



# Trends for Treatment of Complex Hand Burns in the Acute Setting

S.Freudenberger, OTR/L, CHT, CLT, S.Auriemmo, MS, OTR/L, P. Tufaro, OTR/L, CLT, H. Hunter, PT, M. Sher, PT, DPT, CLT, M. Marren, PT, P. Chang, MD

NewYork-Presbyterian/Weill Cornell Medicine, New York, NY



The William Randolph Hearst Burn Center

## Introduction

Hands and the upper extremity are the most common area on the body to be affected by a burn injury.<sup>1,2</sup> Though they make up only about 5% of total body surface area, hand dysfunction can result in significant functional loss for a patient affecting their ability to hold and manipulate objects, write, perform activities of daily living, or return to work.<sup>1</sup>

Rehabilitation practices and protocols for the hand and digits vary among burn centers.<sup>2</sup> The purpose of this study is to examine current occupational and physical therapy (OT/PT) practices in the treatment of complex or deep hand burns in the patient acutely admitted to a burn center.

## Methods

A confidential internet survey was sent to burn therapists in the United States from the American Burn Association Occupational and Physical Therapy Special Interest Group Listserv. One therapist from each burn center was asked to complete the survey. The survey was comprised of 40 questions regarding demographics, interdisciplinary team, evaluation and treatment practices relating to range of motion, edema, positioning, exposed tendons and stiff joints.

## Results

- 41 respondents representing 33% of burn centers
- Respondents were:
  - Occupational therapists (78%)
  - 500 or less annual admissions (76%)
  - More than 16 years of experience (68%)

### Range of Motion (ROM) (Figure 1)

- Most commonly measure composite (57%) and isolated (51%) joint passive/active ROM, then distance from fingertip to distal palmar crease (43%)
- With questionable or confirmed tendon involvement (Picture 1), 68% of OT/PTs measure isolated joint techniques, with active ROM the most common at 38%



