix. Upon insertion of the clear aligners carrying the Biogel, a cotton bud or tissue may be used to clean off the excess that extrudes beyond the edges of the clear aligners. The final setting is achieved after a few minutes and the clear aligner is now activated with the Biogel attachments. Typically, clear aligners are worn full time except for brushing and eating, at least 20 hours a day and changed every 1- 2 week. The Biogel can withstand normal biting forces within the clear aligners, and it does not absorb any oral fluids, food or drinks when consumed.

Although the end users are orthodontic patients who are prescribed clear aligners as their modality of orthodontic treatment, the Biogel is prescribed by the dental clinicians.. The Biogel may be purchased by the clinician to be resold to the patient or may be factored into the cost of the overall treatment fee. The Biogel may also be packaged to be sold directly to the consumer whereby the dental professional provides a prescription to direct the patient to acquire it by themselves. This Biogel is compatible with any clear aligner orthodontic systems in the market.

POTENTIAL APPLICATIONS

At least 80% of dentists and orthodontists worldwide provide orthodontic treatment with some form or brand of clear aligners, and this number is still growing. Attachments are required in most of these clear aligner systems, and they have various disadvantages in terms of aesthetics, costs, time consumption and potential damage to the enamel upon polishing and/or removal. This Biogel is compatible with any clear aligner orthodontic systems currently in the market and negates the need to have attachments placed. This potentially levels the playing field between leading brands of clear aligners and other newer aligner systems.

Other active ingredients may also be incorporated into the Biogel. These may include fluoride releasing, anti-bacteria, and dental whitening properties that promotes oral health, reduces dental decay, and whitens teeth while undergoing orthodontic treatment. Different flavouring may also be added.

MARKET TRENDS & OPPORTUNITIES

According to Fortune Business Insights™, the global clear aligners market size was USD 2.41 billion in 2020. The market is projected to grow from \$2.85 billion in 2021 to \$10.04 billion in 2028. About 60-70% of the global population suffers from misaligned teeth. In North America, 40% of children are estimated to suffer from malocclusion, and more than three out of five teenagers have severe tooth displacement. The growing demand for aesthetics and surge in demand for clear aligners in orthodontic treatment is likely to fuel the clear aligners market growth. Significant technology advancement, improvement in per capita spending, the betterment of economic indicators, and increased penetration by key companies in developing regions are contributing to the markets growth rate. Developed countries are also seeing huge growth in adults seeking orthodontic treatment, which is mainly driven by the availability of products such as clear aligners. The British Orthodontic Society (BOS) reports that 75% of their members have seen an increase in patients opting for clear aligner treatment.

In 2018, it was estimated that 60% of the worldwide population suffers from problems associated with misalignment of teeth,

and around 300 million people could benefit from straightening their teeth.

With the clear aligner market showing rapid signs of growth now and in the immediate future, this Biogel, which is compatible to any clear aligner systems in the market will see its potential growth and uptake mirrored.

UNIQUE VALUE PROPOSITION

Current leading clear aligner brands require the placement of attachments on the teeth for it to work effectively. The Biogel interface:

1. Improves the aligner fit but engaging the natural undercuts of the dentition
2. Removes or reduces the need to have attachments placed. This improves aesthetics, reduces clinical chair time and clinical costs, diminishes pain from scratching of the insides of the mouth, and improves the ease of insertion and removal of the clear aligners. The reduced need for "attachment" placement and removal also reduces any potential damage to the enamel surfaces of the dentition.
3. May contain fluoride releasing and anti-bacterial properties to prevent and reduce the incidences of dental decay while undergoing orthodontic treatment.
4. May contain teeth whitening properties to safely whiten teeth while undergoing orthodontic treatment.
5. Patents granted in US and China, and patent pending in Australia and EU countries.