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## ORIGINAL RESEARCH

# The Buddy Study: Local reach, adoption and implementation following a randomised controlled trial of conservative management of fifth metacarpal neck fractures

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## Abstract

**Objective:** To understand the *reach, adoption and implementation* of the evidence that buddy strapping for uncomplicated fifth metacarpal neck fractures is non-inferior to plaster casting.

**Methods:** Mixed-method study using clinical audit of the years before and after the original randomised controlled study was published (2019) and staff questionnaires/semi-structured interviews.

**Results:** Sixty-nine percent of questionnaire respondents were aware of the original study findings (i.e. *reach*) and 57% had *adopted* the research findings. The proportion of patients receiving buddy strapping was 6% in 2014–2016 and 28% in 2019–2021 (*implementation*). Qualitative data provided insight into ongoing barriers to adoption and implementation including fear of reprisal, the

need for permission, opinions of senior decision makers, perceptions about patient preferences, and an overall tendency to ‘play it safe’.

**Conclusions:** Even in a department where primary research is conducted, implementation requires ongoing attention to factors impacting reach and adoption.

**Key words:** *boxer’s fracture, emergency department, fifth metacarpal, implementation.*

## Introduction

A randomised controlled trial (‘Buddy study’) showed that patients with uncomplicated fifth metacarpal neck fractures treated with buddy strapping compared to plaster casting have similar functional outcomes.<sup>1</sup> Little is known about the reach, adoption, or implementation of these findings in practice.

## Key findings

- Buddy taping for fifth metacarpal neck fractures has been shown to be non-inferior to casting.
- Buddy taping increased from 6 to 28% after publication of the Buddy Study.
- Ongoing attention to clinicians knowledge, behaviour and beliefs may reduce barriers to adopt best evidence into practice.

Although minimal intervention is cheaper and faster with no detrimental effect on pain or function, many patients continue to receive plaster casts.<sup>1,2</sup> This evidence-practice gap can be explored using the ‘diffusion of innovation’ framework.<sup>3</sup> This framework acknowledges the importance of clinician knowledge, behaviour, values and beliefs in context. Key phases of the framework are the ‘*reach*’ (awareness), ‘*adoption*’ (decision to use) and ‘*implementation*’ (application of new intervention) of evidence. We aimed to explore the reach, adoption and implementation of evidence at the site where the original study was conducted.

## Methods

This mixed methods study had three components: (i) an audit of uncomplicated fifth metacarpal fractures in the 2 years prior to the study commencing

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(April 2014–March 2016), and the years following publication (April 2019–March 2021); (ii) a questionnaire to GCHHS emergency department staff from July to November 2021; and (iii) semi-structured interviews with staff from November 2021 to February 2022. The study received approval from the local ethics committee (LNR/2021/QGC/75027). The audit was used to assess implementation of the evidence. We retrieved data by using diagnostic coding for metacarpal neck fracture and medical record review. Data were extracted by LN and CA using a standardised template, with a focus on ED management (buddy strap *vs.* plaster). The questionnaire (Online Supplement A) was designed to understand elements of reach, adoption and implementation. After piloting, the questionnaire was distributed to all staff members ( $n = \sim 250$ ) who contribute to management for patients with fifth metacarpal fractures (residents, registrars, consultants, advanced practice physiotherapists, plaster technicians, orthopaedic registrars and nurse practitioners). Three emails were sent to eligible participants 2 weeks apart. The survey was delivered using SurveyMonkey® (San Mateo, CA). Results from the questionnaire informed the semi-structured interview guide. The purpose of semi-structured interviews was to further explore reach, adoption, implementation and experience with a variety of practitioners. The interview guide is available in Online Supplement B. Recruitment for interviews included self-referral from the survey as well as purposive approaches to ensure a balance of perspectives. Interviews were conducted by research nurse AR. They were audio recorded and transcribed using OtterAI. Interviews and qualitative data from the questionnaires were analysed by EP using deductive thematic analysis with sensitization to factors related to reach, adoption and implementation.<sup>4</sup> Throughout analysis, initial codes and findings were discussed with CA who also had reviewed the interviews in depth. The final analysis was shared with members of the entire department *via* infographic with request for feedback. No changes

were made to the analysis based on this member-check.

