

Healthcare Providers and Parents Highlight Challenges of Pediatric Hand Fracture Care

Ann-Sophie Lafreniere, MD

Altay Baykan, BSc

Rebecca Hartley, MD, MSc, FRCSC

Paul Ronksley, MSc, PhD

Shannan Love, MSLP

Alan Robertson Harrop, MD,

MSc, FRCSC

Frankie O.G. Fraulin, MD, FRCSC

Dave J.T. Campbell, MD, PhD,

FRCPC

Maoliosa Donald, PhD, BScPT

Background: Pediatric hand fractures are common, and many are referred to hand surgeons despite less than 10% of referrals requiring surgical intervention. We explored healthcare provider and parent perspectives to inform a new care pathway.

Methods: We conducted a qualitative descriptive study using virtual focus groups. Emergency physicians, hand therapists, plastic surgeons, and parents of children treated for hand fractures were asked to discuss their experiences with existing care for pediatric hand fractures, and perceptions surrounding the implementation of a new care pathway. Data were analyzed using directed content analysis with an inductive approach.

Results: Four focus groups included 24 participants: 18 healthcare providers and six parents. Four themes were identified: educating parents throughout the hand fracture journey, streamlining the referral process for simple hand fractures, identifying the most appropriate care provider for simple hand fractures, and maintaining strong multidisciplinary connections to facilitate care. Participants described gaps in the current care, including a need to better inform parents, and elucidated the motivations behind emergency medicine physicians' existing referral practices. Participants also generally agreed on the need for more efficient management of simple hand fractures that do not require surgical care. Healthcare providers believed the strong preexisting relationship between surgeons and hand therapists would facilitate the changes brought forward by the new care pathway.

Conclusion: These findings highlighted shortcomings of existing care for pediatric hand fractures and will inform the co-development and implementation of a new care pathway to enable more efficient management while preserving good patient outcomes. (*Plast Reconstr Surg Glob Open* 2023; 11:e4815; doi: [10.1097/GOX.0000000000004815](https://doi.org/10.1097/GOX.0000000000004815); Published online 17 February 2023.)

INTRODUCTION

In the context of ever-growing surgical wait times across Canada,¹ there is an unprecedented need for more efficient use of limited healthcare resources.² Appropriately matching provider expertise to patient needs is an approach that can help address this issue. Pediatric hand fractures are commonly referred to hand surgeons, even though most have excellent outcomes with immobilization and splinting.³ In fact, only 10%

of pediatric hand fractures referred to hand surgeons require surgical intervention.⁴ These findings led us to consider developing a care pathway whereby low-risk fractures could be managed by a direct referral to an alternate care provider [eg, hand therapists (HTs) or family physicians].

Care pathways are population-specific, evidence-based clinical decision guides with the aim of standardizing care to improve health outcomes.⁵ Care pathways have been successfully implemented in pediatrics, including the management of asthma in a primary care setting,⁶ outpatient seizure care,⁷ and cancer symptom management⁸; however, to our knowledge, there is no care pathway for the low-risk pediatric hand fracture population. As the basis for a care pathway, our team has

From the University of Calgary, Calgary, Alberta, Canada.

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developed an evidence-based clinical prediction rule for pediatric hand fracture triage called the “Calgary Kids’ Hand Rule” (CKHR) to assist physicians in differentiating fractures that require specialized care by a hand surgeon (high-risk or “complex”) from those that do not (low-risk or “simple”).⁹ The CKHR is based on a risk index of six predictors of fracture complexity: angulation, condylar involvement, dislocation, displacement, malrotation, and open fracture. The CKHR can be applied by primary care and emergency physicians when assessing a child’s hand fracture to guide referral decisions (Fig. 1). Internal validation of the CKHR prediction model displayed strong performance, with accurate prediction of 96.4% of complex fractures (C-statistic = 0.88).⁹

Early engagement of key stakeholders [parents and healthcare providers (HCPs)] is critical to the success of a new care pathway. We sought to explore the experiences of parents and HCPs with the existing care practices for treatment of pediatric hand fractures and uncover factors that may influence possible practice changes. This work will inform the co-development of a CKHR-based hand fracture care pathway.

