

## Original Research

### Efficiency of passive self-ligating bracket vs conventional bracket system

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#### ABSTRACT:

**Background:** A self-ligating bracket utilizes a permanently mounted moveable component to secure the arch wire. The present study assessed the efficiency of passive self-ligating bracket vs conventional bracket system. **Materials & Methods:** 30 patients with moderate irregularity index for dental crowding of both genders were divided into 2 groups of 15 each. Group I was e bonded with self- ligating brackets pre-adjusted edgewise, MBT 0.022 slot brackets and group II were bonded with conventional pre-adjusted edgewise, MBT 0.022 slot brackets. Inter-molar widths were measured from the central and mesial occlusal pits of the mandibular and maxillary first molars. The total time taken in number of days for completion of alignment was calculated from T0 to T2. **Results:** Group I had 7 males and 13 females and group II had 8 males and 12 females. Irregularity index (mm) in maxilla at T0 in group I was 2.65 and in group II was 3.15, at T2 was 0.56 in group I and 1.04 in group II and at T2 was 0.0 in both groups. The difference was significant ( $P < 0.05$ ). Irregularity index (mm) in mandible at T0 in group I was 3.62 and in group II was 4.76, at T2 was 1.18 in group I and 1.72 in group II and at T2 was 0.0 in both groups. The difference was significant ( $P < 0.05$ ). **Conclusion:** Self- ligating brackets pre-adjusted edgewise found to be superior as compared to conventional pre-adjusted edgewise.

**Key words:** self-ligating bracket, arch wire, malocclusion

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#### INTRODUCTION

A self-ligating bracket utilizes a permanently mounted moveable component to secure the arch wire.<sup>1</sup> Self ligating brackets are commonly used these days in orthodontic practice. It was Stolzenberg who first described a self-ligating edgewise bracket more than 70 years ago. The SPEED appliance used in the 1980s was the main self-ligating bracket to be generally used.<sup>2</sup>

The term self-ligation in orthodontics infers that the orthodontic bracket has the ability to engage itself to the arch wire. Self-ligating (SL) brackets have a mechanical device built into the bracket to close off the slot. There are two categories of SL brackets Active SL brackets in which a spring clip actively presses against the arch wire. Passive SL brackets in which the SL clip closes the slot creating a tube.<sup>3</sup> In this type, the clip does not actively press against the wire. With less friction, the idea that less force is needed to cause tooth movement has led to the presumption that self-ligating brackets produce more physiologically harmonious tooth movement by not interrupting the periodontal blood supply.<sup>4</sup> Other

advantages of the self-ligating bracket system that have been highlighted for more certain full arch wire engagement, less chair-side assistance, and faster arch wire removal and ligation, leading to reduced chair time.<sup>5,6</sup> The present study assessed the efficiency of passive self-ligating bracket vs conventional bracket system.

#### MATERIALS & METHODS

The present study comprised of 30 patients with moderate irregularity index for dental crowding of both genders. All were enrolled with their written consent.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 15 each. Group I was e bonded with self- ligating brackets pre-adjusted edgewise, MBT 0.022 slot brackets and group II were bonded with conventional pre-adjusted edgewise, MBT 0.022 slot brackets. All study models were evaluated by using Little's Irregularity Index to quantify the alignment of the six anterior teeth. Crowding was calculated as the difference between the sum of tooth widths and arch circumference taken

from the line of best fit, through the contact points mesial to the first molars. Inter-canine widths were measured from the cusp tips of the canines on the study models. Inter-molar widths were measured from the central and mesial occlusal pits of the mandibular

and maxillary first molars. The total time taken in number of days for completion of alignment was calculated from T0 to T2. Results were tabulated and assessed statistically. P value less than 0.05 was considered significant.

## RESULTS

**Table I Distribution of patients**

Groups	Group I	Group II
Number	self- ligating brackets pre-adjusted edgewise	conventional pre-adjusted edgewise
M:F	7:13	8:12

Table I shows that group I had 7 males and 13 females and group II had 8 males and 12 females.

**Table II Assessment of irregularity index in maxilla at different time interval**

Parameters (mm)	Group I	Group II	P value
T0	2.65	3.15	0.04
T1	0.56	1.04	0.02
T2	0.0	0.0	0

