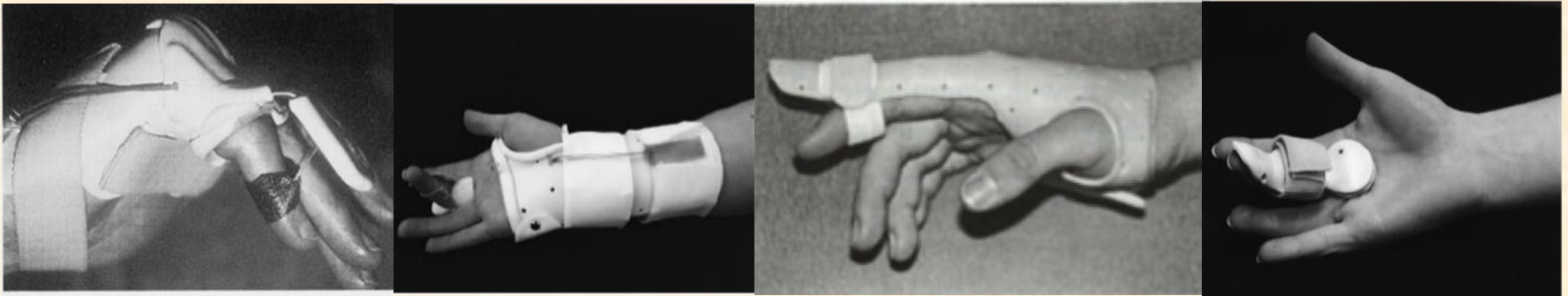


A systematic review on mobilization splinting for the post-traumatic stiff hand



Joan S. Lin, Senior Occupational Therapist,
Tan Tock Seng Hospital, Singapore

Anna L. Pratt, Lecturer in Occupational Therapy,
Brunel University London, UK



Overview

- Background
- Objectives
- Method
- Results
- Summary
- Implications on practice & research
- Limitations

Background

- Hand stiffness or contracture
 - Persistent reduction in ROM of the fingers
 - Common complication after a traumatic hand injury and/or surgery
 - Due to structural changes in the connective tissues

(Michloviz, Harris & Watkins, 2004;
Dudek & Trudel, 2008)

Background

- Hand stiffness or contracture
 - Restricts mobility of hand
 - Affects normal hand functions
 - Affects one's ability to perform self-care and home-making tasks independently
 - May have a considerable financial impact

(Farmer & James, 2001; Wong 2002; Rosberg et al., 2003; Dias & Garcia-Elias, 2006)

Background

- Mobilization splints
 - Dynamic splint
 - Static progressive
 - Serial static / serial casting

(Flowers, 2002; Glasgow, Tooth & Fleming, 2010;
Wilton 1997)

Background

- Mobilization splints
 - Few studies of high quality
 - Approach to splinting varied
 - Decision based on therapists' subjective experiences

(Flowers, 2002; Wilton 1997)

Objectives

1. Assess the clinical effectiveness of mobilization splinting

Key questions:

- Does mobilization splinting increase the ROM for the post-traumatic stiff hand?
- Does mobilization splinting improve function for the post-traumatic stiff hand?

Objectives

2. Explore the types of mobilization splint believed to be the most effective

Key question:

- What type of mobilization splint is the most effective for improving ROM for the post-traumatic stiff hand?

