Low Friction: traditional mechanics: a perfect fit

Dr. Gary Holt graduated Magna Cum Laude from the University of Maryland Dental School and then completed his orthodontic residency at the University of Missouri-Kansas City. He has completed the training to be Dawson Level I certified. His interests are efficient treatment with attention to detailed occlusion, the use of TADs to improve treatment time and effectiveness, and the use of Diode Lasers in the orthodontic practice. He has completed three Ironman races and lives in Littleton, CO with his wife and three children.

The orthodontic profession has three major technologies or trends that are evolving and offering new and exciting ways to practice according to the editor of the Journal of Clinical Orthodontics.1 These are 3-D cone beam computed tomography (CBCT), mini implants or temporary anchorage devices (TADs) and low friction bracket systems. At the forefront of the orthodontic profession right now is the question of low friction systems or passive self-ligating bracket systems and how they may benefit the orthodontist. One needs to look no further than a recent issue of American Journal of Orthodontics to discover that low friction brackets are a question of low friction systems or passive self-ligating bracket systems. This novel bracket system has a removable cover over the arch slot on the cuspsids, first bicuspid, and second bicuspid that enable the bracket to function similar to a buccal tube during the initial leveling and aligning treatment stages. However, Synergy R® differs from every passive self-ligating bracket currently on the market because it converts, when bonded to the tooth, to a traditional active bracket with full ligation capabilities for space closure and finishing during the later treatment stages.

Why the interest in low friction brackets? Orthodontists are trying to minimize total treatment time, reduce the patient burden, expedite each adjustment appointment, increase appointment intervals while providing superior results and many doctors are examining the bracket system as a means to achieve these goals. This is nothing new. In the 1950s the Russell bracket was introduced and reported to do just that. This bracket would produce more comfort, fewer office visits, and shorter overall treatment time.2 Other examples of the early self-ligation brackets were the Omnicco Edgelok (1972), Forestadent Mobil-Lock (1980), Orec SPEED (1980), and A Company Activia (1986).3 The self-ligation concept was given a big boost when Dr. Dwight Damon entered his namesake bracket in 1998 and has continued to enjoy a resurgence in popularity since that time.4 The Damon system was interesting because it was a passive bracket that had a “fourth wall” (shout) that was comparable to a buccal tube. There is another bracket on the market that is truly passive and acts like a buccal tube—Synergy R® from Rocky Mountain® Orthodontics. This novel bracket system has a removable cover over the arch slot on the cuspids, first bicuspid, and second bicuspid that enable the bracket to function similar to a buccal tube during the initial leveling and aligning treatment stages. However, Synergy R® differs from every passive self-ligating bracket currently on the market because it converts, when bonded to the tooth, to a traditional active bracket with full ligation capabilities for space closure and finishing during the later treatment stages.

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Chain™, then that is exactly what you do with Synergy R. The Energy Chain™ is placed in the manner as you place it with a conventional bracket. If you like to distalize the canines into Class I using a NiTi coil spring then that is exactly what you do with Synergy R. The brackets have a hook in the middle of the bracket for easy access and bio-mechanic advantage. Once the canines are Class I and you want complete space closure you can chain 6-6 or you can place a crimpable hook on the arch wire and slide with a NiTi coil spring. The low friction system lends itself to sliding mechanics and space closure is accomplished very quickly.

One concern with self-ligating systems is the loss of torque control, especially in the maxillary anterior. To many orthodontists, the desire to maintain careful 3D control of the maxillary anterior is a very important aspect of orthodontic treatment.14 Enter the Synergy R bracket. This bracket has the ability to allow the doctor to dictate the necessary friction in the maxillary and mandibular incisors. The clinician can dial in the bracket / arch wire friction to fit his / her specific treatment needs. If the doctor wants passive ligature in the anterior, that can be accomplished with the use of an elastomeric tie just around the center tie wings. If he / she desires more detailed rotation control then he / she can tie only the mesial or distal tie wings. If the doctor wants complete 3D control of the bracket then the doctor can place the ligatures around all wings. This bracket system takes advantage of a completely passive system from the cuspid to the molars, but allows for more control in the anterior. This bracket offers some of the same advantages as a Giansanti bidimensional system without the bracket dimensions needing to be different. The bracket can be passive early in treatment, but can be made to have complete 3D control at any point in time.

As many orthodontists say, “It is not how you start the case, but how you finish the case.” That is indeed the truth. The attention to detail in the finished cases is what separates us as specialists. Another concern with low friction systems is the inability to finish cases as desired. The Synergy R bracket or placing bends into the arch wire and then you can finish the case. This is a big advantage of the Synergy R system.

**CASE 1**

Patient presented with Class II division 2, deep bites, and retroclined incisors. The treatment plan was to level the Curve of Spee, align the teeth, followed by Class II elastics.

Note: Maxillary bicuspids

Note: Mandibular rotations incisors

Maxillary left lateral

13 week follow up photo aligned with 0.018 x 0.018 arch wire. The patient was ready to proceed into the working mechanics phase of treatment.

**CASE 2**

Patient presented as Class I crowded with blocked out maxillary right cuspid and severe crowding in mandibular arch. Treatment plan was to open space for UR3 and level and align the lower arch.

At initial bonding note the blocked out maxillary cuspid and high irregularity in the lower arch. After 12 weeks of treatment space had been created for the upper right cuspid and the lower arch alignment had improved dramatically.

**CASE 3**

Patient presented with a Class II malocclusion. The treatment plan was to bring the cuspid into the maxillary arch as quickly as possible. Then proceed into the working wires and initiate Class II mechanics. The low friction brackets aided in the vertical alignment of the high cuspid without impact to the other anterior segments.

After 12 weeks of treatment the vertical correction of the cuspid was almost completed without affecting other aspects of the arch form.

**CASE 4**

Patient presented with a Class II deep bites, posterior cross-bite, and rotations in the lower arch. The treatment plan was to correct the cross-bite with an RPE and then level and align the arch with Synergy R.

After 12 weeks of using a low friction bracket, the cuspid was in occlusion, and the anterior segment 2-2 had not been negatively affected.

**CASE 5**

Patient presented with a Class III tendency, open bite, and high mandibular left cuspid. The treatment plan was to bring the cuspid into occlusion without impact to the anterior segment.

After 15 weeks of using a low friction bracket, the cuspid was in occlusion, and the anterior segment 2-2 had not been negatively affected.
CASE 6

Patient presented with a Class II, division 2 malocclusion, deep bite, rotations, and a poor arch form. The treatment plan was to open the bite by leveling the Curve of Spee, improve the arch form, and best utilizes the frictionless environment provided by Synergy R® brackets.

Procedure

1. Push the wire through the bracket until you can see it coming out the distal part of the bracket.
2. Place a scaler on the distal part of the bracket behind the wire and grab an anterior part of the wire with a Hemostat.
3. Push the wire bursally with the scalar while simultaneously pushing closely on the wire with the Hemostat. This will allow the wire to come through the slot. Push an ample amount of wire through, this will be your working wire. Usually the length of two bicuspids is enough.
4. Grab the wire with the Hemostat and thread it on itself. The extra wire allows for flexibility and if the wire is damaged during this step you can remove the damaged area.

References