

Original Research

A Questionnaire for Orthodontists in Central India on the evaluation of efficacy of self-Ligating brackets (SLB) over Conventional brackets (CB): An observational study

¹Dr. Rashmi Jawalekar, ²Dr. Sagar Barkhade, ³Dr. Pankaj Akhare, ⁴Dr. Akanksha Kumar, ⁵Dr. Shefali Gedam, ⁶Dr. Anjali Nandanwar

¹Head and Professor, ^{2,5,6}Post-Graduate Student, ³Reader and Professor, ⁴Assistant Professor, Department of Orthodontics and Dentofacial Orthopaedics, Swargiya Dadasaheb Kalmegh Smruti Dental College and Hospital, Nagpur, Maharashtra, India

ABSTRACT:

Background: The purpose of this study is to determine if the reported advantages of SLB are indeed perceived by orthodontists in their daily practice and whether there is a relationship between the bracket systems or practitioner's preference and the perceived advantages of that bracket system. **Materials and Methods:** The questions were scripted and distributed to evaluate the clinical efficiency of Self Ligating Brackets compared to Conventional Brackets as perceived by Orthodontists on their experience and efficacy of both of these bracket systems. **Results:** Self ligating Brackets were preferred during the initial stage of treatment based on the shorter adjustment appointments and faster initial treatment progress they provided. On the other hand, practitioners preferred Conventional brackets during the finishing and detailing stages of treatment. Conventional brackets were also preferred over Self Ligating Brackets Considering the cost factor and less inventory that resulted in fewer appointments. **Conclusions:** The orthodontists preference was significantly influenced by the proportion of patients treated with Self Ligating Brackets, the number of cases it took them to become accustomed to Self ligating brackets and the average appointment intervals associated with Self ligating brackets.

Keywords: Self-ligating brackets; Perception; Bracket preference

Received: 20 July, 2023

Accepted: 25 August, 2023

Corresponding Author: Dr. Sagar Barkhade, Post Graduate Student, Department of Orthodontics and Dentofacial Orthopaedics, Swargiya Dadasaheb Kalmegh Smruti Dental College and Hospital, Nagpur, Maharashtra, India

This article may be cited as: Jawalekar R, Barkhade S, Akhare P, Kumar A, Gedam S, Nandanwar A. A Questionnaire for Orthodontists in Central India on the evaluation of efficacy of self-Ligating brackets (SLB) over Conventional brackets (CB): An observational study. Int J Res Health Allied Sci 2023; 9(3):127- 132

INTRODUCTION

The advantages of self-ligating (SL) brackets include reduced friction, full and secure wire ligation, improved oral hygiene, anchorage conservation, chairside time savings, improved ergonomics, quicker treatment times, and longer appointment intervals.¹ Many studies have indicated lower friction levels for SL brackets, but their experimental designs were variable and might not simulate the dynamics of the oral environment.²

In addition, it is believed that with self-ligation mechanics, greater arch expansion with less incisor proclination is achieved, and, therefore, fewer extractions are required to provide space to alleviate crowding.⁴

Unfortunately, a lot of literature provides conflicting findings about friction and treatment efficiency with the use of SLB. While some studies have reported less friction with SLB regardless of bracket angulation, others have found that when tipping and angulation are accounted for, these brackets produce similar or higher friction compared with CB.³

The purpose of this study is to determine if the reported advantages of SLB are indeed perceived by orthodontists in their daily practice and whether there is a relationship between the bracket systems or practitioner prefers and the perceived advantages of that bracket system.

In 2010, the American Association of Orthodontists Council on Scientific Affairs reported that there was either no evidence or weak evidence to support most of the claims indicating that SLB systems provide superior treatment efficiency and efficacy.¹¹

The purpose of this study is to determine if the reported advantages of SLB are indeed perceived by orthodontists in their daily practice and whether there is a relationship between the bracket systems or practitioner's prefers and the perceived advantages of that bracket system.

MATERIALS & METHODS

A total of 20 questions were prepared, the initial series of questions obtained individual practitioner characteristics and focused on the responding clinician's experience with SLB in their practice (eg, "How long have you been using SLB?" and "What percentage of your patients do you treat with SLB?").