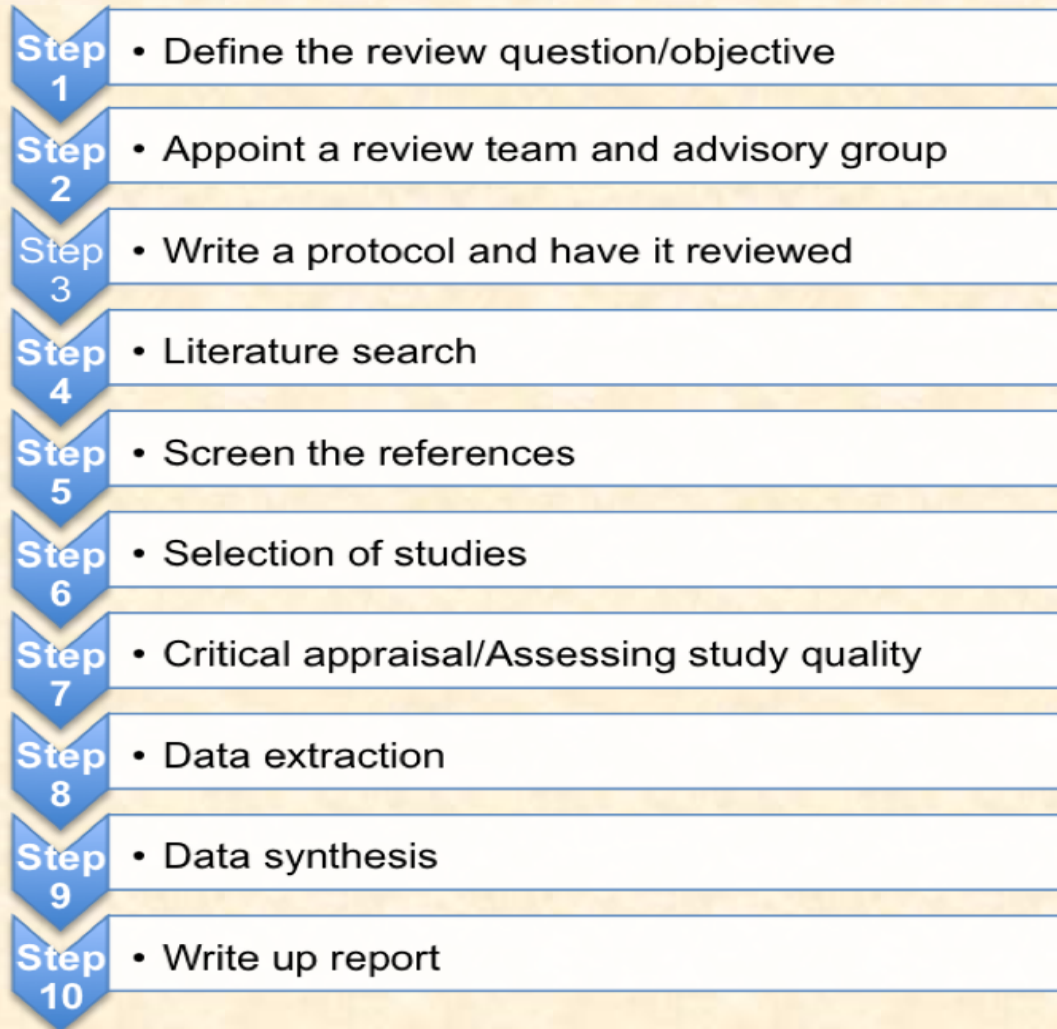
Objectives

3. Identify factors that can influence splinting outcomes

Key question:

- What are the factors that can influence splinting outcomes?

Methodology



(Petticrew & Roberts, 2006)

Method—Literature search

- Electronic databases
 - AMED (1985 to May 2013)
 - MEDLINE (1950 TO May 2013)
 - Pubmed central (1948 to May 2013)
 - CINAHL (1981 to May 2013)
 - Scopus (1996 to May 2013)

