ABSTRACT

Treatment stability with bonded versus vacuum-formed retainers after 12 months: a systematic review and randomized clinical trial

Introduction: This systematic review (SR) and randomized clinical trial (RCT) aimed to compare the clinical effectiveness of bonded versus vacuum-formed retainers (VFRs) regarding their capacity to maintain treatment stability, periodontal effects, and failure rates. **Methods**: For the SR, ten databases were systematically searched up to August 2021. RCTs comparing both retainers were included. The Risk of Bias (RoB) evaluation was performed with the Cochrane RoB tool 2.0. All steps of the review were performed independently by two reviewers. The GRADE was used to evaluate the certainty of the evidence. For the RCT, patients finishing orthodontic treatment were recruited and randomly allocated into two experimental groups. The bonded retainer (BR) group received upper and lower V-bend BRs bonded in the lingual surfaces of the anterior teeth. The VFR group received upper and lower VFRs right after fixed appliances removal. The patients were evaluated in four time-points: at fixed appliances removal (T0), after 3 months (T1), 6 months (T2), and 12 months (T3). Treatment stability based on occlusal outcomes and retainers' survival rates were the primary and secondary outcomes, respectively. Intergroup comparisons regarding stability outcomes were performed using Mann-Whitney U-tests (P < 0.05). The Kaplan-Meier survival plot and the log-rank test were employed to assess the retainers' survival. Results: Initial search yielded 923 studies. After full-text assessment, five RCTs remained. On a short-term (3-6 months) and longterm (4 years) basis, BRs were more effective to maintain stability than VFRs in the lower arch. From 12 to 24 months both retainers presented the same efficacy. In the upper arch, the retainers were equally effective. BRs were associated with greater plaque and calculus accumulation than VFRs after 12 months. The retainers' failure rates were similar in the upper arch on the first year of retention. Contrarily, BRs presented greater failure rates in the lower arch than VFRs. In the RCT, both groups included 25 patients. The groups were comparable regarding their baseline characteristics. Up to 6 months both retainers were equally effective; however, after 12 months, BRs were more effective in to

maintain the incisors' alignment in the maxilla (*P* < 0.001) and in the mandible (*P* < 0.006) compared to the VFRs. No differences were noticed in the intercanine and intermolar widths, overjet and overbite. There were also no differences in the retainers' survival rates in the maxillary and mandibular arches. **Conclusion**: The SR concluded that in the lower arch BRs were more effective than VFRs to maintain stability in the initial 6 months of retention and in the long term. In the upper arch, both retention protocols are equally effective. The RCT concluded that BRs were more effective to maintain the incisors alignment in the maxilla and mandible compared to VFRs after 12 months. Moreover, both retainers present the same survival rates in the maxillary and mandibular arches after the same period. **Registration**: This SR was registered in PROSPERO CRD42020199392. This trial was registered at ClinicalTrials.gov (NCT04847323). **Funding**: Coordination for the Improvement of Higher Education Personnel - Brazil (CAPES), Finance Code 001.

Keywords: Orthodontics. Orthodontic Retainers. Systematic Review. Randomized Clinical Trial.