The second part of the survey assessed a variety of treatment factors, allowing orthodontists to indicate a preference for either SLB or CB based on their experience and perceived clinical results. Duration of treatment time, the discomfort experienced by the patients, and the likelihood of extraction treatment were some of the factors evaluated in this section of the study

A randomly generated list of the names and Email Id's of 120 orthodontists under the age of 60 who were practising in Central India were obtained from the database currently available at the Dental Colleges from Central India.

A short explanation of the study was provided on the front page of the survey, which requested the orthodontists' voluntary participation. There were identifying markers on the survey to trace back individual respondents, which were matched to a coding list at the mailing centre to maintain the confidentiality of the submitted responses. A follow-up survey was sent to the orthodontists who did not return a completed survey with the first mailing

Multi-way repeated-measures analysis of variance (ANOVA) was used to evaluate each of the practitioner characteristics to determine if they had any association with treatment factors when considering bracket preference.

Out of 120 survey invitations, were successfully delivered. A total of 76 out of 120 surveys were completed

RESULTS

Out of 120 survey invitations, 120 were successfully delivered. A total of 76 out of 120 surveys were completed (63% return rate). The total number of visits to the clinic were Nearly equal in regard to self-ligating bracket systems as well as conventional bracket system.

A total of 89.5% of practitioners have found out that Shorter adjustments appointments were required in self-ligating brackets as compared to conventional bracket systems.

34.2 of Orthodontic practitioners have found that pain during initial levelling and alignments with self-ligating bracket systems was marginally less than with conventional bracket systems.

Of the 76 responding practitioners, A total of 81.6% of practitioners were using the self-ligating bracket system in nearly 10-20% of cases & with 13.2% of orthodontic practitioners 20-40% of patients treated with a self-ligating bracket system. For 50% of practitioners, Less than 5 cases were needed for the Accustomisation with the self-ligating of bracket system.

39.5% of Orthodontists have experienced an appointment required to finish one patient with self-ligating brackets irrespective of malocclusion were 9-10 appointments while 28.9 % of orthodontists have seen 7-8 appointments and 18.4% of orthodontists have seen to have required only 4-6 appointments to finish a patient with self-ligating brackets.

64.9% of orthodontists preferred self-ligating bracket systems in Extraction cases with orthodontic treatments while 35.1% of orthodontists have preferred conventional bracket systems.

44.7 % of Orthodontists experienced that Conventional bracket systems were Easy for attaching elastic chains while 31.6% of orthodontists found out that self-ligating bracket systems were easy to attach elastic chains.

With 39.5% of orthodontic practitioners, the most common drawback was the failure to maintain full archwire engagement in a conventional bracket system as compared to self-ligating bracket systems while 36.8% of orthodontists experienced delayed initial archwire alignment with a conventional bracket system.

With 65.8% of orthodontic practitioners, patients were initially hesitant but finally agrees after convincing and were willing to pay more for the orthodontic treatment with the self-ligating brackets system while with 13.2% of practitioner's patients has disagreed about the application of self-ligating brackets and agreed with a conventional bracket system.

23.7 % of practitioners found out that there has been nearly 30-40% of Reduced chair side assistance with self-ligating bracket system as compared to the conventional bracket system while 26.3% of practitioners have experienced 20-

30% and 36.8% of practitioners have experienced nearly 10-20% of reduced chair side time and only 13.2% of orthodontists have saved nearly 40-50% of their chairside assistance.

