

3MSM Health Care Academy

Sliding mechanics in an extraction case treated with 3MTM ClarityTM ADVANCED Ceramic Brackets and the 3MTM MBTTM Appliance System.

CLARITYTM | ADVANCED
advanced ceramic brackets

MBTTM
Versatile+ Appliance System



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Dr. Gianluigi Fiorillo received his degree in Dentistry from La Sapienza University of Rome in 1992 and post graduate Certificate in Orthodontics in 2000 from the University of Ferrara. Since 2007 he has been a visiting professor of D'Annunzio University of Chieti, also in 2015 at the Second University of Naples and in 2016 at the University of Catania. He coordinates (in Italy) the 3MTM MBTTM Versatile+ Appliance System study group and is the author of the orthodontic blog mbteam.co. Dr. Fiorillo lives and works in Rome, dealing exclusively in orthodontics.

The choice of an extraction treatment can be made because of crowding, protrusion, dental asymmetries and class relationship. In all of these factors, using straight wire technique, the space closure is achieved by sliding mechanics generating friction in the posterior region, whatever the anchorage system. In other words, the alignment of the teeth in the anterior region first allows a sliding only on premolars and molars, as if cuspids and incisors move like a single big tooth with two ends, sliding to the posterior binary represented by the slots or, conversely, moving the posterior teeth forward, sliding on the same segments of the arch.

This shows that friction exerts its negative effects on the premolar brackets with a ligature, since the molar tubes can be considered a slot with four sides, like self-ligating brackets. This consideration alone should help to mitigate the concern that supporters of the self-ligating technique express to the “problem” of friction in extraction cases in straight wire technique. But to be honest, friction occurs also when cuspids are moving towards extraction spaces when resolving crowding and with incisors, while correcting the horizontal and vertical misalignment, rotations, overlays and protrusions. And to be frank, sliding is prevented the most, especially in this stage, because of the presence of ligatures or by using ceramic brackets.

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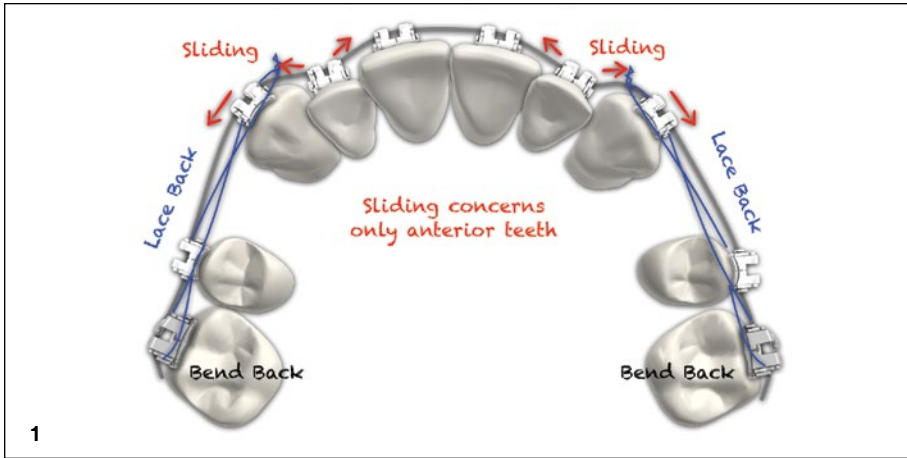


Figure 1: 3M™ MBT™ Appliance System Philosophy – Leveling and alignment phase.



Figure 3: 3M™ MBT™ Appliance System Philosophy – Space closure phase.

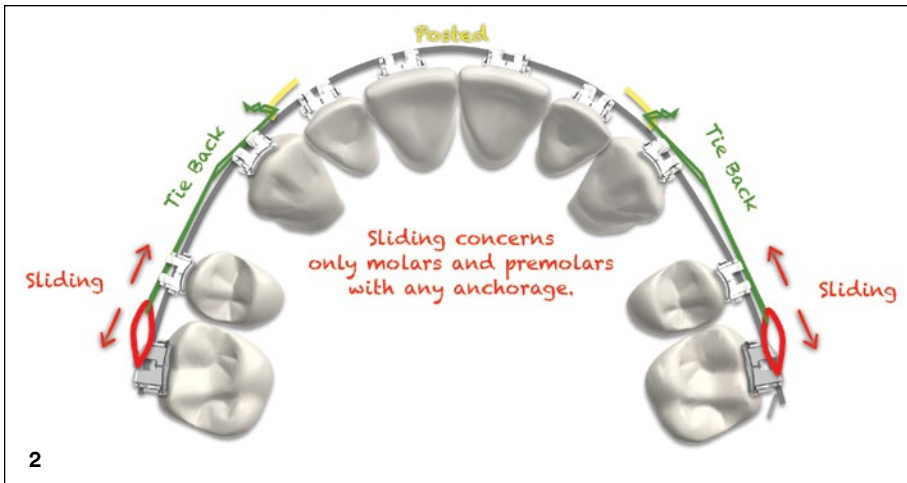


Figure 2: 3M™ MBT™ Appliance System Philosophy – Space closure phase.

