

SmartClip™ Self-Ligating Appliance System Treatment Efficiency Survey

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Users Report Enhanced Efficiency When Using SmartClip™ Self-Ligating Brackets

Objective: To evaluate treatment times for traditional and self-ligating orthodontic brackets and determine if the use of SmartClip™ Self-Ligating Brackets improve orthodontic treatment efficiency. **Methodology:** More than 1,000 orthodontic practitioners were surveyed in the United States, Canada and Europe with responses based on their experience using SmartClip Self-Ligating Brackets from 3M Unitek. The survey was completed by 266 participants who responded to how long they have been using SmartClip Brackets; if the use of SmartClip Brackets reduced their average treatment time; how many office visits they have been able to eliminate from their overall treatment time; if they were able to extend the office appointment interval for patients and reduce chair time; and if they observed significant improvements in treatment efficiency. **Results:** Of the 266 respondents, 86% used SmartClip Brackets for one or more years. Eighty percent responded that the use of SmartClip Brackets reduced their average treatment time, and 62% were able to eliminate three or more office visits from their overall treatment time. For 68% of respondents, office appointment intervals for patients were extended and 79% experienced a reduction in chair time when using SmartClip Brackets. Overall, 70% perceived that they achieved clinically significant improvements in treatment efficiency when using SmartClip Brackets. **Conclusion:** SmartClip Self-Ligating Brackets provide orthodontists with significant improvements in treatment efficiency through the reduction of average treatment time, elimination of unnecessary office visits, extension of the time between patient appointments, and reduction of patient chair time when compared to traditional ligated brackets.

Introduction

Self-ligating orthodontic appliances have become increasingly popular over the last two decades. A number of different advantages of self-ligating brackets have been discussed in orthodontic literature, including reduced friction,^{1,2,3} anchorage conservation,⁴ improved oral hygiene,⁵ reduced chair time,⁵ and shorter treatment times.⁶

Several different passive or active self-ligation systems are currently available on the market. The 3M Unitek SmartClip™ SL3 Self-Ligating Appliance System was designed to provide orthodontists with a passive self-ligation bracket system featuring clips on the mesial-distal bracket edges with no need for doors or latches. The SmartClip Bracket (Figure 1) allows the archwire to move freely in the bracket slot, while maintaining the control required throughout treatment. The design of SmartClip Brackets is also aimed to provide efficient treatment with better hygiene, without the need for ligatures, ligating doors or latches that could trap food particles or build up calculus.

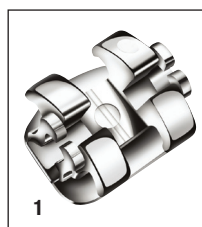


Figure 1: SmartClip™ SL3 Self-Ligating Bracket

In this survey, the efficiency of an orthodontic practice was evaluated through a survey administered to more than 1,000 orthodontic practitioners in the United States, Canada and Europe. There were 266 respondents to the survey which asked about their experiences with the 3M Unitek SmartClip™ Self-Ligating Appliance System. There are many components to having an efficient orthodontic practice. The survey aimed to gather input on how the SmartClip Self-Ligating Appliance System affected these components, including: (1) reducing the average treatment time for patients, (2) completing treatment in a reduced number of office visits, (3) extending the time between office visits, and (4) reducing chair time for each patient.

Since most cases require at least a couple of years to complete, survey data was evaluated for responding doctors who used SmartClip Brackets either for less than three years or for three or more years. It was found that the data for the doctors who used SmartClip Brackets for three or more years was comparable as for those doctors who used SmartClip Brackets for less than three years. The overall data for both sets of doctors is therefore given throughout this paper.

Reduced Average Treatment Time

To better interpret the experience that the respondents had with SmartClip Brackets, they were asked for the length of time they had used the brackets. Figure 2 shows the distribution of respondents based on the number of years that they used SmartClip Brackets. Forty-nine percent had used SmartClip Brackets for three or more years, while 86% of the respondents used SmartClip Brackets for one or more years.

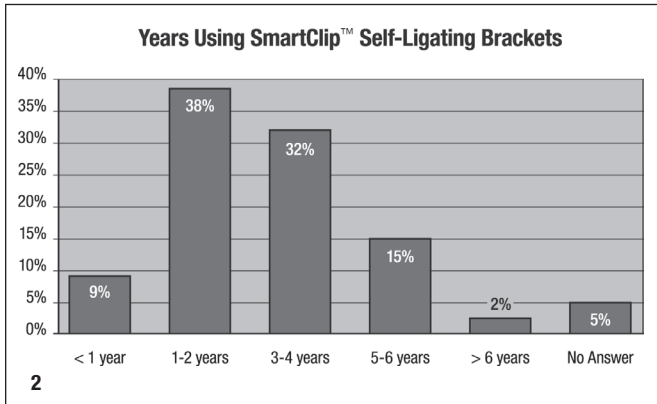


Figure 2: Years that respondents have been using SmartClip™ Self-Ligating Brackets.