Picture 1: Deep hand burn with questionable tendon status

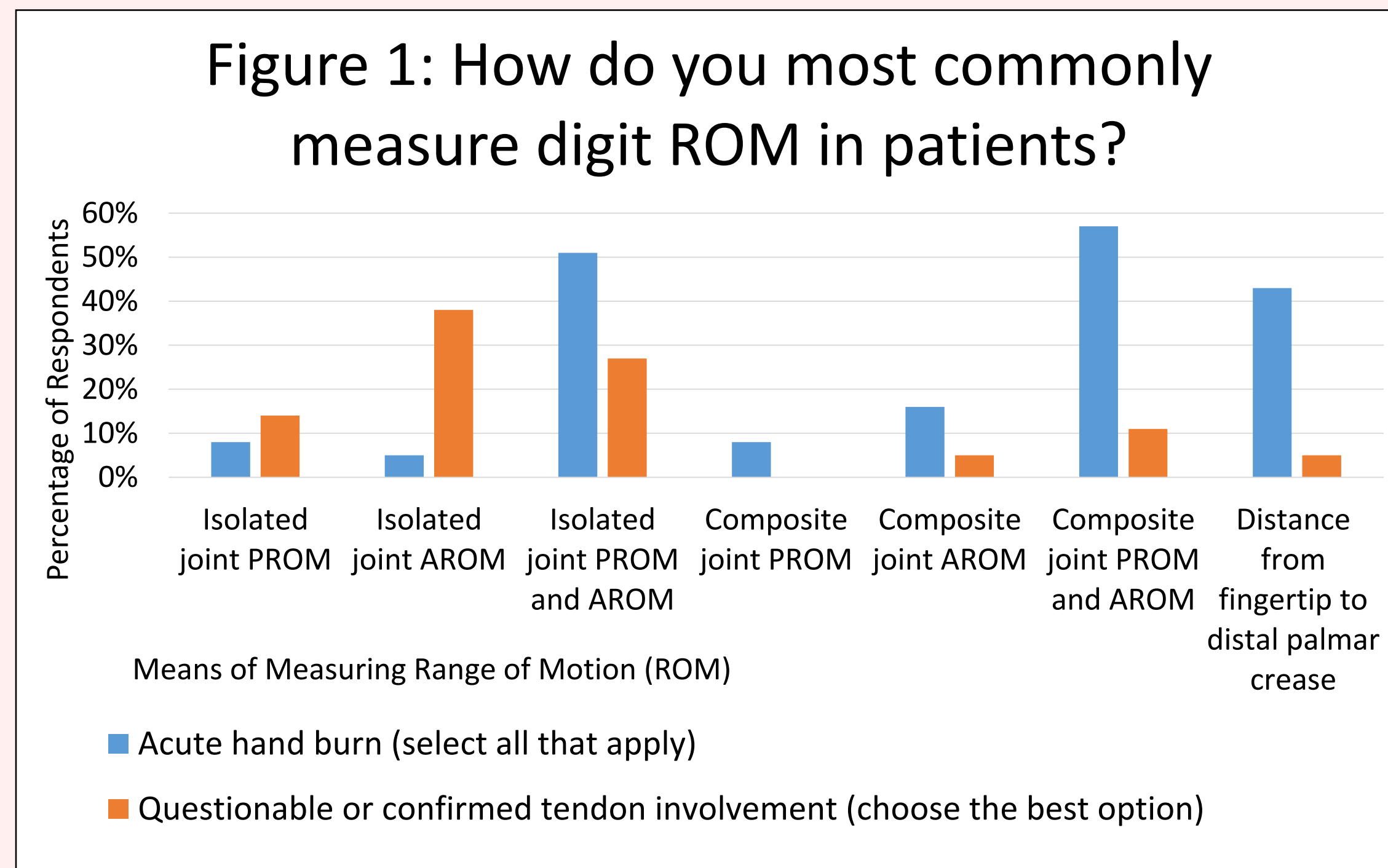


Table 1: What type of edema management do you most commonly used in the acute hand burn that has dressings?

Active exercises	94%
Elevation	92%
Functional use of the extremity	83%
Self adherent wrap	50%
Elastic bandage	47%
Edema glove	33%
Diaphragmatic breathing	6%
Lymphatic massage proximal to the burn area	6%
Elastic therapeutic tape proximal to the burn area	6%

## Edema Management

- Initiated (other than elevation) within 24 hours from the patient's admission (44%)
- Most prevalent practice is active exercise (94%) and elevation (92%) with only 50% using more aggressive practices such as self-adherent wrap (50%) (Table 1)

## Results

### Anti-Deformity Positioning

- Orthotics are initiated within 24 hours of admission (44%) and are the most common means of post-graft immobilization (41%)
- Percutaneous pins are utilized for metacarpophalangeal (MCP) and proximal interphalangeal (PIP) joint stability, most frequently in PIP joints (62%) (Figure 2) and remained 2-3 weeks on average (45%)
- 53% of therapists utilize casting for hand stiffness
- For PIP contractures, joint mobilization (45%) and static progressive orthotics (42%) are viewed as the most effective interventions, surpassing casting (Table 2)