Sr.no	QUESTIONNAIRE	Number of ORTHODONTISTS IN Percentage
1.	How much time do you require for ligation with the Conventional Bracket System? A]10 Minutes B]15 Minutes C]20 Minutes D]30 Minutes	A] 47.4% B] 36.8% C] 7.9% D]7.9
2.	Approximately what percentage of your patients are being currently treated with a Self-Ligating bracket system? A]10-20% B]20-40% C]40-60% D]More than 60%	A]81.6% B]13.2% C] 2.6% D] 2.6%
3.	Approximately how many cases did it take for you to become accustomed to the Self-Ligation technique? A] Less than 5 Cases B] 6-10 Cases C] More than 10 CASES D] More Than 20 CASES	A] 50% B]34.2% C]7.9% D]7.9%
4.	Have you noticed your patient's frequent emergency visits with the any of following Bracket Systems? A] Self-ligating bracket system B] Conventional bracket system C] Both D] None	A] 47.9% B] 47.4% C] 26.3% D]18.4%
5.	Which of the following Bracket System have shorter adjustment appointments? A] Self-ligating bracket system B] Conventional bracket system C] Both D] None	A] 89.5 B] 2.6% C] 7.9% D]0%
6.	Have your patient experienced pain during initial alignment with the Self-Ligating Bracket System? A] Yes B] No C] Maybe	A] 34.2% B]26.3% C] 39.5
7.	Which of the following Bracket System is easy for attaching the Elastic Chain? A] Self-ligating bracket system	A] 31.6% B] 44.7% C]23.7%

	B] Conventional bracket system C]Both	
8.	Which is the most common drawback you see with the Conventional Bracket system as compared to Self-Ligating Bracket System? A] Failure to Maintain full archwire Engagement B] Delayed Initial Arch Alignment C] Resistance to tooth movement D] Delayed expansion	A] 39.5% B] 36.8% C] 2.6% D] 21.1%
9.	Are your patients willing to pay more for the Orthodontic treatment with Self-Ligating Brackets? A] Agrees quickly B] Disagrees quickly C] Initially hesitant but finally agrees after convincing D] Patients do not care about brackets used	A]7.9% B] 13.2% C] 65.8% D] 13.2%
11.	Which type of Bracket System has a potential impediment to oral hygiene? A] Self-ligating bracket system B] Conventional bracket system	A] 28.9% B] 71.1%
12.	Which of the following Bracket System has shown you resistance to sliding? A] Self-ligating bracket system B] Conventional bracket system	A] 39.5% B] 60.5%
13.	How many times based on percentage do you find clip damage with Self-Ligating Brackets? A] 15-20% B] 25-30% C] 35- 40% D] More than 40%	A] 65.8% B] 31.6% C] 2.6% D] 0%
14.	In which of the following brackets do you find frequent debonding? A] Self ligating bracket system B] Conventional bracket system	A] 26.3% B] 73.7%
15.	How much chair side time have you saved with Self-Ligating brackets as compared to Conventional brackets? A] 30 Minutes B] 60 Minutes C] More than 60 Minutes D] Equal time Required in Self-ligating bracket system and conventional brackets	A] 73.7% B] 13.2% C] 7.9% D] 5.3%
16.	. How many numbers of appointments are required to finish one patient with Self-Ligating Brackets irrespective of malocclusion? A] 4-6 Appointments B] 7-8 Appointments C] 9-10 Appointments D] 11-12 Appointments	A] 18.4% B] 28.9% C] 39.5% D] 13.2%

17.	With which of the following Bracket Systems have you preferred extractions with orthodontic treatment? A) Self-ligating bracket system B) Conventional bracket system	A) 35.1% B) 64.9%
18.	In which of the following Bracket System you have achieved better Long-term stability with less relapse potential? A) Self-ligating bracket system B) Conventional bracket system C) Both D) None	A) 32.4% B) 13.5% C) 43.2% D) 10.8%
19.	In which of the Bracket System you have achieved better Space closure and desired anterior-posterior changes? A) Self-ligating bracket system B) Conventional bracket system C) Both D) None	A) 44.4% B) 13.9% C) 36.1% D) 0%
20.	With which of the Bracket Systems are you happy in terms of treatment efficiency, patient satisfaction, and treatment stability? A) Self-ligating bracket system B) Conventional bracket system	A) 78.9% B) 21.1%

DISCUSSION

Most practitioners reported using SLB on either a low percentage or a high percentage of patients. This was demonstrated by the fact that 82% of respondents reported using SLB on fewer than 20% of patients, while 3% reported using SLB on the majority (50%– 100%) of patients. These findings were similar to those of a 2009 survey of SLB users, in which 33% of the practitioners used SLB in all their cases and 11% used them in most cases. In the current survey, only 30% of orthodontists reported using SLB with a somewhat comparable frequency to use of CB. In addition, bracket preference was also shown to be significantly affected by the number of cases it took the practitioners to become accustomed to SLB and by the average appointment intervals for SLB and CB. Clinicians who quickly became accustomed to self-ligation were more likely to prefer SLB during all stages of treatment and were also more likely to report a shorter overall treatment time with SLB compared to CB.

