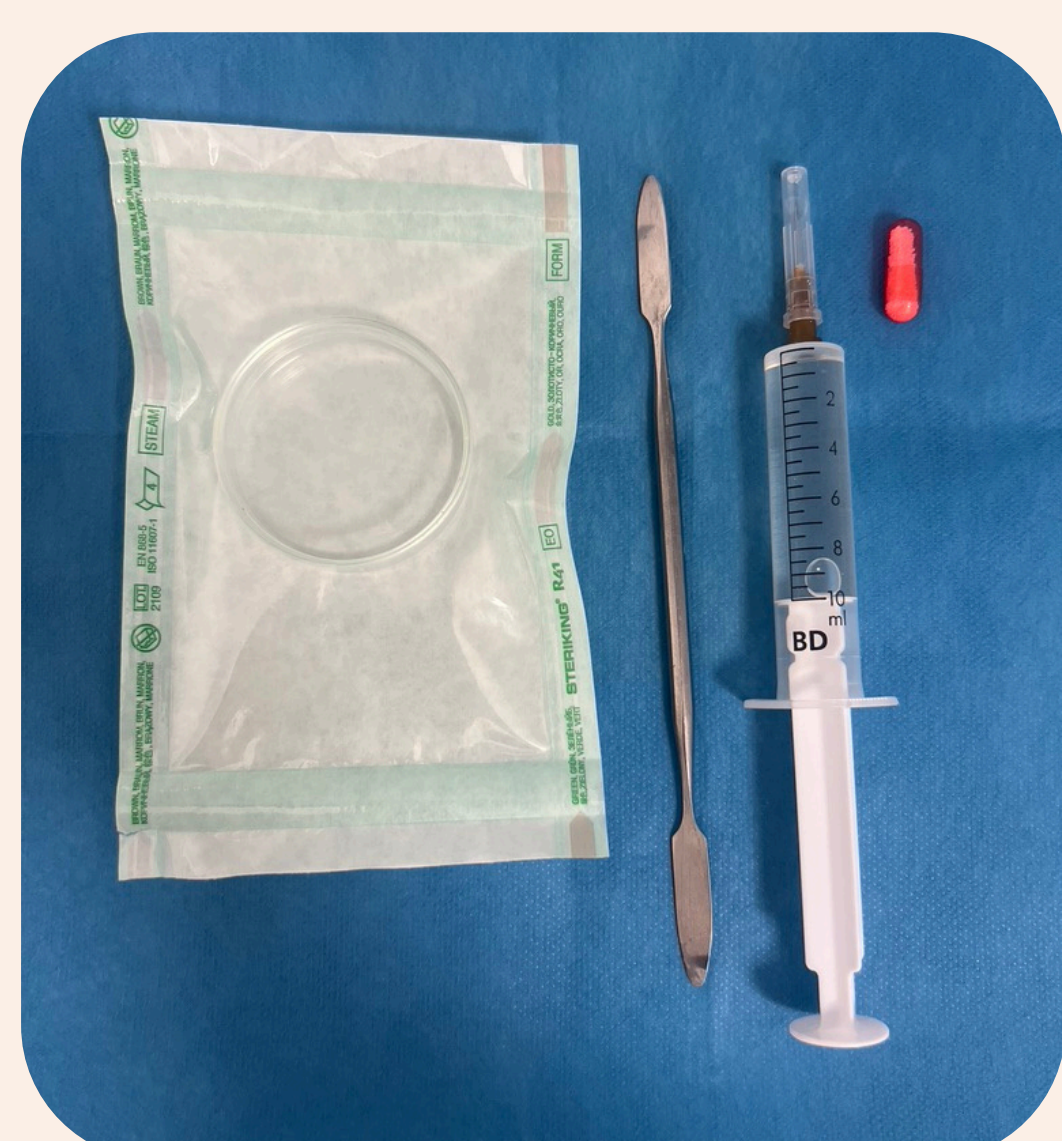


EFFECT OF DIFFERENT CONTINUOUS CHELATING PROTOCOLS ON SEALER PENETRATION INTO ROOT DENTIN AND PUSH-OUT BOND STRENGTH

