

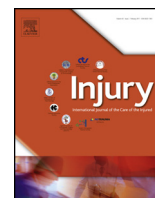


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Should we bury K-wires after metacarpal and phalangeal fracture osteosynthesis?

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ABSTRACT

Background: Burying Kirschner wires (K-wires) under the skin after metacarpal and phalangeal fracture osteosynthesis may reduce risk of infection, but it might also complicate later removal.

Purpose/aim of study: To examine infection and reoperation rates after metacarpal and phalangeal fracture osteosynthesis with buried versus exposed K-wires.

Materials and methods: Metacarpal and phalangeal fractures treated with K-wire osteosynthesis at our institution from 1st of January, 2009 to 1st of February, 2015 were identified retrospectively. The final study population included 444 patients, 331 with metacarpal, 109 phalangeal and 4 with mixed fractures. Surgical and patient records were examined 90 days postoperatively.

Findings/results: 337 patients (75.9%) were treated with buried K-wires and 107 patients (24.1%) with exposed (non-buried) K-wires. 14 patients (4.1%) treated with buried K-wires presented with postoperative infection, opposed to 7 patients (6.5%) treated with non-buried K-wires ($p = 0.311$). None of the postoperative infections caused re-operation. Only one case of deep/severe infection was recorded in a patient treated with buried K-wires requiring intravenous antibiotic treatment. In 58 of 337 patients (17.2%) treated with buried K-wires, removal was not possible in the outpatient clinic and required readmission for removal in the operation theatre. All exposed K-wires could be removed in the out-patient clinic without re-operation.

Conclusions: We found no difference in postoperative infection rate between metacarpal and phalangeal fracture osteosynthesis with buried versus exposed K-wires. However, the high readmission and reoperation rate (17.2%) after burying K-wires should call for reconsideration of surgical strategies.

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Introduction

Reduction and osteosynthesis of metacarpal and phalangeal fractures is often performed using Kirschner wires (K-wires). Previous studies have suggested that burying K-wires under the skin after osteosynthesis of hand and wrist fractures significantly decreases risk of infection [1]. Pin tract infections are usually reported as being superficial requiring only oral antibiotic treatment [8]. However, there have been case reports of more severe systemic infections with osteomyelitis and toxic shock syndrome [2]. Numerous conflicting studies exist, debating whether burying K-wires reduces risk of infection ([1,4,11,8,12], see Table 1).

Intuitively, K-wire burial complicates later removal. This may be associated with significantly higher costs, as removal of buried

K-wires is not always possible in an out-patient setting and may require readmission and removal in the operating room (OR) [5,6]. Therefore, the objective of this study was to examine infection and reoperation rates after metacarpal and phalangeal fracture osteosynthesis with buried versus exposed K-wires.

Materials and methods

Retrospectively, 597 patients with metacarpal and phalangeal fractures treated with osteosynthesis at our institution were identified from 1st of January, 2009 to 1st of February, 2015, by querying the hospital surgical procedure database for diagnoses coded with ICD-10 fracture of the 1st metacarpal (S62.2), fracture of the 2nd to 5th metacarpal (S62.3), multiple fractures of the metacarpals (S62.4), fracture of the 1st phalanges (S62.5), fracture of the 2nd to 5th phalanges (S62.6) and multiple finger fractures (S62.7), as well as procedural codes for internal fixation of metacarpal and phalangeal fractures. Eligible operations were restricted to those performed primarily at our institution in

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Table 1
Infection rates for non-buried K-wires after osteosynthesis.

	Fracture location	Infection Rate (%)
Subramanian [7]	Distal Radius and ulna	2.0
Chan et al.	Lateral humeral condyle in children	3.0
Stahl and schwartz [8]	Hand and wrist	5.5
Sharma et al. [9]	Upper extremity fractures in children	5.8
van Aaken et al. [10]	Distal radius	5.9
Hsu et al. [11]	Hand and Wrist	6.0
Botte et al. [12]	Hand and Wrist	7.3
McGonagle et al. [15] (mg l. I endnote)	Lateral humeral condyle in children	8.3
das de et al. [6]	Lateral humeral condyle in children	9.8
Koç et al. [5]	Hand and Wrist	10.0
Madhukar et al. [16] (mg l. I endnote)	Distal radius	15.9
McFadyen et al. [13]	Distal radius	17.0
Rafique et al. [4]	Metacarpal and phalangeal	18.2
Lakshmanan et al. [3]	Distal radius	21.0
Hargreaves et al. [1]	Distal radius	34.4

patients older than 18 years of age. Excluded were patients with K-wire removal and follow up in other hospitals, fractures treated with screw osteosynthesis, patients requiring simultaneous osteosynthesis of fractures other than metacarpal and phalangeal

fractures, as well as Ishiguro procedures and other ligament-repair procedures using K-wires (Fig. 1).