METHODS

Design and Ethics

We conducted a qualitative descriptive study using virtual focus groups to explore pediatric hand fracture stakeholders’ experiences with existing care practices.¹⁰ Our research team included pediatric plastic surgeons, health services researchers, and a patient partner (S.L.). S.L. was involved throughout the protocol development, data collection, and analysis process. Consistent with other Canadian centers, all hand surgeons at our institution are pediatric plastic surgeons. Prior ethics approval was obtained from the local research ethics board. We used the Consolidated criteria for Reporting Qualitative Research to inform the reporting of this study.¹¹

Takeaways

Question: What are the perspectives of healthcare providers and parents on pediatric hand fracture care?

Findings: This qualitative study highlighted gaps in the current referral practices and care for pediatric hand fractures. Participants demanded more efficient and streamlined management of simple hand fractures not requiring surgical care. The strong preexisting relationship between surgeons and hand therapists would facilitate the changes brought forward by the new care pathway.

Meaning: Stakeholders’ perspectives will inform the co-development and implementation of a new care pathway enabling more efficient pediatric hand fracture care.

Participant Selection and Setting

This study involved HCPs and parents of children who provided or received care for hand fractures in a publicly funded healthcare system. All participants spoke English and were able to provide consent. We used purposive sampling to include a range of relevant stakeholder groups from different clinical settings who could provide insight into the study objective: parents; physicians within emergency departments (ED) and urgent care centers; plastic surgeons (PS); and HTs from both hospital and community settings. HTs were occupational and physical therapists with additional certification in hand therapy. Family physicians were invited but did not express interest in participating in the focus groups, given the low volume of hand fracture referrals they receive. Parents of children who previously attended the hand clinic for nonoperative fractures were recruited by a member of the research team (A.B.). Members of our team and core stakeholder group identified HCPs based on their clinical roles and settings. All consented individuals participated.

Data Collection

A total of four 90-minute focus groups (ie, parents, HTs, ED physicians, and PS) were conducted in February 2021 using an online platform (2021, Zoom Video

Alberta Children’s Hospital

CALGARY KIDS’ HAND RULE

A **COMPLEX FRACTURE** is defined by the presence of any of the following, either on examination, or on the initial X-ray, both before any attempted reduction performed.

| | |
|--|--|
| <p style="font-weight: bold; margin: 0;">PHYSICAL EXAMINATION:</p> <p><input type="checkbox"/> Open fracture</p> <p><input type="checkbox"/> Malrotation</p> | <p style="font-weight: bold; margin: 0;">PRE-REDUCTION RADIOGRAPH:</p> <p><input type="checkbox"/> Angulation</p> <p><input type="checkbox"/> Condylar involvement</p> <p><input type="checkbox"/> Dislocation or Subluxation</p> <p><input type="checkbox"/> Displacement</p> |
|--|--|

If none present, please tick SIMPLE FRACTURE

Was a closed reduction performed? Y / N (circle)

Fig. 1. Calgary Kids’ Hand Rule referral form.

Communications, Inc). Sessions were facilitated by a female physiotherapist, health services researcher (M.D.) with experience in qualitative research, using a semistructured interview guide. The focus group format was selected to enable collection of multiple perspectives and assess the relevance of individual contributions through participant interactions. Some participants knew the interviewer before the study, from her role as a physiotherapist; however, they did not know her research motivations, goals, or interests. Other team members (A.B., A.-S.L., S.L., and R.L.H.) observed the focus groups and took field notes relating to discussions and group dynamics. The interview guide (Fig. 2) was designed based on barriers to the practical application of clinical prediction rules reported by Cowley et al¹² and input from our research team. Participants were shown the current (Fig. 3) and proposed care pathways (Fig. 4). Areas of questioning included (1) experiences with existing care for pediatric hand fractures, including strengths and limitations and (2) perceptions surrounding the proposed care pathway, which includes the CKHR. All focus groups were audio-recorded, anonymized, and transcribed verbatim by a professional transcriptionist. A demographic questionnaire was also sent to participants inquiring about age, sex, fracture treatment received, HCP specialty, years in practice, and site of practice.