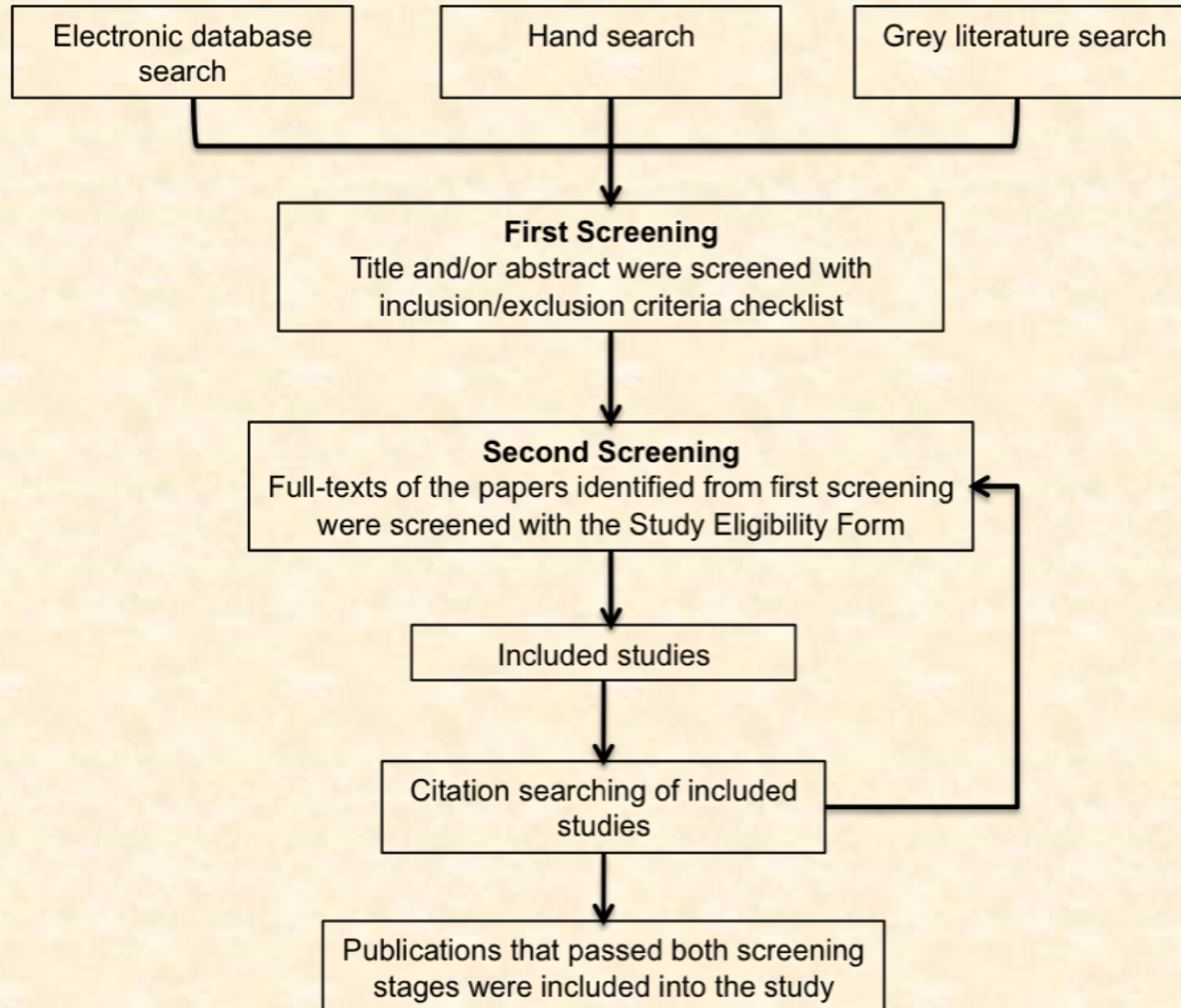
Method—Literature search

■ Hand searches

- American Journal of Hand Therapy (1987-2013)
- British Journal of Hand Therapy (1999-2008)
- Hand Therapy (2009-2013)
- American Journal of Hand Surgery (1988-2013)
- Hand Clinic (2002-2013)

