

To Remove or Retain? Prevalence of Complications Related to Plate Removal and Retention in Paediatric Diaphyseal Forearm Fractures: A Systematic Review and Meta-Analysis

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Introduction

- Paediatric diaphyseal forearm fractures (DFFs) are one of the most common injuries in childhood and some cases require operative management in the form of TENS or plate fixation.
- After fracture healing with plate fixation, metalwork may either be retained or removed routinely, each with their own unique drawbacks in the paediatric population.
- Unlike in adults, there is no consensus as to whether forearm plates in children should be routinely removed or retained.
- The aim of this systematic review and meta-analysis is to perform a comprehensive evaluation of the existing literature and estimate the prevalence of complications related to plate removal or retention in paediatric DFFs.

Methods

- A systematic review of four databases (MEDLINE, Embase, CENTRAL, CINAHL) was conducted according to PRISMA guidelines (full search string in appendix).
- Studies were included if they reported the prevalence of complications following plate removal or retention in paediatric DFFs (full inclusion/exclusion criteria in appendix).
- Data extracted included study characteristics, study methodology, population characteristics (including demographics, sample size, fracture/plate details) and study results (including prevalence of pre-specified complications).
- A meta-analysis and meta-regression were performed to determine the pooled prevalence of the complications.
- Methodological quality was assessed using the Joanna Briggs Institute Critical Appraisal Checklist for Prevalence Studies.

Results

- A total of 11,932 studies were identified, following which a total of **18 studies representing 607 patients** with forearm plate fixation were included in the analysis.
- Pooled prevalence of **refracture rates** were
 - **1.57%** (95% CI 0.04% to 4.43%) after plate removal.
 - **3.00%** (95% CI 0.00% to 11.02%) after plate retention.
- Meta-regression showed **no significant difference** between the two groups (regression coefficient = -0.14, 95% CI -1.12 to 0.83, p=0.77).
- Other complications investigated were:
 - **Infection = 1.36%** (95% CI 0.00% to 6.19%).
 - **Nerve injury = 1.97%** (95% CI 0.00% to 7.42%).
 - **Unplanned removal of symptomatic metalwork = 5.53%** (95% CI 2.39% to 9.57%).
- Methodological quality was demonstrated to be high in 16/18 (89%) of studies with 2/18 (11%) studies being deemed low quality.