## Results

The proportion of patients receiving buddy strapping for an uncomplicated fifth metacarpal neck fracture was 10/168 (6%) prior to the conduct of the original study and 28/100 (28%) after publication. Despite this change in practice, there were ongoing challenges related to *reach*, *adoption* and *implementation* as identified by 42 questionnaire responses (17% response rate) and 28 semi-structured interviews (4 advance practice physiotherapists [APPs], 4 nurse practitioners [NPs], 4 emergency consultants, 5 emergency registrars, 4 emergency residents, 3 plaster technicians and 4 orthopaedic registrars).

### Reach

Over two-thirds (29/42; 69%) of questionnaire respondents were aware of the original study. Nearly all who worked in ED during the conduct of the original study (23/24, 96%) were aware, compared to a quarter of those who did not (4/15, 27%). Many of the interviewees felt awareness and participation in the original research enhanced reach within the department.

I think it probably has a bigger impact than other studies because [I'm] more aware that it's happening and more aware of the results – Registrar 1.

High staff turnover was felt to be a threat to reach:

I think people have forgotten about the study...there's lots of new people that have come through – Nurse Practitioner 2.

### Adoption

Just over half of the participants were considering adopting buddy strapping into their practice (24/42, 57%). Table 1 highlights key barriers to adoption and implementation

which one plaster technician best summed up as '*playing it safe*'. Key barriers to adoption were related to a lack of knowledge of institutional endorsement of the evidence, particularly among nurse practitioners and junior doctors. These practitioners desired inclusion of evidence in protocols and guidelines before adopting them into practice.

I don't know if we've had formal formally been told by the orthopaedic team that we can use "The Buddy Study". I've never had seen any paperwork to say that they're happy for us to treat that way. So that's probably one of the main barriers. Has it been approved by the orthopaedic hand bosses? – Nurse Practitioner 3.

Other factors preventing adoption were fear of '*doing the wrong thing*' (particularly as judged by external providers), '*being safe*' and '*going against the status quo*'.

### Implementation

Once individuals had decided to adopt buddy strapping, the barriers to implementation were mostly related to appropriately nuanced decisions at the point of care including patient preferences and functional requirements. Some problematic barriers to implementation were the personal '*desire to do something*' and perceived pressures from other providers less aware of the evidence.

For example, one registrar said, '*I think that often it feels like we're doing more for the patient if we're doing that [casting them] so it feels like you're actually doing something [compared to buddy strapping].*'

Some participants interviewed felt they were more likely to implement findings because they participated in the research.

I feel like as ED Registrars we're way more inclined to do the buddy strapping because we were around for that study. – Registrar 3.

TABLE 1. Sociocultural barriers to adoption and implementation – ‘Playing it safe’