■ Grey literature

Method—Literature Screening



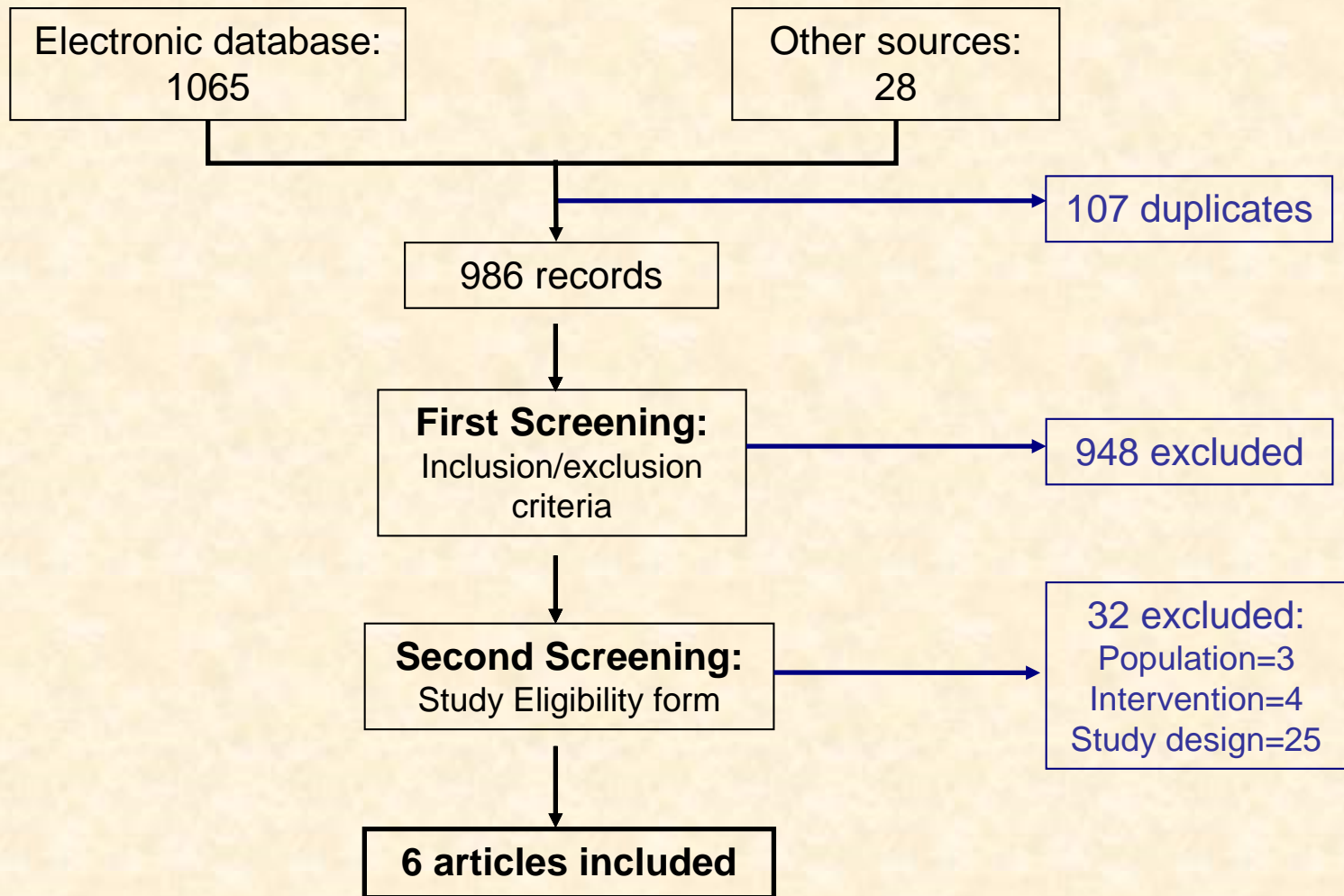
Method—Literature Screening

Inclusion Criteria	Exclusion Criteria
<i>Types of studies</i> <ul style="list-style-type: none">• Primary research with any study designs	<i>Types of studies:</i> <ul style="list-style-type: none">• Non-English articles• Literature reviews• Expert opinions
<i>Types of participants</i> <ul style="list-style-type: none">• Participants aged 11 years and above• Participants with hand stiffness as a complication of hand injury and/or surgery	<i>Types of participants</i> <ul style="list-style-type: none">• Participants under the age of 11• Participants with hand stiffness secondary to neurological conditions• Participants with stiffness due to non-traumatic hand conditions such as Dupuytren's disease• Animal studies
<i>Types of intervention</i> <ul style="list-style-type: none">• Upper limb and hand rehabilitation/exercise programme that involved any type of mobilisation splints used for stiffness management	<i>Types of intervention</i> <ul style="list-style-type: none">• Stiffness treated with surgical interventions
<i>Types of outcome measures/assessment tools</i> <ul style="list-style-type: none">• ROM measurements• Total end range time	<i>Types of outcome measures/assessment tools</i> <ul style="list-style-type: none">• Nil

Method—Critical appraisal

- Assessing study quality
 - Structured Effectiveness Quality Evaluation Scale (SEQES) (MacDermid, 2004)
 - Centre for Evidence-Based Medicine (CEBM) Levels of evidence