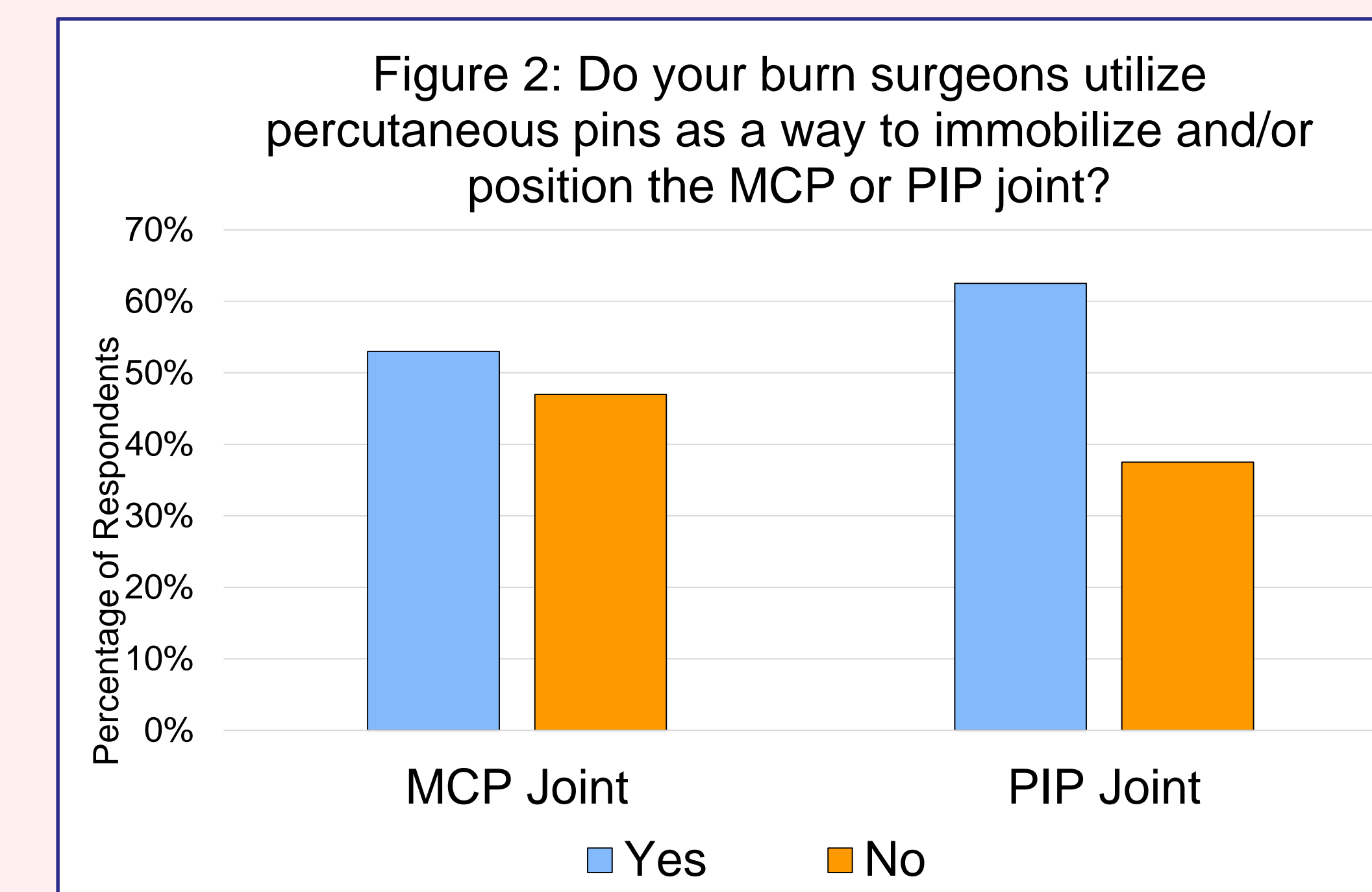


Table 2: Based on your clinical experience, what is the most effective therapy-driven treatment approaches for a PIP flexion contracture?

Joint mobilization	45%
Static progressive orthotic	42%
Thermal modality and ROM exercises	32%
Static orthotic crossing PIP and DIP joints	23%
Serial casting crossing PIP and DIP joints	23%
Dynamic orthotic	16%
Serial casting crossing PIP joint only	13%
Spring-based PIP extension orthotic	13%
Static orthotic crossing PIP joint only	10%
Other	13%

### Interdisciplinary Approach

- 88% of centers utilize an interdisciplinary approach to care for the hand
- 57% of hand-specific interdisciplinary rounds are formal and structured, 31% are informal and unstructured, and 9% are short daily huddles that are 10 minutes or less
- With burns > 20% TBSA that involve deep burns, 59% of therapists perceive the hand as a surgical priority

## Conclusion

Consistency among burn centers across the country exists regarding the use of interdisciplinary rounds, edema management, and ROM measurements in acute hand burns. However when the injury is more complex, as in deeper hand burns or with the presence of secondary complications, there is less of a consensus regarding assessment and treatment. This variance is well documented<sup>4,5</sup> and indicates the need for more research regarding the efficacy and utility of methods being used in order to establish a standard of care. In advance of further research, the interdisciplinary team approach to care for hand burns may be the forum to advance these treatments.

## References, Funding and Disclosure

1. Schneider J, Holavanahalli R, Helm P, O'Neil C, Goldstein R, Kowalske K. Contractures in burn injury part II: investigating joints of the hand. Journal of Burn Care & Research. 2008;29(4):606-613.
  2. Richard R, Baryza M, Carr J et al. Burn rehabilitation and research: proceedings of a consensus summit. Journal of Burn Care & Research. 2009;30(4):543-573. doi:10.1097/bcr.0b013e3181adcd93
  3. How-to Guide: Multidisciplinary Rounds. Institute for Healthcare Improvement. <http://www.ihl.org/resources/Pages/Tools/HowtoGuideMultidisciplinaryRounds.aspx>. Published 2019. Accessed August 25, 2019.
  4. Murray D, Warthman R, Richey K, Foster K. A national survey of therapy protocols for the treatment of hand burns. Paper presented at: 50<sup>th</sup> Annual Meeting of the American Burn Association; April 2018; Chicago, IL
  5. Holavanahalli R, Helm P, Parry I, Dolezal C, Greenhalgh D. Select practices in management and rehabilitation of burns: A survey report. Journal of Burn Care & Research 2001; 32:210-223
- Funding: None Disclosure: None