Data Analysis

Descriptive statistics were used to summarize demographic data. Two research team members (A.-S.L., plastic surgery resident and A.B., research assistant) completed the qualitative data analysis. Transcripts were imported into NVivo 12 (QSR International Pty Ltd., version 12, 2018) for analysis. Inductive direct content analysis was used to develop a preliminary coding scheme by compiling segments of text from the first focus group that related to our areas of questioning.¹³ Next, the two team members independently and iteratively coded the subsequent focus group transcripts, meeting after each transcript was coded. A final meeting was conducted to reach agreement on the final coding framework, which was systematically applied to all transcripts. Preliminary themes were refined based on feedback from the larger research team and checked against coded extracts. No additional focus groups were conducted because data saturation (the point where no new information emerged resulting in no new codes) was reached.¹⁴

Participants did not provide feedback on findings. However, it is recognized that findings would be shaped by experiences and beliefs of the two research members performing the analysis.¹⁵ As such, multiple strategies were used to ensure rigor, including an audit trail with study-related discussion notes reflecting decision-making and regular review and discussion of the data with other

| INTERVIEW GUIDE | |
|------------------------|--|
| 40 mins | <p>Please tell us about your experience with the current pathway.</p> <p>Prompts (parent):</p> <ul style="list-style-type: none"> • In what ways does the pathway outlined here reflect your experiences? • What part of your experience was the most challenging/satisfying? • How well-informed did you feel about the course of your child's treatment? • How do you feel your experience might have been improved? <p>Prompts (healthcare provider):</p> <ul style="list-style-type: none"> - In what ways does the pathway outlined here reflect your experiences? - What aspects of the current pathway do you find to be problematic? - What aspects of the current pathway do you find to be effective? - How does the current pathway hinder/facilitate your ability to provide patient care? - How do you feel the current pathway might be improved? |
| 45 mins | <p>Please tell us your thoughts on the proposed changes to fracture care.</p> <p>Prompts (parent)</p> <ul style="list-style-type: none"> • How do these proposed changes better meet your needs? • Perceived barriers to implementing new pathway (20 minutes) • Perceived facilitators to implementing new pathway (20 minutes) <p>Prompts (healthcare provider):</p> <ul style="list-style-type: none"> - How might you expect your role to be affected by these changes? - What are some potential obstacles/benefits you see to implementing these changes? - What are some needs that these changes fail to address? |

Fig. 2. Focus group semistructured interview guide.