Results



Results

No.	Study	Study Objective	Design	n	Population
1	Flowers & LaStayo (1994)	Test if improvement in PROM is directly proportional to total end range time	Prospective cohort study	15 (20 digits)	Mean age: 38 (18-84)
2	Prosser (1996)	Investigate treatment outcome after a dynamic splinting programme	Prospective case series	20 (22 digits)	Mean age: 35
3	Benaglia, Sartorio & Franchignoni (1999)	1. Describe fabrication of a new static progressive splint 2. Report efficacy of splint	Prospective case series	4	Mean age: 20.5 (18-24)
4	Glasgow, Wilton & Tooth (2003)	Investigate importance of TERT on contracture resolution	Sequential RCT	32	Mean age: 39.7 (19-74)
5	Glasgow et al. (2011)	Identify predictors of outcome with dynamic splinting	Prospective cohort study	46 (56 joints)	Mean age: 44.2 (15-76)
6	Glasgow et al. (2012)	Compare effect of daily TERT	RCT	18	Mean age: 41 (group 1) vs 35.3 (group 2)

Results

No.	Study	Intervention	Outcome	SEQES score
1	Flowers & LaStayo (1994)	Group A: serial cast 6 days then 3 days Group B: serial cast 3 days then 6 days	Group A: total gain 106° Group B: total gain 60°	29
2	Prosser (1996)	Dynamic splint for 8 weeks; 8-12 hours/day	All participants improved: Average gain 18°	23
3	Benaglia, Sartorio & Franchignoni (1999)	Static progressive PIPJ extension splint 1-hr wear, 1-hr rest, 6x/day	1 gain full extension after 1/52; 3 gain full extension after 2/52	16
4	Glasgow, Wilton & Tooth (2003)	Intermittent or continuous use of mobilization splints for 4 weeks (static progressive or dynamic splints) Group A: <6 hrs per day; Group B: 6-12 hrs per day	Group A: -Mean daily TERT: 3.21hrs; -Av increase 10.2° Group B: -Mean daily TERT: 7.87hrs; -Av increase 21.9°	28
5	Glasgow et al. (2011)	Dynamic splint for 8 weeks; 6-12 hrs/day	Significant predictors: Pre-treatment stiffness & type of deficits	27
6	Glasgow et al. (2012)	Capener splint for 8 weeks Group 1: daily TERT 6-12 hrs Group 2: daily TERT 12-16 hrs	Group 1: mean daily TERT-9.5 hrs Group 2: mean daily TERT-11.5hrs No significant difference in improvement	31

Summary

Objective 1: Assess the clinical effectiveness of mobilization splinting

Key question:

- Does mobilization splinting increase the **ROM** for the post-traumatic stiff hand?
 - All studies reported an increase in ROM post-mobilization splinting
 - NO control group
 - **Low to moderate evidence**

Summary

Objective 1: Assess the clinical effectiveness of mobilization splinting

Key question:

- Does mobilization splinting improve **function** for the post-traumatic stiff hand?
 - No study uses function as an outcome measure
 - **No answer to this question**

Summary

Objective 2: Explore the types of mobilization splint believed to be the most effective

Key question:

- What type of mobilization splint is the most effective for improving ROM?
 - Each study utilized 1 type of splint
 - Only 1 study examined results for dynamic & static progressive, however the splints worked on different type of deficits
 - Difficult to pool & compare results due to variability among studies
 - **Little to no evidence**

Summary

Objective 3: Identify factors that can influence splinting outcomes

Key question:

- What are the factors that can influence splinting outcomes?
 - Possible factors:
 - Total end range time
 - Pre-treatment stiffness
 - Time since injury
 - Methodological flaws and biases noted
 - **Limited inconclusive evidence**

Implications for practice

- Low to moderate evidence to suggest mobilization splinting as an effective approach
 - Supported current practice
 - However, \uparrow ROM \neq \uparrow functional ability
 - Therapists to translate ROM gains into functions

Implications for practice

- Insufficient & inconclusive evidence to suggest the most effective splint type & factors affecting outcome
 - Review of splinting protocol
 - Provides treatment consistency
 - Provides guidance to less experienced therapists

Implications for research

- Well-designed RCTs comparing various types of mobilization splints against a control group
- Well-designed RCTs that compare different lengths of TERT
- Trials to include functional assessments as outcome measures
- Exploratory trials that use mobilization splints during different stages of tissue healing

Limitations

- Different approach from conventional Cochrane systematic reviews
 - Studies of lower quality
- Single reviewer under supervision
 - In part fulfilment for an MSc dissertation
- Excluded non-English articles

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