

Fracture load and survival of anatomically representative monolithic lithium disilicate crowns with reduced tooth preparation and ceramic thickness,

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Abstract: Purpose: To investigate the effect of reducing tooth preparation and ceramic thickness on fracture resistance of lithium disilicate crowns. Materials and Methods: Two typodont mandibular molars were prepared to receive all-ceramic crowns. The first tooth was prepared according to the manufacturer's instruction (group A) and the second tooth was prepared with 0.5 mm less tooth reduction (group B). Twenty crowns were milled from each preparation. Five specimens from each group acted as control while the remaining 15 specimens were subjected to thermal mechanical loading in chewing simulator. All specimens were then subjected to single load to fracture test to determine the fracture resistance. Results: The mean fracture load values (in Newton) for group A were 2339.7 and 2148.8 and for group B were 1751.7 and 1053.6 without and with fatigue, respectively. Reducing tooth preparation thickness significantly decreased fracture resistance of the crowns at baseline and after fatigue application. After fatigue, the mean fracture load statistically significantly decreased ($P < 0.001$) in group B; however it was not affected ($P > 0.05$) in group A. Conclusion: Reducing the amount of tooth preparation by 0.5 mm on the occlusal and proximal/axial wall with a 0.8 mm chamfer significantly reduced fracture load of the restoration. Tooth reduction required for lithium disilicate crowns is a crucial factor for long-term successful application of this all-ceramic system.