題名:Surface area improvement with grooves and boxes in molar crown preparations

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摘要:STATEMENT OF PROBLEM: Axial-wall inclination has been shown to affect the stability of a cemented restoration in function, resulting in early restoration failure. PURPOSE: The purpose of this study was to evaluate surface area improvement with the use of supplemental grooves in tooth preparations for complete crowns. MATERIAL AND METHODS: The surface area preparation improvement in combinations of unfavorable/marginal height and axial-wall inclinations was quantified. A right regular pyramid was used to simulate a single mandibular molar tooth preparation with known axial-wall inclinations and vertical heights. Various combinations of these 2 variables allowed the calculation of surface areas with a formula for the area of a pyramid, cones, and right triangles through geometric/trigonometric manipulations. The pyramidal model system had a 9-mm square base with marginal and unfavorable vertical heights, 3 or 4 mm, and axial-wall inclination angles from 2 to 25 degrees. Conical-shaped grooves of varying lengths and widths, depending on height and axial-wall inclinations, were introduced with a tapered fissure bur. The percentage of surface area gained or lost through the supplementation with tapered grooves and boxes served as the dependent variables, alpha-factors (1) through (5). RESULTS: Significant area gains were demonstrated in all alpha-level comparisons. The greatest change was found in the 4-mm height grouping, as a positive 35.2% gain in the 25-degree level with 4 grooves. CONCLUSIONS: Axial-wall groove and box supplementation were shown to improve the surface areas

of simulated mandibular molar preparations with unfavorable axial-wall inclination and vertical height levels.