Abstract

Objective The aim of the study was to provide data on the fracture strength and fracture mode of monolithic high translucent Y-TZP crowns and porcelain-veneered high translucent Y-TZP crown cores and to compare that data with the fracture strength and fracture mode of porcelain-veneered Y-TZP crown cores and monolithic lithium disilicate glass-ceramic crowns.

Material and methods Sixty standardized crowns divided into six groups (n = 10) were fabricated: monolithic high translucent Y-TZP crowns, brand A and B, veneered high translucent Y-TZP crown cores, brand A and B, monolithic lithium disilicate crowns and veneered Y-TZP crown cores. All crowns were thermocycled, cemented onto dies, cyclically pre-loaded and finally loaded to fracture.

Results The monolithic Y-TZP groups showed significantly higher fracture strength (2795 N and 3038 N) compared to all other groups. The fracture strength in the veneered Y-TZP group (2229 N) was significantly higher than the monolithic lithium disilicate group (1856 N) and the veneered high translucent Y-TZP groups (1480 N and 1808 N). The monolithic groups showed total fractures and the veneered groups total and cohesive fractures.

Conclusions The fracture strength of monolithic high translucent Y-TZP crowns is considerably higher than that of porcelain-veneered Y-TZP crown cores, porcelain-veneered high translucent Y-TZP crown cores and monolithic lithium disilicate crowns. The fracture strength of a crown made of monolithic high translucent Y-TZP is, with a large safety margin, sufficient for clinical use for the majority of patients. Porcelain-veneered Y-TZP crown cores show higher fracture resistance than monolithic lithium disilicate crowns.