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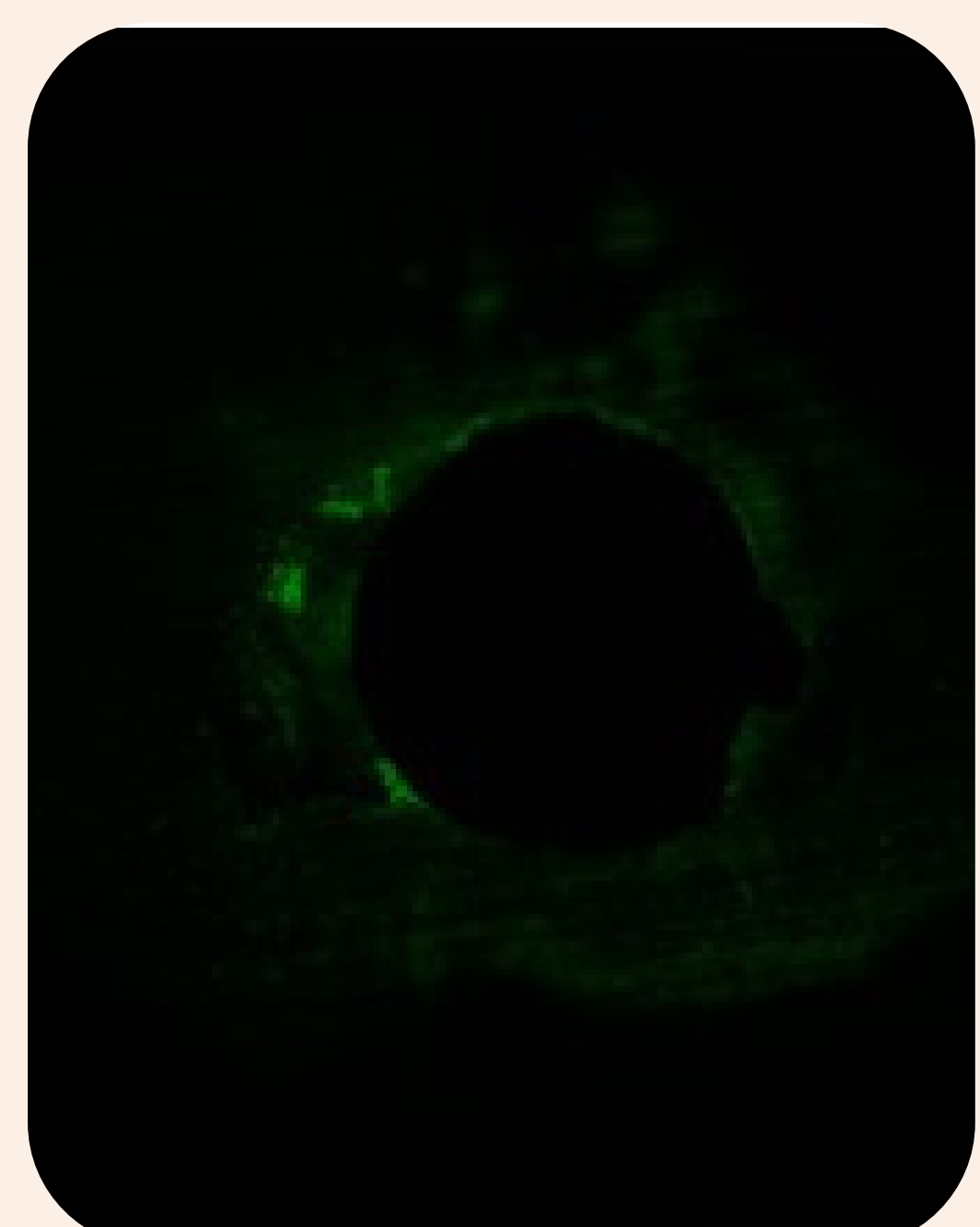
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INTRODUCTION