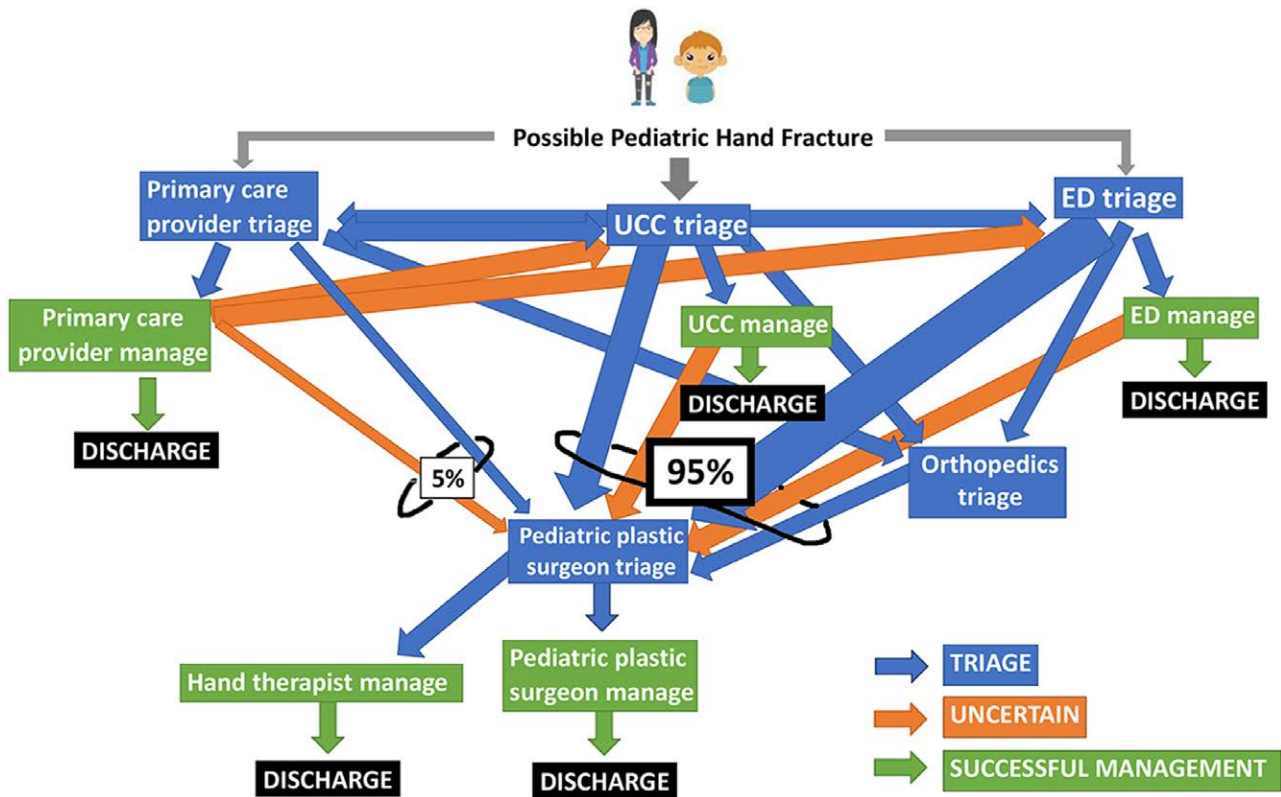


Fig. 3. Current care for pediatric hand fractures.

team members. Data triangulation of the four different groups provided corroboration of the data, and overlapping ideas provided the means for generating the final themes.

RESULTS

Participant Characteristics

The focus groups involved 24 participants (18 HCPs and six parents). Most participants were under the age of 50 (n = 17) and women (n = 17). All lived in an urban setting. The sample of HCPs included eight ED physicians, four PS, and six HTs. The majority (n = 10) worked at the Alberta Children’s Hospital.

Themes

Four high-level themes were identified. Themes and descriptions are described below (Fig. 5), and representative quotations are provided in SDC 1. (See table, Supplemental Digital Content 1, which shows themes, relevant concepts, and illustrative quotes. <http://links.lww.com/PRSGO/C396>.)

Theme 1: Educating Parents throughout the Hand Fracture Journey

Parents reported fear and anxiety when presented with a hand fracture diagnosis for their child and felt generally uninformed about the care process (“When they hear ‘plastic surgeon’ they get overwhelmed thinking they are

for sure having surgery” – HT P5). Parents also reported uncertainty regarding their child’s care (“I was confused as to having to see the plastic surgeon; ... I didn’t fully understand the role of hand therapy” – parents P5). Consequently, parents requested better clarity and information around care (“If they could provide that information and let you know that this is going to be happening” – parents P3). The current process also limited surgeons’ ability to educate patients and families (“By the time I come to see some families, we are an hour behind in clinic [...] and I don’t have the chance to answer their questions correctly” – PS P2).

Theme 2: Streamlining the Referral Process for Simple Hand Fractures

Emergency physicians admitted to experiencing discomfort triaging hand fractures (“[...] trying to differentiate simple versus complex. [ED physicians] are still very uncomfortable about that” – ED P4). They also cited a fear of poor outcomes as a key motivator for existing referral practice (“Though we are comfortable with certain things, bad outcomes are very sobering” – ED P2) as well as comfort from securing proper follow-up with plastic surgery (“When we send to plastics that’s a closed loop referral system” – ED P3). ED physicians were open to HT management of simple hand fractures but noted the need for updated referral processes (“An HT consultation only comes from plastic surgery [...] We need a streamlined process to connect to a HT” – ED P7).