The results of this study indicated a significant relationship between an orthodontist’s appointment intervals and his bracket preference. Practitioners who reported longer appointment intervals (10 or more weeks) with SLB were more likely to prefer SLB for the majority of the treatment factors, including faster initial treatment progress, better oral hygiene, shorter adjustment appointments, and an overall shorter period of treatment.

Some other respondents indicated that “While overall treatment time may be similar between brackets but there are comparatively less total appointments when using SLB.” On the treatment efficiency it has been seen that on average, patients treated with SLB finished treatment 4 to 6 months sooner and had 4 to 7 fewer appointments than did patients with CB.

SLB have also been proposed to improve oral hygiene in patients as a result of decreased plaque retention with the elimination of elastomeric ligatures. In this study, orthodontists indicated a significant preference for SLB when comparing oral hygiene in patients with SLB and CB. However, several studies reported that there are no significant differences in oral hygiene between the patients bonded with CB and those bonded with SLB. It has been seen that there was a inclination of practitioners towards CB over SLB in extraction cases.

Currently available SLB are clearly more expensive than most CB. A concern repeated by many orthodontists was whether any perceived increase in clinical efficiency with SLB justified the increased cost. From this study, orthodontists significantly preferred CB in this regard, with the majority of practitioners indicating that CB are more cost effective than SLB. In fact, the majority of orthodontists who discontinued use of SLB reported doing so mainly because they did not see significant enough advantages over CB brackets to make up for the increased cost.

CONCLUSION

The orthodontists participating in this study reported a perceived clinical difference between SLB and CB with regard to orthodontic treatment. SLB were preferred by orthodontists more often than CB for the majority of the treatment factors evaluated. The orthodontists' bracket preference was significantly influenced by the proportion of patients they treated with SLB, the number of cases it took them to become accustomed to SLB, and the average appointment intervals for both SLB and CB.

REFERENCES

1. Harradine NWT. Self-ligating brackets: where are we now? *J Orthod.* 2003;30:262.
2. Harradine NW. The history and development of self-ligating brackets. *Semin Orthod.* 2008;14:5–18.
3. Birnie D, Harradine NW. Introduction. *Semin Orthod.* 2008; 14:1–4.
4. Rinchuse DJ, Miles PG. Self-ligating brackets: present and future. *Am J Orthod Dentofacial Orthop.* 2007;132:216–222.
5. Pizzoni L, Ravnholt G, Melsen B. Frictional forces related to self-ligating brackets. *Eur J Orthod.* 1998;20:283–291.
6. Cordasco G, Farronato G, Festa F, Nucera R, Parazzoli E, Grossi G. In vitro evaluation of the frictional forces between brackets and archwire with three passive self-ligating brackets. *Eur J Orthod.* 2009;31:643–646.
7. Kim T, Kim K, Baek S. Comparison of frictional forces during the initial leveling stage in various combinations of selfligating brackets and archwires with a custom-designed typodont system. *Am J Orthod Dentofacial Orthop.* 2008; 133:187.e15.
8. Bednar JR, Gruendeman GW, Sandrik JL. A comparative study of frictional forces between orthodontic brackets and arch wires. *Am J Orthod Dentofacial Orthop.* 1991;100:513–522.
9. Redlich M, Mayer Y, Harari D, Lewinstein I. In vitro study of frictional forces during sliding mechanics of “reducedfriction” brackets. *Am J Orthod Dentofacial Orthop.* 2003; 124:69.
10. Ehsani S, Mandich M, El-Bialy T, Flores-Mir C. Frictional resistance in self-ligating orthodontic brackets and conventionally ligated brackets. A systematic review. *Angle Orthod.* 2009;79:592–601
11. Marshall SD, Currier GF, Hatch NE, Huong GJ, Nah HD, Queens SE, Shroff B, Southard TE, Suri L, Turpin DL. Reader’s Forum, Ask Us. *Am J Orthod Dentofacial Orthop.* 2010;138:128–131