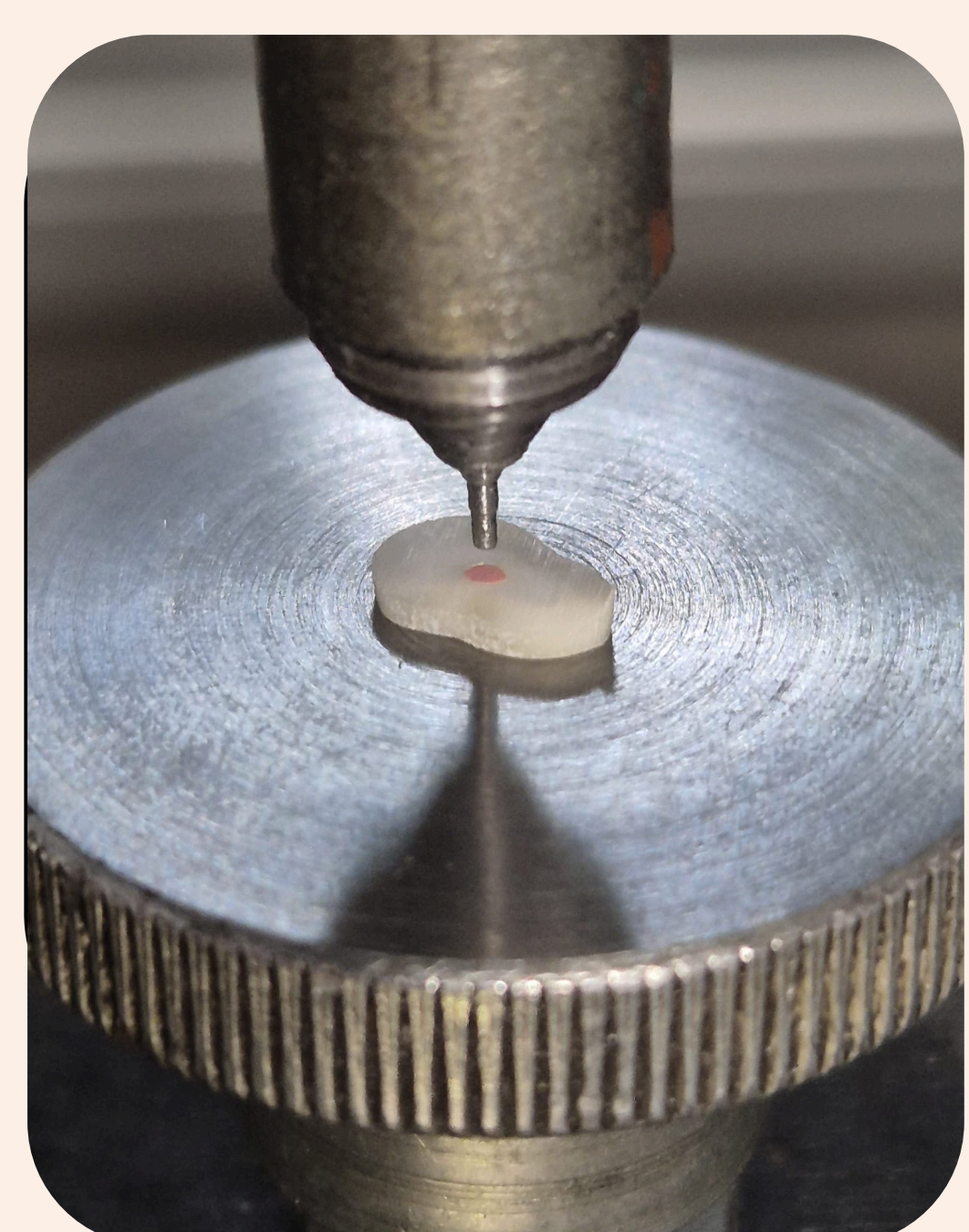
Ultrasonic activation (US) may enhance chemomechanical debridement and improve the sealing of root canals. A combined NaOCl and HEDP solution allows simultaneous irrigation and chelation.