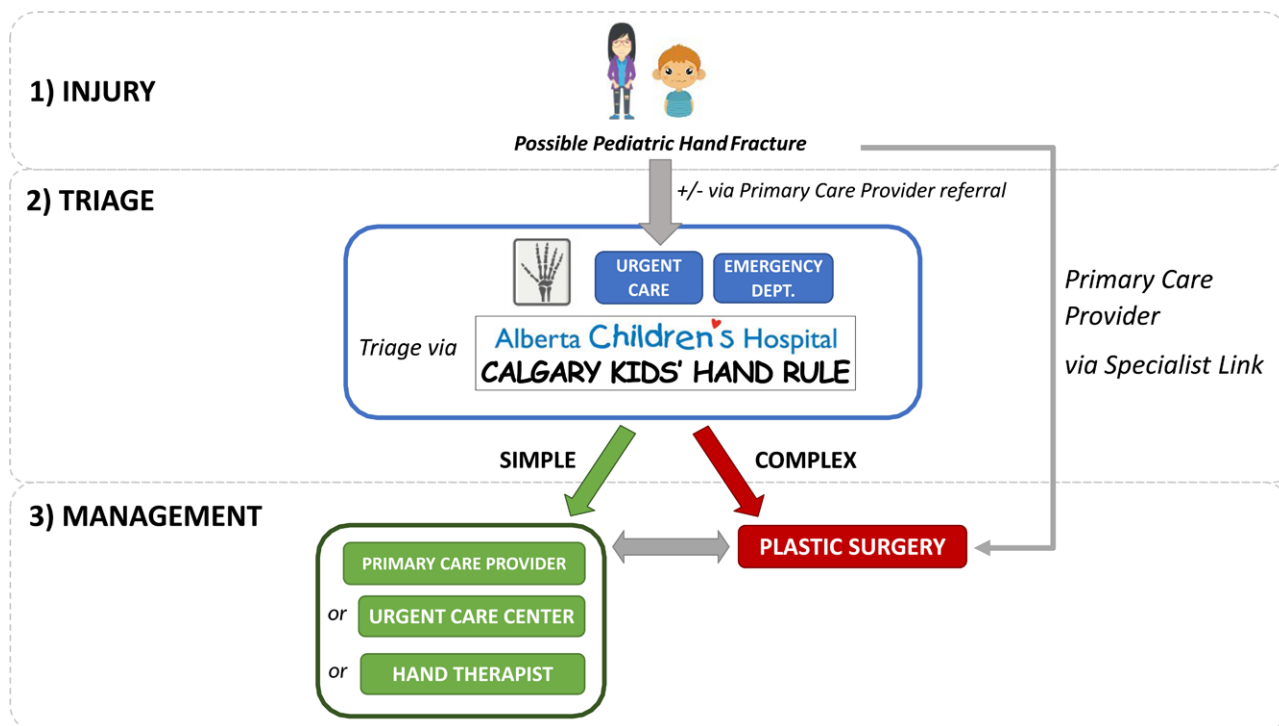


Fig. 4. Proposed care pathway for pediatric hand fractures.

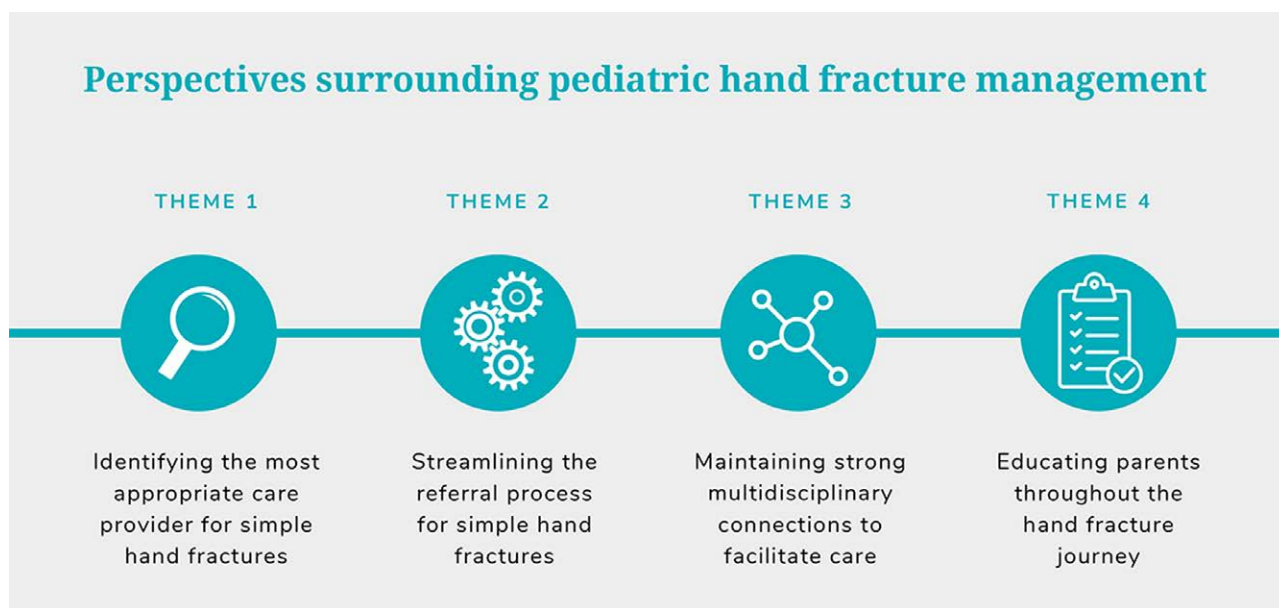


Fig. 5. Themes related to care for pediatric hand fractures.

