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Suitability of different tooth replicas for endodontic training: perceptions and detection of common errors in the performance of postgraduate students

Aim To compare students' perceptions on 5 different tooth replicas and detect common errors in students' performance that might be attributed to a specific tooth replica.

Methodology Five groups ($n = 10$ each) of artificial first maxillary molars (DEPT, DRSK, Nissin, DENTALIKE, TrueTooth) were used in the study. All 50 teeth were individually mounted in opaque containers, distributed in 10 packages containing a sample from each with an assigned random order for students to perform root canal treatments. Ten postgraduate students performed root canal treatment in the 5 teeth, in the assigned order, and completed a satisfaction questionnaire. Three expert raters evaluated their performance and completed a questionnaire to detect common errors attributed to a specific tooth replica. Inter-rater reliability was calculated with the interclass correlation coefficient for both consistency and absolute agreement. A two-way related measures ANOVA was used to assess the interaction among evaluators and tooth groups in average students' score. Post hoc T3 Dunnett was used to compare groups. Students' perceptions among groups were compared with chi-square and linear by linear association tests.

Results Inter-rater reliability was very high for both consistency (ICCC = 0.939; 95% confidence interval (CI) 0.902-0.964) and absolute agreement (ICCA = 0.940; 95% CI 0.904–0.965). No statistical differences were found among evaluators' ratings; however, students performed differently in different tooth replicas ($P < 0.05$). 60% of students preferred DRSK for endodontic training purposes, followed by DENTALIKE (30%). The least preferred was TrueTooth (70% responses) due to complex anatomy and poor resistance to instruments and heat pluggers. Evaluators detected several common errors in specific tooth replicas and preferred tooth replicas manufactured based on microCT scans of natural teeth.

Conclusions Tooth replicas manufactured based on microCT scans of natural teeth (TrueTooth and DENTALIKE) had much better acceptance among evaluators, although students rated and performed worse in TrueTooth replicas due to their higher level of difficulty.