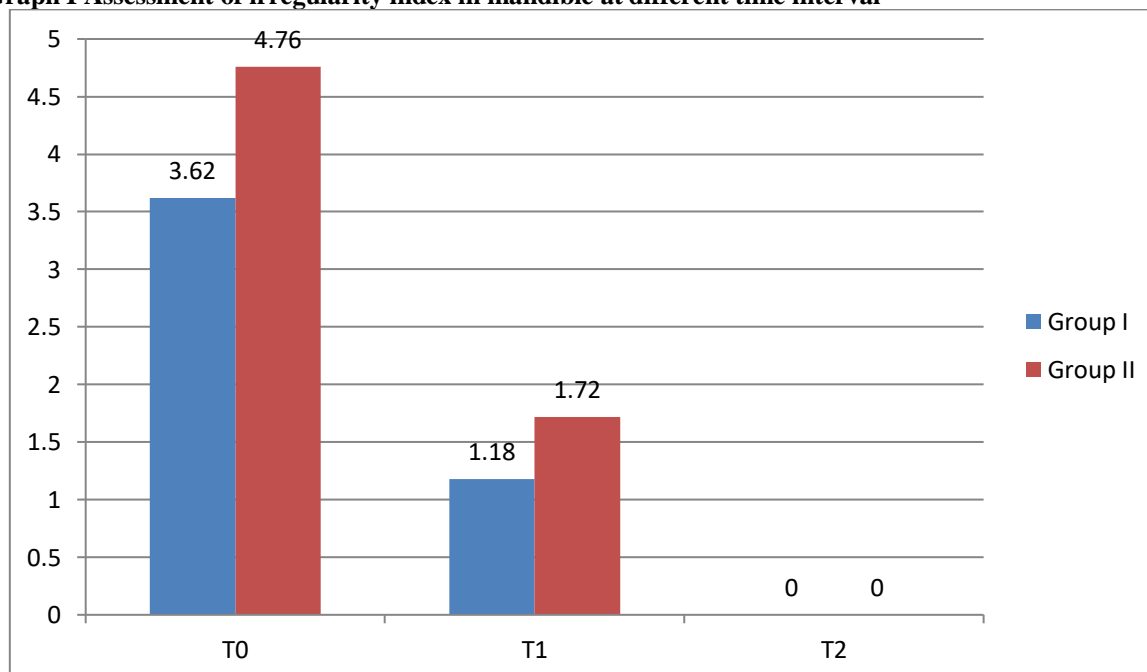
Table II shows that irregularity index (mm) in maxilla at T0 in group I was 2.65 and in group II was 3.15, at T2 was 0.56 in group I and 1.04 in group II and at T2 was 0.0 in both groups. The difference was significant ( $P < 0.05$ ).

**Table III Assessment of irregularity index in mandible at different time interval**

Parameters (mm)	Group I	Group II	P value
T0	3.62	4.76	0.05
T1	1.18	1.72	0.04
T2	0.0	0.0	0

Table III, graph I shows that irregularity index (mm) in mandible at T0 in group I was 3.62 and in group II was 4.76, at T2 was 1.18 in group I and 1.72 in group II and at T2 was 0.0 in both groups. The difference was significant ( $P < 0.05$ ).

**Graph I Assessment of irregularity index in mandible at different time interval**



## DISCUSSION

Self-ligating brackets are ligature less bracket systems that have a mechanical device built into the bracket to close off the edgewise slot.<sup>7</sup> The cap holds the arch wire in the bracket slot and replaces the

steel/elastomeric ligature. With the self-ligating brackets, the moveable fourth wall of the bracket is used to convert the slot into a tube.<sup>8</sup> Reduced friction with self-ligating bracket is claimed to be a great advantage over conventional brackets.<sup>9</sup> It is asserted

that low friction allows for sliding mechanics to be accomplished in the truest sense, thereby facilitating alignment, increasing the appointment intervals, and possibly reducing the overall treatment time.<sup>10</sup> The present study assessed the efficiency of passive self-ligating bracket vs conventional bracket system.

We found that group I had 7 males and 13 females and group II had 8 males and 12 females. Fleming et al<sup>11</sup> reported approximately 1-mm greater increase in inter-molar width with self-ligating brackets. This difference can be attributed to several factors including alignment and leveling over 30 weeks.

We found that irregularity index (mm) in maxilla at T0 in group I was 2.65 and in group II was 3.15, at T2 was 0.56 in group I and 1.04 in group II and at T2 was 0.0 in both groups. Eberting et al<sup>12</sup> reported the quality of finished cases, between passive self-ligating brackets and conventional brackets which was found to be equivalent at reducing occlusal irregularity as measured by PAR and Irregularity scores, and cases treated with SL brackets were actually found to have better ABO scores, even when treated in less time than cases with conventional brackets.

We found that irregularity index (mm) in mandible at T0 in group I was 3.62 and in group II was 4.76, at T2 was 1.18 in group I and 1.72 in group II and at T2 was 0.0 in both groups. Shivapuja et al<sup>13</sup> reported that self-ligating brackets are no more efficient than conventional brackets for anterior arch alignment or closure in the maxillary and mandibular arch during the first 20 weeks, with no statistical significance.

Johnson et al<sup>14</sup> also evaluated the inter-canine and inter-molar distances in dental casts of cases treated with and without extractions. An average increase of 0.8 mm in the inter-molar distance was found, and 0.3 mm for the inter-canine distance, while the maximum increase was 1.5 mm in one case without extraction, the inter-canine distance did not change.

The shortcoming of the study is small sample size.

## CONCLUSION

Authors found that self-ligating brackets pre-adjusted edgewise found to be superior as compared to conventional pre-adjusted edgewise.

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