Surgeons believed diverting simple fractures to an alternate care provider could improve their clinic flow (“This is a middle phalanx Salter-Harris 2 fracture, with a kid from this age group, so I need 30 minutes [...] potentially they are able to streamline their services and PA have to wait less before seeing somebody.” – PS P2). Similarly, HTs agreed that a clearer referral process would allow “efficiencies in the system and consistency of treatment”

– HT P1. To support parents in the referral process, both parents and HTs suggested the use of educational hand-outs (“It should be part of the referral” – HT P2).

Theme 3: Identifying the Most Appropriate Care Provider for Simple Hand Fractures

All participants discussed the importance of matching provider expertise to patient needs. Most parents,

surgeons, and ED physicians felt the plastic surgery visits were not always necessary for patients with simple hand fractures, and that many of these fractures could be effectively managed by HT (“I don’t think she needed to see [the plastic surgeon] at all. She could have gone straight to the HTs” – parents P3). Participants were confident that HTs have the resources and the expertise to care for that population (“Our HTs are experts on splinting pediatric hand fractures and evaluating pediatric hand injuries for deformity or disability” – PS P1).

The CKHR-integrated pathway could provide more consistent and efficient care for patients by diverting simple hand fractures directly to nonsurgical providers (“We don’t hear about [the simple fractures]. We don’t see them. We don’t triage them.” – PS P1).

Family physicians were initially considered as possible follow-up care providers for children with simple hand fractures, though the findings of this study suggest that they may not be the most appropriate choice. Parents expressed a desire for specialist care (“Definitely not a general physician because again, not a specialist. [...] it should be seen by somebody who’s a specialist at it.” – parents P2), while HTs believed family physicians are not currently equipped to manage hand fractures “family physicians don’t have the experience or personnel to do the splinting” (HT P1). ED physicians and surgeons echoed these sentiments (“There will be family physicians who may not feel super comfortable managing these things.” – ED P3; “[they] don’t actually want the patients back, they want us to manage them.” – PS P1).

Theme 4: Maintaining Strong Multidisciplinary Connections to Facilitate Care

Emergency physicians, HTs, and surgeons reported that communication within the medical team is vital to ensure good patient outcomes. At our center, HTs and plastic surgeons collaborate closely (“With the plastic surgeons, you could run upstairs and ask a question. It’s a lot easier.” – HT P3). Maintaining that existing rapport was seen as a key facilitator of a new care pathway implementation (“Having a back-and-forth conversation which again is really, really important to happen.” – HT P4). HTs appreciated their ability to consult with on-site plastic surgeons regarding management falling outside their scope of practice (“If we are worried about [a fracture] that may not be simple and [patients] need to loop back to the plastic surgeon.” – HT P2). Plastic surgeons believed this relationship is important in preventing bad outcomes (“I feel great about that just knowing that there is a safety net. If the HTs have any concerns, they know where we live, and they immediately let us know.” – PS P1). This strong multidisciplinary relationship also provided reassurance to referring doctors that patients can access the expert care they need (“They have good communication with the plastic surgeons if there’s issues and that just takes all of the complexity and follow-up out of the equation.” – ED P3).

DISCUSSION

We identified gaps in existing care for pediatric hand fractures, including a need for improved patient education, and uncovered some of the motivations for existing referral practices. Inefficiencies in the current referral process, namely the surgical referral of nonsurgical fractures, were also highlighted. Stakeholder engagement and the established rapport between surgeons and HTs is believed to facilitate the changes proposed by a new care pathway.