OBJECTIVE

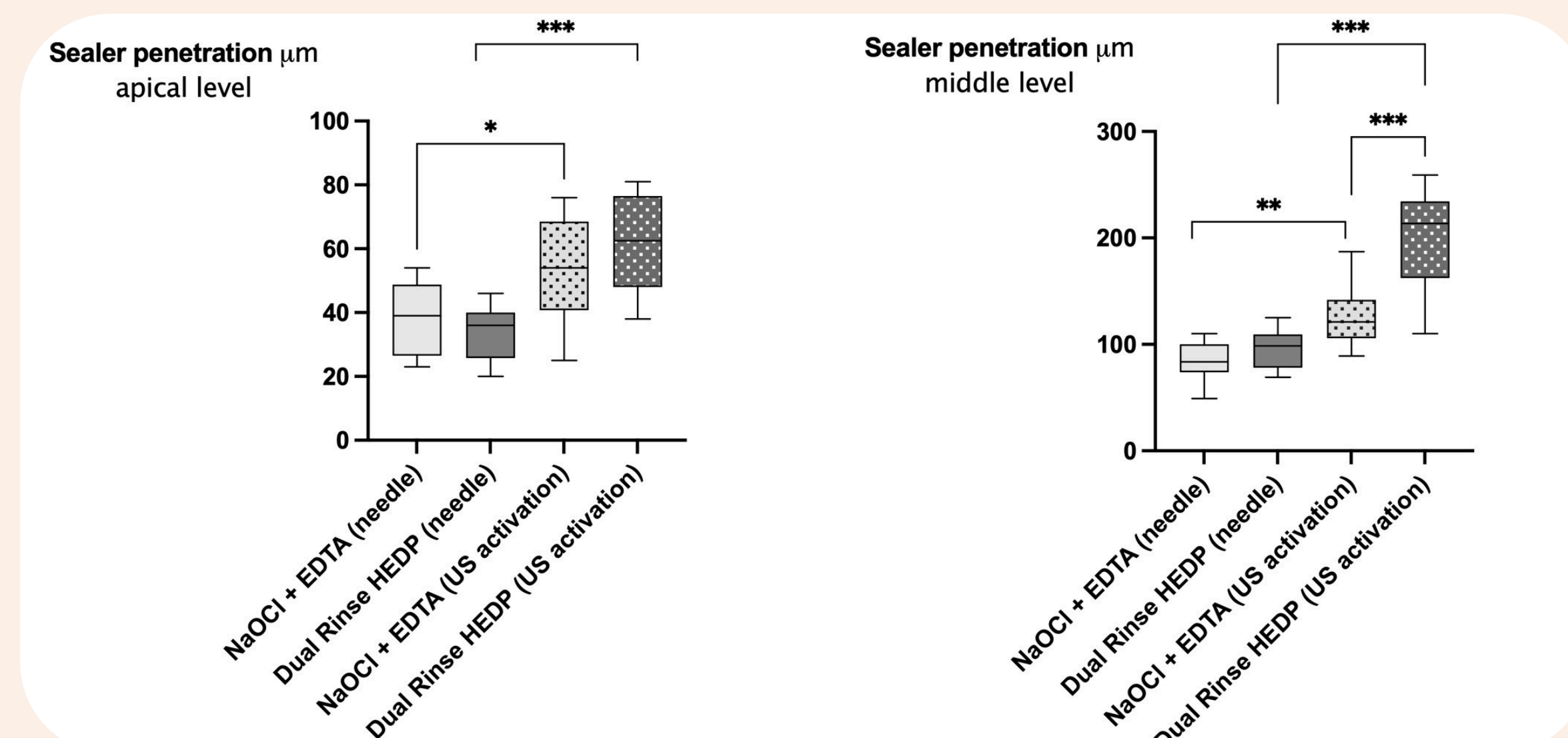
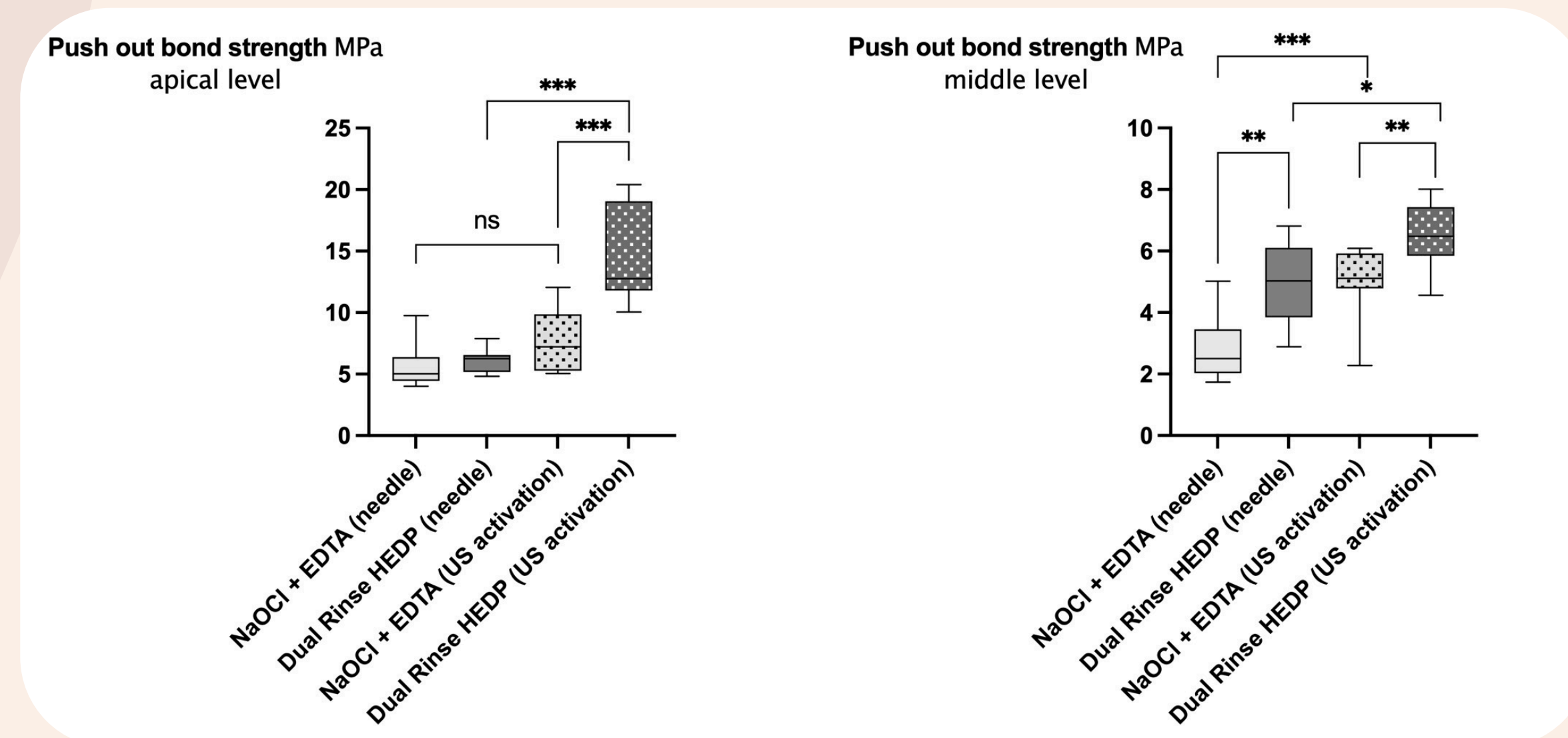
To assess the effect of sequential versus continuous chelation in root canal irrigation on the penetration depth and push-out bond strength of a calcium silicate-based sealer.

