INPLASY

Evaluation of the efficacy of mechanical nickel-titanium and manual instruments in root canal treatment of deciduous teeth: a meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202540023

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 7 April 2025 and was last updated on 7 April 2025.

INTRODUCTION

Review question / Objective This study aims to assess the impact of manual versus mechanical nickel-titanium instruments on root canal treatment in deciduous teeth.

Condition being studied Caries is one of the common diseases affecting the health of baby teeth, and the occurrence of caries can affect the quality of life of children. When caries occur in the enamel and dentin, filling and repair can be considered. If caries progress to the pulp, combined with surgery is the preferred method for clinical treatment of pulp infection and apical inflammation.

METHODS

Participant or population Research including individuals who have undergone primary tooth intervention.

Intervention Studies involving root canal treatment done using rotary file systems like Kedo-S files, K3 files, etc.

Comparator Studies involving root canal treatment done using manual/hand files—K files or H files, hand ProTaper files.

Study designs to be included Randomized controlled trial.

Eligibility criteria
Inclusion criteria:
P: Patients with pulpitis of deciduous teeth requiring root canal treatment (3-11 years old)
I: Single visit treatment with the Kedo-SG blue/green file
C: The traditional K-file was treated several times
O: Postoperative pain VAS score, treatment time, success rate
S: RCT study

Exclusion criteria:

• Use hybrid preparation techniques (rotation + manual alternation)

• Grey literature whose data cannot be extracted.

Information sources MEDLINE, PubMed, EMBASE, Goole Scholar and Cochrane.

Main outcome(s) Mean instrumentation time.

Additional outcome(s) The quality of obturation.

Quality assessment / Risk of bias analysis The papers were qualitatively analyzed using the Cochrane risk of bias tool, specifically the Bias Risk Assessment of Randomized Controlled Papers as outlined in the Cochrane Handbook.

Strategy of data synthesis RevMan 5.3 statistical software was used for data analysis. For continuous variables such as root canal preparation time and filling time, weighted mean difference (MD) and 95% confidence interval (95%CI) were used to combine effect sizes. For binary categorical variables, the risk ratio (RR) and its 95%CI were combined.

Subgroup analysis Type of rotary nickel-titanium machine.

Sensitivity analysis The sensitivity analysis was carried out by article by article elimination method, and the difference between the fixed effect model and the random effect model was compared.

Country(ies) involved China.

Keywords manual instruments; mechanical nickel-titanium instruments; deciduous teeth; root canal treatment; root preparation.

Contributions of each author
Author 1 - Dong Wang.
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Author 3 - Rongjing Zhou.