In all cases surgical records were examined a minimum of 90 days postoperatively. Patient age, gender and date of primary

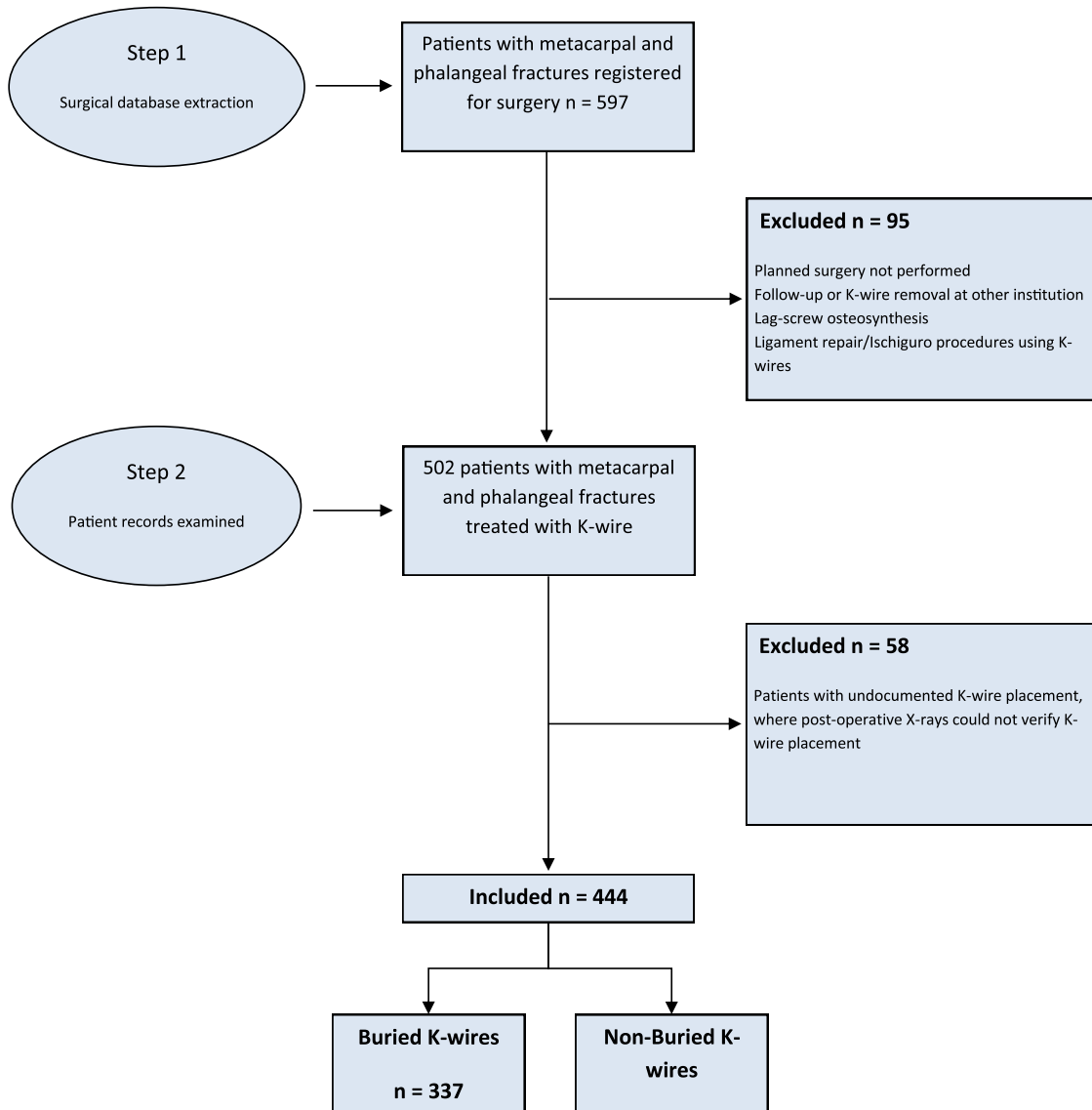


Fig. 1. Study population.

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