

# Attachments in Clear Aligners Treatment – Report of Clinical Experience using High-Q-Bond Retainer (BJM LAB)

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## 1. Introduction:

**Attachments are composite resins of “3D geometric shapes” bonded with the acid-etch technique on the teeth surface.**

Their first function is retention. In order to fully facilitate the prescribed movements of the mis-positioned teeth, the aligners must be fully seated and anchored in position. This can be achieved by adding attachments to the strong, correctly positioned teeth. This will hold the aligner firmly in place whilst the targeted teeth move into the required position and prevent the aligner from dislodging during the process.

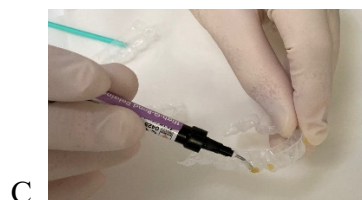
The second function of attachments is to facilitate movement by changing the shape of the tooth to provide an increased surface area for the aligner to push against, much like a lever. This becomes necessary where the tooth needs to be rotated, intruded or extruded.

## **The process of bonding the Aligners Attachments**

**I. The attachments are printed with the 3D teeth model (A) and fabricated into each aligner starting from the first passive "Template" aligner (B).**



**II. Applying the Bonding material in the aligner template (C) and checking the aligner with the Bonding material (D).**



**III. Placing the aligner over the teeth, holding it firmly and light curing (E).**

E



## **2. The properties of the Bonding material used as aligner attachment's**

The below requirements are essential for achieving successful treatment.

1. Easy and convenient material to work with
2. Adequate bond strength to the enamel surface for months of treatment as well as non-adhesion of the material to the aligner "Template" surface
3. Resistance to breakage and the formation of cracks
4. Accurate color matching to tooth shade
5. Color stability of the material

Properties of High-Q-Bond Retainer:

1. Excellent flow properties, making the device extremely easy to work with. The viscosity is designed to prevent drifting.
2. Uses light cure adhesive technology to provide additional working time and ensure accurate placement.
3. Compatible with all curing units available on the market.
4. Bonds chemically and mechanically to tooth enamel for a superior bond.
5. Contains the adhesive promoter PENTA for strong and durable chemical bonding.
6. Easy to identify due to its visible orange colour prior to curing.
7. After curing, the device colour accurately represents the tooth shade.

## **3. Clinical Experience Using High-Q-Bond Retainer for aligners attachments**

1. During the last 10 years, I have used this material in hundreds of cases to treat patients with Clear Aligners. Due to multiple attachments being needed per case, I can assume I have prepared thousands of attachments using High-Q-Bond Retainer throughout this period.
2. I worked, and still do, with the following companies:
  - Invisalign, Align Technology
  - Spark Ormco Corporation
  - D-aligners Ortholine Lab in Israel using the following aligners manufacturers:
    - ACE by Dentsply Sirona
    - Zendura FLX by Straumann Group

Taglus Vedia Solutions

3. My clinical experience with the material is very positive and I realized over the years that it perfectly satisfies all the requirements needed to obtain successful Clear Aligners treatments.
  - A. The handling of the material is mostly convenient.
  - B. The bond strength to the enamel is excellent, providing stability throughout the period of treatment.
  - C. No adhesion of the material to the "Template" surface has ever occurred when using any different type or brand of Clear Aligners.
  - D. The material integrity has never "deteriorated" during the use of aligners, specifically under the constant placement and removal of the aligner from the teeth/ attachments.
  - E. Color matching and color stability, highly important in anterior teeth, is excellent.

**4. Possible Reasons for attachments failures:**

In the past, I have encountered failures of the attachments during the course of treatment, however, these failures were very few, and can be related to the following reasons:

1. Occlusal interferences/ contact between the attachments and teeth from the opposite dental arch.
2. Saliva contact with the etched or the primed surface especially in the 2<sup>nd</sup> molars before placing the "Template" aligner over the teeth and curing the material.
3. Incomplete "injection" of the material into the "Template" which causes defects in the integrity of the attachment.

It should be noted that the above reasons are not related to the quality of High-Q-Bond Retainer as an attachment's material but rather to the practitioners' use of the material.

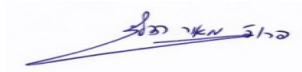
I would recommend adding the above notes to the material brochure.

## 5. Conclusion:

High-Q-Bond Retainer is highly suited to being used for the creation of attachments during Clear Aligner treatments. The material demonstrates all the necessary properties and attributes, and performs extremely well throughout the treatment process, as demonstrated during my 10 years of successful use. Any limitations can be attributed to the working practices of the practitioner, the material itself does not have any limitations.

Prepared by: *Prof. Meir Redlich DMD, MSc, PhD and Specialist in Orthodontics*

Signature:

A handwritten signature in blue ink, appearing to read 'Meir Redlich', is written over a light blue horizontal line.

Date: *June 7th, 2023*

Place: *Tel-Aviv, Israel*

Prof. Meir Redlich DMD, MSc, PhD – short CV:

**Personal Details:**

Name: Meir Redlich

Born: 03.03.1956

Associate Professor, Dept. of Orthodontics, Faculty of Dental Medicine, Hebrew University-Hadassah, Jerusalem, Israel, until July 2011.

**Higher Education:**

1980 **D.M.D.** Faculty of Dental Medicine, Hebrew University-Hadassah, Jerusalem

1990 **Post-Graduate in Orthodontics**, Faculty of Dental Medicine, Hebrew University- Hadassah, Jerusalem (**Cum Laude**).

1994 **M.Sc.** Faculty of Dental Medicine, Hebrew University-Hadassah, Jerusalem

2001 **Ph.D.** Faculty of Dental Medicine, Hebrew University-Hadassah, Jerusalem  
“Changes in gene expression of collagen and collagenase following application of orthodontic force”.

The first specialist in Orthodontics in Israel to receive a Ph.D. degree.

Published 60 papers in various scientific journals mainly orthodontics but also dental, biological and journals in chemistry.

Served as a reviewer in 10 Journals.

Received national and international research grants over 500,000 Euro.

The PI of the 1<sup>st</sup> clinical study in Orthodontics registered at the NIH Clinical website

(Evaluating the efficacy of Elmex® gelée in preventing WSL in orthodontic patients).

Supervised over 30 students in DMD, Master’s and doctoral degrees.

**Main research topics:**

1. Reduction of friction using inorganic fullerene-like nanoparticles of WS<sub>2</sub>.
2. Preventing White Spots Lesions adjacent to orthodontic brackets.
3. Orthodontic mechano-signal transduction pathways in the periodontium.
4. Mechanical behaviors of orthodontic wires.
5. Bond strength and biocompatibility of adhesives materials in orthodontics.