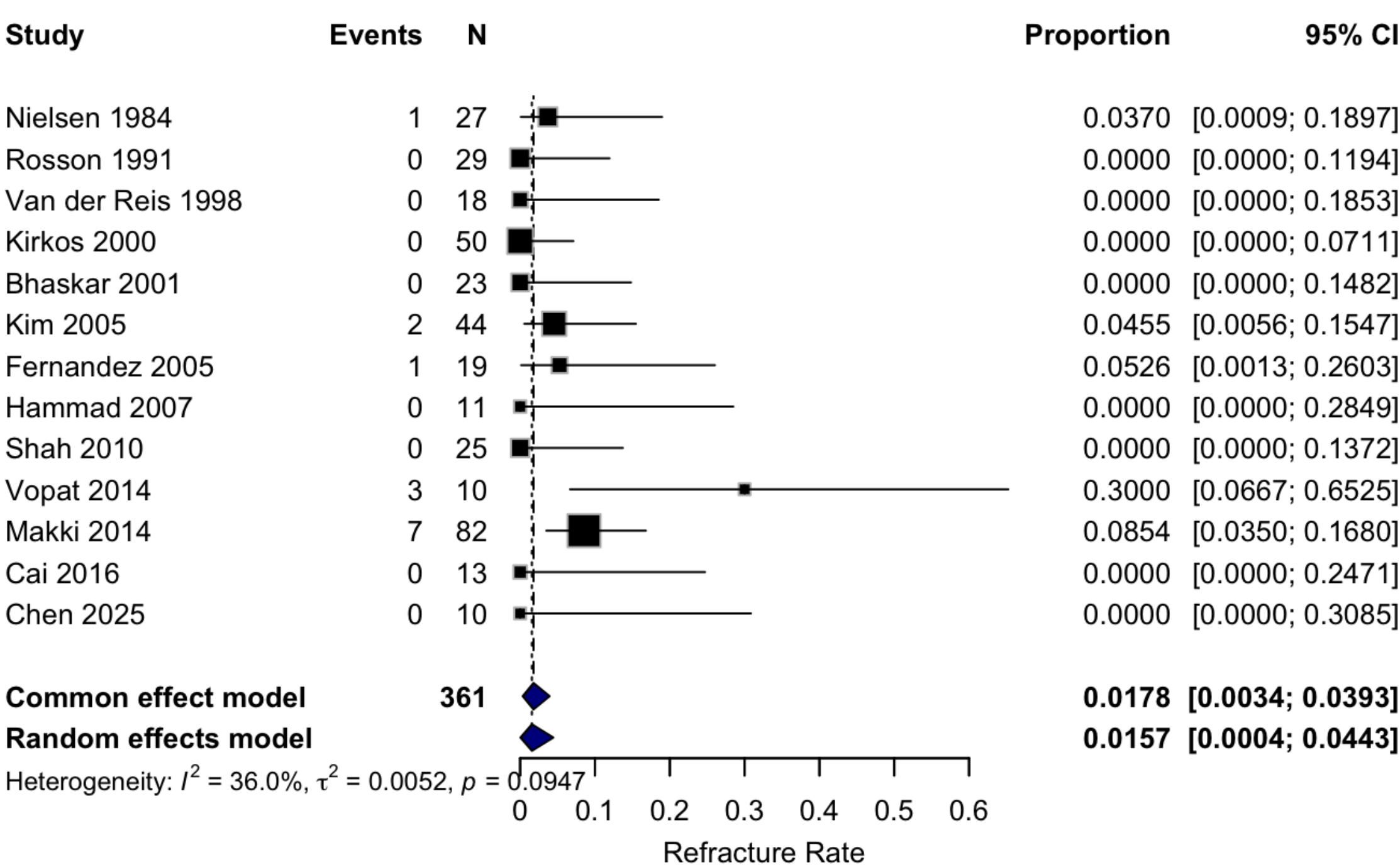


Figure 1. Meta-analysis of refracture rate following plate removal.

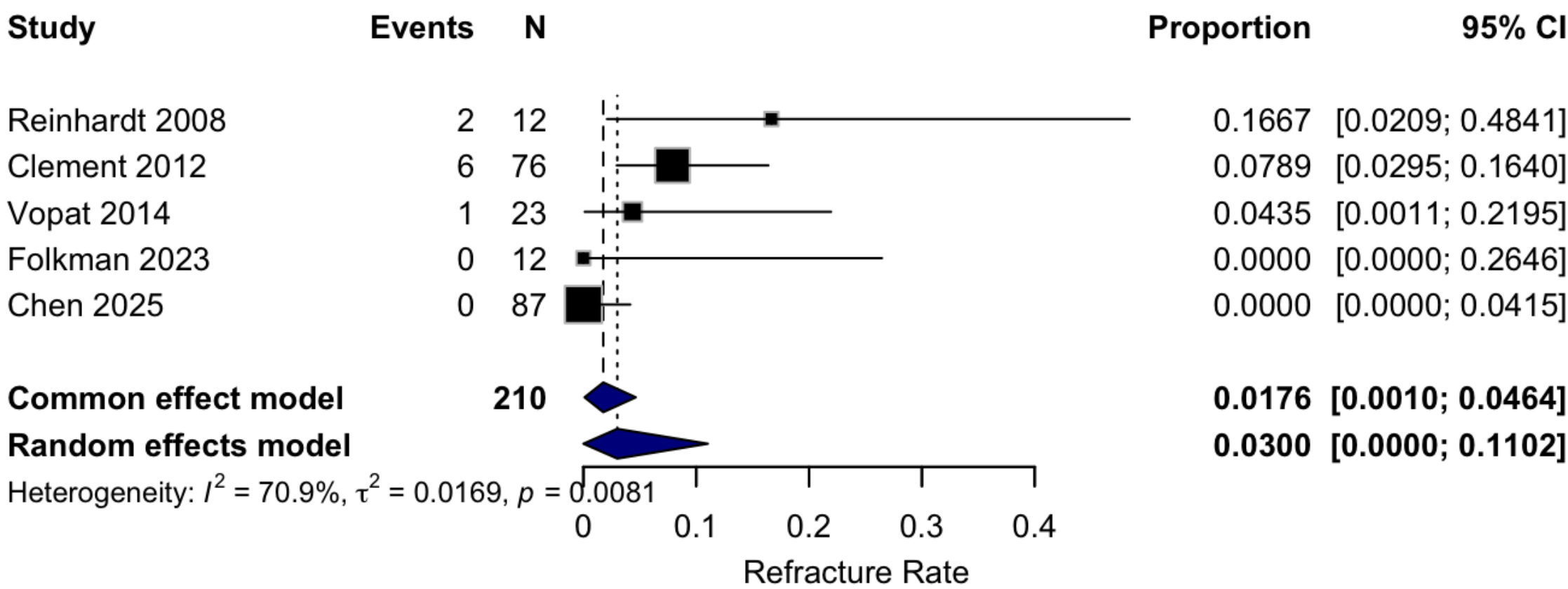


Figure 2. Meta-analysis of refracture rate following plate retention.

Conclusions

Complication rates following both plate removal and retention are low, and both options are generally safe.

