

# Do we require Application of Primer for Bonding Orthodontic brackets? An in-vitro study

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## ABSTRACT

Objective of this study was to compare the mean shear bond strength of orthodontic brackets cured with or without the prior application of primer. Sixty extracted first premolars because of orthodontic reasons were included in this study. In group P, 50 teeth were cured using standardized bonding protocol including application of primer resin while 50 teeth in group P0 were cured without including step of primer application. It was concluded that application of primer resin is not necessary while bonding orthodontic metal brackets.

**Keywords:** Shear bond strength; Brackets; Primer.

## INTRODUCTION

The bonding of orthodontic brackets on tooth surface is a key step in any orthodontic therapy.<sup>1</sup> Repeated bond failures in orthodontic brackets got side effects of longer therapy duration, increased overall treatment cost and decreased patient compliance<sup>2-4</sup>.

Modern orthodontic bonding has evolved through different phases<sup>5</sup>. The application of primer in orthodontic is usually recommended while bonding orthodontic brackets, and it is proposed that primers enhance shear bond strength of composite resins by increasing the mechanical interlocking between tooth surface prisms and the polymerized liquid primers on one side and polymerized liquid primers and adhesive on other side<sup>6-8</sup>.

Nonetheless, application of primer while bonding orthodontic brackets is still controversial. Results of various in-vitro studies have revealed that there is no difference in orthodontic bond strength with or without primer use.<sup>9-13</sup> Similarly, results of various ex-vitro studies have also revealed that there is no difference in orthodontic bond strength with or without primer use<sup>14-16</sup>.

However, there are several limitations of above mentioned studies; therefore, aim of current in-vitro study was to compare the mean shear bond strength of the orthodontic metal bracket cured with or without primers.

## METHODOLOGY

This In-vitro study was conceived from January 2017 to January 2018 at Orthodontic department of Dental Section, Faisalabad Medical University. One hundred human extracted premolars were selected and preserved based on following inclusion criteria: Extraction because of orthodontic reasons, complete root formation, intact buccal surface, no tooth wear or caries of any surface. One

hundred teeth were divided in to 2 groups randomly using random number table method. In group P, 50 teeth were cured using standardized bonding protocol including application of primer resin while 50 teeth in group P0 were cured using standardized bonding protocol but without including step of application of primer resins.

Bonding strength was measured using universal testing machine in both the groups and presented in form of mean and standard deviation. Student's t-test was applied for comparison of mean bond strength in both the groups.

## RESULTS

The mean value of shear bond strength of orthodontic metal brackets bonded in both the groups are shown in Table 1 & 2.

The t-test comparison showed insignificant difference between the two groups (Table 3)

Table 1: Bond strength of orthodontic metal brackets (MPa)

Mean shear bond strength (MPa)	
N	100
Mean	15.54
SD	3.51
Minimum	11.31
Maximum	19.83

Table 2: Comparison of bond strength (MPa)

Shear bond strength (MPa)	Study Groups	
	Group P	Group P 0
n	50	50
Mean	16.10	15.32
SD	3.56	3.10

Pvalue = 0.0921 (Insignificant)

Table 3: Comparison of bond strength – t test

Shear bond strength (MPa)				95% Confidence interval of the Difference	
t	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
0.0921	0.0919	1.4367	1.8445	1.3909	2.6503

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## DISCUSSION

Primers are basically composed of unfilled resin particles.<sup>17</sup> Aim of current study was to compare the mean shear bond strength of the orthodontic metal bracket cured with or without primers. Result of this present study revealed that although bond strength values were higher in primer group but statistically insignificant differences were found in bond strength in both the groups.

Results of various in-vitro studies have also revealed that there is no difference in orthodontic bond strength with or without primer use<sup>9-13</sup>. Similarly, results of various ex-vitro studies have also revealed that there is no difference in orthodontic bond strength with or without primer use<sup>14-16</sup>. The result of present study may be attributed to the fact that sufficient amounts of unfilled resin particles already exist on the surface of the composite resins to fill the micropores in the tooth surface, thus priming step is not necessary.

Findings of current in-vitro study are in agreement with the findings of recently conducted randomized controlled trial where it was found that application of primer got no clinically significant influence on failure rate of metal brackets in a clinical setting over an 18 month follow up.<sup>18</sup> However, findings of current study are in contrast with the findings of another recently conducted randomized controlled trial<sup>15</sup>.

There are several limitations of this in-vitro study, but despite these limitations, the result of the present in-vitro study suggests that application of primer resin is not necessary while bonding brackets.

## CONCLUSION

Application of primer resin is not necessary while bonding orthodontic metal brackets.

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