Several of our findings are of interest, given that there is the opportunity to streamline care to optimize healthcare resources and better meet patient needs. The first two themes, educating parents throughout the hand fracture journey and streamlining the referral process for simple hand fractures, were especially informative about the existing referral practice shortcomings that need to be addressed within a new clinical pathway. A qualitative study on the surgical management of tuberculosis in Peru identified similar concerns, where patients referred to a respirologist feared that they might require surgery.¹⁶ The authors highlighted the importance of having the primary care team on board to inform patients, given their established patient–provider trust. A standardized referral process would provide opportunities for patient education on hand fracture care at multiple stages (eg, a hand-out given in the ED, in-person education on fracture healing, immobilization, splinting with the HTs). Efficient HCP–patient communication, which could be facilitated by our new care pathway, has previously shown to be linked to improved clinical outcomes and patient satisfaction.¹⁷

Changing a referral process used daily by ED physicians may seem daunting, especially knowing the reassurance they get from referring hand fractures to surgeons. Suggesting referral of some patients to alternate care providers is only feasible if the referring physicians believe that patient outcomes will be preserved. Previous studies have demonstrated that physician trust is strengthened when they perceive their organizational culture to have emphasis on quality of care.¹⁸ In our context, maintaining trust requires a preservation of patient safety and clinical outcomes. Our proposed changes to the referral process are backed by a robust clinical prediction rule with demonstrated accuracy: accurately predicting up to 98% of complex fractures in a recent prospective trial.¹⁹ Patient safety is further preserved by the ability for alternate care providers to easily refer missed complex cases to a surgeon.

Second, identifying the most appropriate care provider for simple hand fractures is a key factor in managing healthcare resources. In the context of ever-growing surgical wait times across Canada, this potential care mismatch presents a high-yield opportunity for the optimization of healthcare resources.^{2,20} This idea of redistribution of resources has been demonstrated by a local adult multidisciplinary hand clinic. The clinic triages nonoperative cases to hand therapy and physiatry, enabling plastic surgeons to manage a higher volume of urgent operative referrals.²¹ The overall result is a reduction in number of clinic visits for a patient and shortened clinic wait times. In our study, members of all focus

groups recognized that simple hand fractures can be managed by nonsurgical experts, such as HTs, increasing the availability of hand surgeons to manage more complex cases. Although family physicians were initially considered as potential care providers for simple hand fractures, stakeholders suggested that their lack of splinting resources and variable experience levels would make them less suitable for this role. As such, family physicians were removed from potential care providers for patients with simple hand fractures.

Finally, altering existing practices requires strong multidisciplinary relationships, which ties into our last theme: maintaining strong multidisciplinary connections to facilitate care. Care pathways rely on effective multidisciplinary work, a predictive factor of a successful implementation.^{22,23} Characteristics of a high functioning multidisciplinary team include collaborative practice, clear communication, unambiguous definition of roles and responsibilities, and precise goals.²⁴ A systematic review looking at policy and implementation issues around multidisciplinary care planning demonstrated that implementing multidisciplinary care often requires changing patterns of interaction between HCPs, alignment of roles and work practices, and changes to organizational arrangements.²⁵ The success of a new care pathway will rely on the strong multidisciplinary communication described above to ensure patients receive the most appropriate care for their needs with minimal adverse outcomes.

Limitations

The main limitation of our study is that our findings are context specific. All plastic surgeons and most of the HTs participating in this study were used at the same tertiary academic hospital. In addition, all parents were women and local urban residents. Thus, the homogeneity of our study sample may limit the generalization of our findings to other settings. However, this can be partially mitigated by the observation that mothers are most often the caregivers for children.²⁶ Our overall sample size was constrained by the limited number of potential candidates and the feasibility of conducting large focus group sessions. Our findings are also limited by the lack of actual patient perspectives (no feedback from children was sought) and the lack of direct input from family physicians.

CONCLUSIONS

Exploration of parents and HCP perspectives surrounding pediatric hand fracture management revealed the need for better clarity and education about the hand journey for parents with an updated referral process from the ED that enables better matching of patient needs to provider expertise. A new care pathway will accomplish this by leveraging a clinical prediction rule to assist emergency and urgent care physicians in accurately referring patients to the most appropriate care provider. The implementation of this new institutional change will require ongoing

communication and collaboration with all relevant pathway stakeholders.

Maoliosa Donald, PhD, BScPT

Department of Community Health Sciences
Cumming School of Medicine
University of Calgary
HSC G239, 3330 Hospital Drive NW
Calgary AB T2N 4N1
Canada
E-mail: donaldm@ucalgary.ca

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