Survey participants were asked how much they were able to reduce their average treatment time when compared to traditional ligated brackets, based on their best estimate and experience with SmartClip Brackets. More than 80% of the survey respondents stated that they were able to reduce their average treatment time. Specifically, 57% reported that they were able to reduce their average treatment time by three or more months when compared to traditional ligated brackets. Therefore, based on those doctors who responded to this question (253), a statistical analysis shows that with 95% confidence, more than 80% of all doctors could be expected to see a reduction in average treatment time. Figure 3 shows the reduction

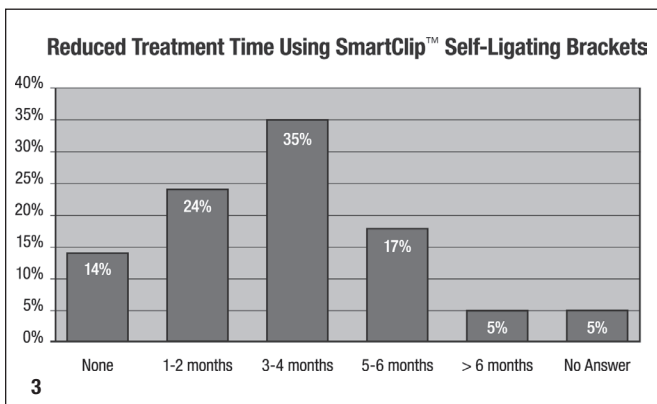


Figure 3: Months that respondents were able to reduce their average treatment time when using SmartClip™ Self-Ligating Brackets when compared to traditional ligated brackets.

of average treatment time among survey respondents when using SmartClip Brackets compared to traditional ligated brackets.

The reduction in average treatment time observed by the survey participants is believed to be influenced by the reduced resistance to sliding in the SmartClip Appliance System. In the passive self-ligating design of SmartClip Brackets, the clips on the mesial and distal edges of the bracket provide reduced resistance to sliding on the archwire compared to that created by an elastic ligature. The reduced resistance to sliding allows for more efficient tooth movement throughout treatment. Testing was done by an assistant of Dr. Hugo Trevisi (Presidente Prudente, Brazil) using a gauge to measure resistance to sliding on patients wearing either SmartClip Brackets (Figure 4A) or conventional brackets with elastic ligatures (Figure 4B). The gauge showed that the resistance to sliding created by elastic ligatures was nine times greater than that measured on SmartClip Brackets.

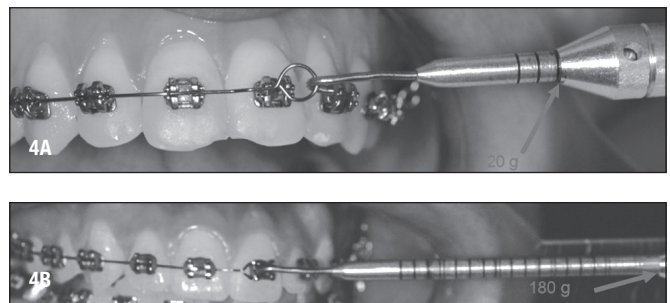


Figure 4A-B: Resistance to sliding measurements on patients wearing (a) SmartClip™ Self-Ligating Brackets and (b) traditional brackets with elastic ligatures.

In addition to the reduced resistance to sliding experienced between the bracket slot and the archwire, SmartClip Brackets are designed with an open slot. This design also provides improved oral hygiene when compared to traditional ligated brackets by minimizing plaque buildup throughout treatment.

Eliminated Unnecessary Office Visits

A key aspect of enhancing orthodontic office efficiency is to eliminate unnecessary office visits. In the conducted survey, respondents were asked how many office visits they were able to eliminate from their overall treatment time with SmartClip™ Brackets when compared to traditional ligated brackets. Eighty-five percent of respondents replied that they were able to eliminate office visits by using SmartClip Brackets. Sixty-two percent stated that they were able to eliminate three or more office visits throughout their overall treatment time with SmartClip Brackets. Based on those doctors who responded to this question (253), a statistical analysis shows that with 95% confidence, more than 84% of all doctors could be expected to eliminate office visits by using SmartClip Brackets.

Figure 5 shows the breakdown of the number of visits that each percentage of survey respondents could eliminate from their overall treatment time.

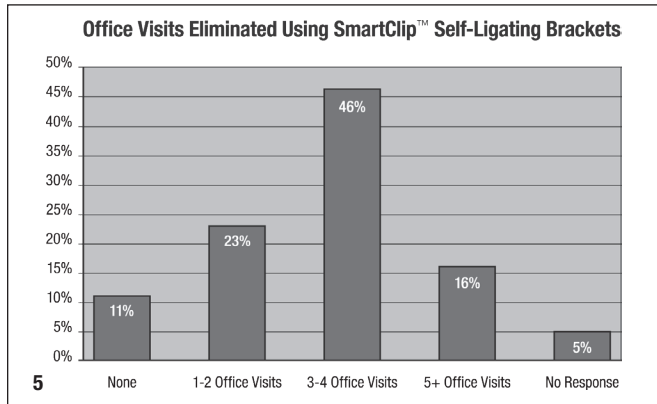


Figure 5: Number of office visits respondents were able to eliminate from their overall treatment time when compared to traditional ligated brackets.

