Q&A

Self-Ligating Brackets

Dr. Robert Fry

What do you see as the advantages and disadvantages of self-ligating appliances?

I treated my first self-ligation case (EdgeLok*) in 1977 as a resident at the University of North Carolina. Since then, I have explored the benefits of six other self-ligating appliances. I was on the original alpha test team for the Damon* appliance in 1995. We currently use In-Ovation R** brackets.

Today, I would estimate that 20% of orthodontists routinely utilize self-ligating appliances in their practices. These brackets have become more popular for two primary reasons:

1. The development of low-force, flat load/deflection archwires.
2. The development of a twin bracket by Dwight Damon in 1997.[1] Earlier single-wing brackets had some placement difficulties.

Self-Ligating Designs

The "passive" design (Damon, SmartClip***) is essentially a tube created by the door of the bracket when closed. The result is a low-friction appliance in all stages of treatment. No bracket is truly passive, however; if it were, tooth movement would not occur.

An "active" self-ligating bracket (SPEED,† Time,‡ In-Ovation R) has a spring clip that pushes the archwire into the slot. In the early stages of treatment, these brackets also produce low friction as the round and square wires level, align, and develop the arches. As the archwire increases in size, the spring clip becomes "active", seating the wire into the base of the bracket and thus enabling the bracket's preprogrammed torques and angulations to be fully expressed. Research indicates that active appliances express torque more efficiently than passive ones.[2]

Manufacturers of passive appliances generally recommend a four-wire sequence; when we used a passive appliance, we found it critical not to deviate from the recommended wire sequence. It is very difficult to close the door on an .019" × .025" archwire if it is preceded by a wire less than .025" in diameter. Active appliances usually require only a three-wire sequence and work well with a variety of combinations, making it easier to experiment with different archwire sizes.

Advantages

A number of claims have been made about the benefits of self-ligation. Evidence in the literature can often be found to support one's personal bias. Although studies report mixed results in regard to decreases in treatment time or the number of visits, I find the greatest advantage of self-ligation is the reduction in chair-time. It is much easier for the staff to learn to engage an archwire with self-ligating brackets than with conventional ties. If the door of the self-ligated bracket is closed, one can be assured the archwire will be fully expressed. Furthermore, since an archwire can be changed quickly, there is less temptation to put off an adjustment until the next visit.

It has been suggested that removing friction

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TABLE 1
PRACTICE DATA (AVERAGES) FOR CHILD PATIENTS WITH SELF-LIGATING BRACKETS

	Units Scheduled	Treatment Time (Months)	Months Over/Under Estimate	Emergency Appointments	Loose Brackets	Total Regular Appointments
2006	78.82	24.46	0.52	2.41	5.36	17.38
2007	71.11	22.32	0.26	2.20	4.67	15.45
2008	63.24	20.04	–1.49	1.80	3.55	13.92
2009	62.93	18.20	–1.73	1.90	3.06	13.48

allows teeth to move faster. Research indicates, however, that binding at the edge of the bracket is much more critical than friction.[3] Indeed, many of the early claims regarding the efficiency of self-ligating brackets may have been overstated. Still, our internal practice data do suggest that self-ligation is more efficient than conventional appliances. We track key statistics for every case—for example, we place great importance in running on time every day and over the course of treatment. Since moving from passive to active self-ligation in 2005, we have seen further substantial improvements in all of these metrics (Table 1).

Early in the Damon testing phase, we noticed superior arch development in comparison to traditional appliances. Another study substantiates that impression with regard to passive self-ligation.[4] Since both active and passive appliances produce low friction through the first two archwires (when arch development occurs), both can be considered to offer the same advantage. We charted thousands of cases and found no greater incidence of periodontal problems than with conventionally tied brackets and traditional archforms.

Self-ligation has allowed us to spread out visits; eight-to-10-week appointment intervals are not uncommon, and "retie" visits are unnecessary. Before self-ligation, we used metal ties to reduce friction. We now have considerably fewer "comfort" appointments due to poking wires.

Since elastomeric ties have been shown to be plaque traps,[5] our referring dentists appreciate our greatly reduced use of elastomeric ligatures.

Disadvantages

Some have expressed concerns about the stability of the increased arch development seen with self-ligation. The literature is fairly clear, however, that both the upper and lower arches will constrict over time, whether you expand or not.[6] This constriction over long periods of time contributes to the "aging of the face". The only factor in the literature that correlates favorably with orthodontic stability is retainer wear. Therefore, we do recommend lifetime retainer wear.

Self-ligating appliances cost more than conventional brackets—approximately $100 for a patient bonded with upper and lower 5-5 brackets. But this cost is minimal compared to the cost savings of decreased chairtime for each visit.

The biggest roadblock to adopting self-ligation is resistance to change. Changing treatment designs from what is currently being used can be a hassle. The new twin design and simplified archwire sequences keep the aggravation to a minimum.

Conclusion

If I were to give one piece of advice about self-ligation, it would be, "Don't dabble!" Commit to placing self-ligating brackets on your next 50 full-treatment cases. It takes such a commitment to ensure that a change gets a fair evaluation.

There comes a point in a baby's life when it is more efficient to learn how to walk rather than to continue to crawl. This analogy rings true for learning how to integrate self-ligation into your practice.

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