Barrier	Representative Quotes	Targets for ongoing improvement
<i>Fear of reprisal:</i> Numerous participants described concern about doing the wrong thing for fear of being judged, particularly by the orthopaedic team who will see patients in follow-up.	<i>‘I think there’s also an element of you don’t want to do the wrong thing by putting them in buddy strapping... you don’t want the patient to go to orthopaedic fracture clinic and have them turn around saying why didn’t you put this patient into plaster?’ – APP3</i>	This highlights the importance of relationships and trust within organisations. Collaborative approaches to education, and ongoing efforts to enhance professional relationships may help build trust.
<i>Need for permission:</i> Numerous participants, primarily NPs and residents, expressed concern that this evidence wasn’t formally ‘approved’ or incorporated into guidelines.	<i>‘I’ve never seen any paperwork to say they’re [orthopaedics] happy for us to treat that way’ – NP 3</i> <i>‘I can’t remember sort of getting a definitive ‘okay’ [to buddy strap]’ – NP1</i>	This highlights the necessity to deliberately incorporate evidence into resources accessed at the point of care by practitioners.
<i>Power:</i> Even when junior staff were aware of the evidence, the adoption and implementation was impacted by the powerful role of their consultants’ preferences.	<i>‘I think there’s no issues from a junior perspective adopting them into my practice, but I think it has to be driven by senior members of the department that they have to agree that this is the way to go and direct us to follow this study. And if we don’t have that guidance, it is difficult because you have different consultants who just have different preferences.’ – Ortho Registrar 2</i>	This highlights that efficient targets for diffusion of innovation may be consultants and higher-level decision makers who strongly influence those who they work with.
<i>Perceived Patient Expectations:</i> Many practitioners expressed the assumption that patients would want a cast but only few discussed how they actually inform patients about the options. No reference to shared decision making was made.	<i>‘probably the biggest resistance I would have is if the patient’s just not going to tolerate it. From a pain point of view. They’re looking for something a little bit more supportive.’ (APP3)</i> <i>‘it feels like you’re doing something by casting them I guess, you’re fulfilling their expectations’ – SHO 3</i>	This highlights that patients may be an excellent target for future knowledge translation efforts. Patient-focused shared decision pamphlets may better inform them of their options.
<i>‘Playing it safe’:</i> throughout the interviews there was the overwhelming sense that the main factor preventing adoption and implementation was (perceived) risk aversion – for practitioners themselves and their patients.	<i>‘I think a lot of clinicians and doctors wanted to play it a little bit more safe. Just leaving it up to the orthopaedic team rather than making that call in emergency’ – Plaster Tech 1</i>	‘Playing it safe’ is a complex phenomenon that is not unique to buddy strapping in fifth metacarpal fractures and likely linked to all of the factors above.

## Discussion

Our study findings align with the diffusion of innovation theory. There were gradual reductions in *reach*, *adoption* and *implementation*. This study highlights the enablers and challenges associated with the diffusion of innovation within an invested institution.

Employment within the organisation at the time of the initial study was associated with increased *reach* of study results. This finding underscores an intangible benefit of being a research-active department.<sup>5</sup> Those working where the research was performed were likely to have heard about the study or even recruited

participants and learned about (and been invested in) the results.

However, the transient nature of the healthcare workforce means that this may not translate into permanently sustained levels of *reach*. Even within the organisation where research was performed, sociocultural barriers to *adoption* and *implementation* of best

evidence are powerful. Fear of reprisal, the need for permission, the powerful opinions of senior decision makers, perceptions about patient preferences, and an overall tendency to 'play it safe' impacted knowledge translation at our institution. Such challenges related to *reach, adoption, and implementation* are likely to be even more significant in sites where research is not conducted.

Specific efforts to support the diffusion of innovation may target these barriers including the incorporation into resources (i.e. guidelines, reference materials, displays, electronic records and clear education material for patients) and careful attention to sociocultural tensions (i.e. power, influence, fear of reprisal) through ongoing efforts to build trusting relationships between people and departments.<sup>6</sup>

There are limitations to this work. The audit results and questionnaire responses are surrogate markers for adoption and reach. As such qualitative interviews were conducted for context and more in-depth insights. The low questionnaire response rate may limit generalisability and be prone to response bias. This may have overestimated reach, adoption, and impact of research within the department.

## Conclusion

Even in a department where primary research is conducted, implementation requires ongoing attention to maximising reach and a nuanced

approach to factors impacting adoption.

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## Competing interests

GK is an Editorial Board member of EMA and a co-author of this article. To minimise bias, he was excluded from all editorial decision-making related to the acceptance of this article for publication.

## Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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## Supporting information

Additional supporting information may be found in the online version of this article at the publisher's web site:

**Supplement A:** Questionnaire.

**Supplement B:** Interview guide.