In my daily clinical experience, I make an extensive use of aesthetic 3M™ Clarity™ ADVANCED Ceramic Brackets, and this doesn't represent a problem. In fact, I don't find any differences compared to the traditional stainless steel ligated brackets. Moreover, these brackets show the same efficiency of self-ligated ones; however, they are more expensive (considering the price, strength of adhesion, breaking resistance, and the general frequency of replacement). On the following page, a clinical case of a 25-year-old female showing a molar Class I, crowding and protrusion in a skeletal relationship of Class II (Figure 4A-H).

In this case, we used Clarity ADVANCED Brackets with 3M™ APC™ Flash-Free Adhesive and stainless steel molar tubes in the MBT prescription. According to the clinical protocol recommended in the MBT technique, the applied arch sequence is: 0.014" NiTi SE, 0.016" NiTi SE, 0.017×0.025" NiTi HA, 0.019×0.025" NiTi HA and Posted SS 0.019×0.025" with lacebacks, bendbacks and tiebacks, as usual.

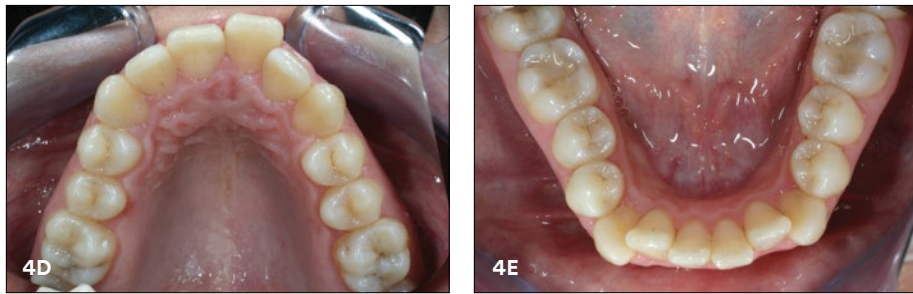
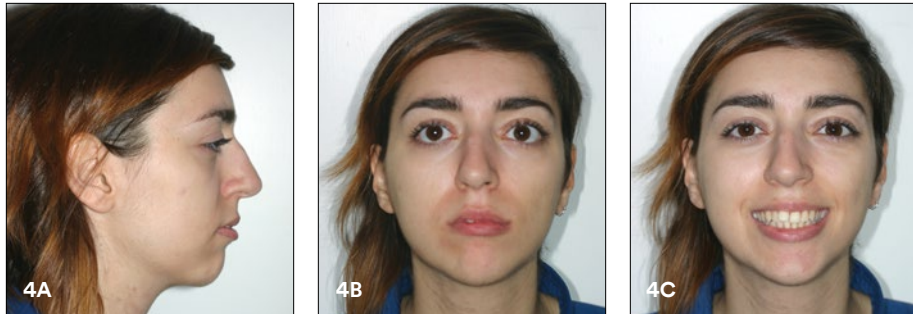


Figure 4A-H

This case is characterized by a skeletal Class II and high angle, occlusal relationship of Class I with crowding and protrusion of the incisors. The chosen treatment included extraction of the four first premolars, establishing medium anchorage to avoid depressing the lip support and, at the same time, resolving crowding, dental protrusion and overjet. The first premolars have undergone interproximal reduction to assist stability, while the lower premolars are immediately extracted to allow the “driftodontics” phenomenon. The appliance is placed in the upper arch and characterized by the presence of 0.014" NiTi SE arch and laceback to guide distally the canines during crowding resolution. In this phase the friction occurs especially in the area of the anterior teeth.



Figure 5A-C



Figure 6A-C



Figure 7A-E



Figure 8A-B

The lacebacks are activated by twisting the mesial ends to keep them in tension, if possible, until the appearance of spacing in the anterior teeth. After the first wire, a 0.016" NiTi SE and 0.017"/0.025" NiTi Heat Activated are applied in upper, while the lower arch can change the alignment of teeth and close spaces spontaneously. In the fifth month of treatment, the brackets are applied below, using the same sequence of wires and applying lacebacks. At this time, the spaces corresponding to the first lower premolars are already partially closed.



Figure 9A-E

The complete closure of the spaces can be achieved if control of the overbite is complete, and for that it is necessary to apply 0.019"/0.025" NiTi SE and, most importantly, the posted SS 0.019"/0.025". At this point, the combination with the tieback technique begins the real space closure phase, in which the sliding and friction take place only in correspondence of the second premolars and the molars. As can be seen in the figures, the active tiebacks are sections of elastic chain that are clinically effective along with the classic combination of 0.010" wire and elastomeric ligatures.



Figure 10A-E

Subsequent checks only require ligature and tieback replacement, having given a light anti-Spee curve on the lower posted wire. After a short period of occlusal settling with short vertical elastics, the appliances were deboned. The duration of treatment was 19 months and two vacuum formed retainers were provided.



Figure 11A-E



Figure 12A-E

The resolution of crowding and protrusion and the closure of premolar spaces based on the biomechanics of the MBT System and the Clarity ADVANCED ceramic bracket has been very efficient. The treatment time was short, there was only breakage of molar tubes, and the amount of friction was not high enough to influence the success of the therapy. On the contrary, the biomechanical progression was fast and characterized by easy case management.



Figure 13A-C

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Case photos provided by Dr. Gianluigi Fiorillo