Extended Time Between Appointments

In addition to reducing the number of visits, another key aspect for enhancing office efficiency is to extend the time between patient appointments. By using SmartClip Brackets, 68% of respondents were able to extend the office appointment interval for patients. Based on those doctors who responded to this question (260), a statistical analysis shows that with 95% confidence, more than 63% all doctors could be expected to extend the time between patient appointments by using SmartClip Brackets.

The main attribute believed to extend the time between appointments, as seen by the survey respondents, is the ligating mechanism. For traditional ligated brackets, the main purpose for scheduling office appointments in 4-6 week intervals is to change the elastic ligatures, since they become stained or lose their elasticity over time and no longer provide effective pressure to the archwire to maintain controlled movements between the archwire and the bracket slot. By eliminating the need to replace the elastic ligatures, orthodontists can schedule appointments with longer intervals, allowing a particular archwire to work fully before seeing the patient again to change it. The extended time between appointments is beneficial for both the orthodontist and the patient, since this means that there are usually fewer appointments throughout treatment, allowing orthodontists to focus on other aspects of their practice, and for patients to take less time away from school or work to attend an appointment.

Reduction In Chair Time

The last key aspect of orthodontic treatment efficiency is to reduce patient chair time. Of the survey respondents, 79% experienced a

reduction in chair time when using SmartClip Brackets. Based on those doctors who responded to this question (257), a statistical analysis shows that with 95% confidence, more than 76% of all doctors could be expected to reduce their chair time by using SmartClip Brackets.

A hypothesis on the reduction in chair time, as observed by the survey respondents, can be the reduced time needed for archwire insertion and removal. For self-ligating brackets, an elastic ligature does not need to be removed and replaced, so chair time mainly consists of removal of the current archwire and insertion of a new archwire in the orthodontist's selected wire sequence. In addition, without the need to move a ligating mechanism out of the path of the archwire, as needed with self-ligating door designs, SmartClip Brackets can save additional chair time.*

To facilitate faster archwire insertion and removal, hand instruments have been designed for use throughout treatment with the SmartClip Appliance System. The SmartClip™ Appliance Wire Insertion Instrument (Figure 6) permits rapid insertion of the archwire into each bracket, without the need to separately move



Figure 6: SmartClip™ Appliance Wire Insertion Instrument.

a ligation mechanism or add an elastic ligature. When using small round archwires in the early phase of treatment, archwires can be inserted into the bracket using one's fingers as well.

The SmartClip™ Appliance Wire Disengagement Instrument (Figure 7) is designed to assist in disengaging all sizes of archwires. This



Figure 7: SmartClip™ Appliance Wire Disengagement Instrument.

instrument allows for archwire removal from each bracket without additional movement of a ligating mechanism or removal of an elastic ligature. For further decreased chair time, small round archwires could be cut at the midline and slid out of the SmartClip™

Appliance. When using the SmartClip Appliance System, archwire changes can be six times faster than with ligated brackets.

Overall Treatment Efficiency

The orthodontists surveyed were asked if they perceive that they achieved clinically significant improvements in treatment efficiency when using SmartClip Brackets. Seventy percent of the respondents did perceive clinically significant improvements. Based on those doctors who responded to this question (248), a statistical analysis shows that with 95% confidence, more than 68% of all doctors could be expected to perceive significant improvements in treatment efficiency by using SmartClip Brackets.

To help facilitate the perceived improvements in treatment efficiency, as observed by the survey respondents, a number of key features were included in the SmartClip System. A unique feature of the SmartClip Self-Ligating Appliance System is its ability to accept tandem archwires to facilitate first- and second-order corrections. An image of tandem archwires in a SmartClip bracket slot is seen in Figure 8. By using tandem archwires the orthodontist can fill the slot and get enhanced rotation, angular, and vertical control. This can speed up the movement of teeth and shorten the length of treatment. In addition, dimpled archwires may be used to prevent archwires from walking, restricting archwire drift. The dimpled archwires could also reduce or eliminate the need to cinch the archwire behind the buccal tubes and provide a permanent visual mid-line reference for treatment.



Figure 8: Images of tandem wires in a SmartClip™ SL3 Self-Ligating Bracket.

Conclusions

By using SmartClip Brackets, orthodontic professionals were able to increase efficiencies in their practices. They were able to realize increased efficiencies by reducing the average treatment time for patients, reducing the number of office visits per patient, extending the time between office appointments for patients, and by reducing the amount of chair time necessary for each appointment. Respondents also stated that they perceived clinically significant improvements in treatment efficiency when using SmartClip Brackets.

The rationale for the reported enhanced treatment efficiency could be attributed to the unique features that are integral to the SmartClip Appliance System. The distinct self-ligation mechanism allows for speedy archwire changes and an open, hygienic bracket. Likewise, other design features, including special instruments and the ability to use tandem archwires, complement the overall SmartClip Appliance System for an unparalleled user experience.

Additional information on the SmartClip Appliance System can be found at <http://3MUnitek.com> with tutorials at <http://3munitektraining.com/tutorials.asp>.

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