METHODOLOGY



80 single-rooted teeth were prepared using Reciproc R25.
4 groups according to the irrigation protocol used (n = 20):
1. NaOCl + EDTA (needle)
2. NaOCl + EDTA (US)
3. NaOCl/HEDP (needle)
4. NaOCl/HEDP (US)
CeraSeal sealer mixed with Fluo-3 dye and gutta-percha using a matched cone technique. Confocal microscopy.

Push-out test



NOVELTY

Using fluorescent dye Fluo-3 as the investigative tool. This specific fluorophore binds to calcium ions within the calcium silicate-based sealer, enabling a more accurate assessment of actual sealer infiltration into dentinal tubules.

RESULTS

No significant differences in sealer penetration were observed between sequential and continuous irrigation protocols in the apical region ($p > 0.05$).

- The highest push-out bond strength values were recorded when continuous chelation was combined with ultrasound, both in the apical and middle regions of the root ($p < 0.001$).
- The combination of continuous chelation and ultrasound resulted in the highest sealer penetration at the middle level ($p < 0.01$).

CONCLUSION

While sealer penetration in the apical region was not significantly influenced by the irrigation protocol, greater penetration was observed at the middle level. Additionally, the combination of continuous chelation and ultrasound resulted in the highest push-out bond strength values in both the apical and middle regions, suggesting that this approach may enhance the adhesive properties of the sealer.

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