

A retrospective study to review the effectiveness
of a low-load prolonged stretch program for
preventing elbow flexion contractures in long term
care residents

HA Convention 2014

Dr. Kuen LAM

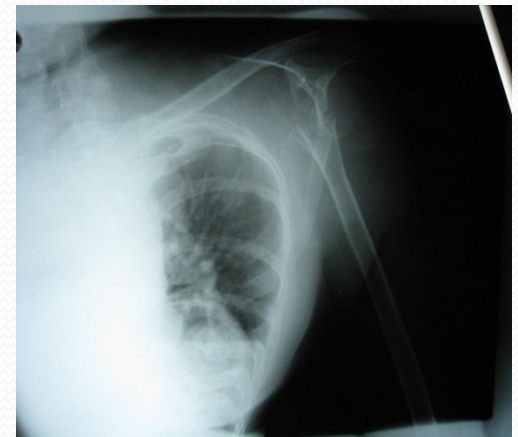
Specialist in Geriatric Medicine

Associate Consultant

Cheshire Home , Shatin (HKSAR)

Background

- Long term care residents are prone to developing contractures
- Elbow flexion contracture is the most prevalent type of upper limb contracture
- there is currently a paucity of research about measures to stop the progression of elbow contractures



Background

- It is widely believed that regular stretch is effective for the treatment and prevention of contractures.
- Stretch may change the muscle's viscoelastic, structural, and excitability properties.
- Animal studies have shown that 4 weeks of sustained stretch in cat soleus muscles results in tissue remodeling and increases the number of sarcomeres.

(J Physiol.1972;224:231-244)

Background

- However, evidence regarding the effectiveness of stretching in preventing contracture remains controversial
- A recent high quality systematic review found that stretching for less than 12 weeks, regardless of the stretching routine, does not have clinically important effects on joint mobility or spasticity in people with neurological diseases who are at risk of contractures.
(Katalinic OM et al. Phys Ther. 2011)

Background

- Notably, all of the previous studies on stretching in preventing elbow contractures had small samples size (ranged from 9 patients to 60 patients) and insufficient statistical power to draw conclusions.
- The studies also lacked explicit inclusion and exclusion criteria and were not designed to control for other confounding factors.
- In the absence of well-conducted , large randomized controlled trials , even a systematic review cannot conclude whether stretching is useful for preventing elbow contractures

Study Design

- **Objective:** To evaluate whether a low-load prolonged stretch program can prevent elbow flexion contractures in high-risk long-term care residents
- **Design:** Retrospective cohort study

Methodology

- In Shatin Cheshire Home (SCH), a 300-bed long-term care hospital in Hong Kong, we started using an elbow extension splinting program (3 hours per day, 5 days a week) for patients who are at high-risk for elbow contractures in 2010, in addition to the usual care.

Bed Positioning Program to prevent limb deformity of residents



Methodology

**A low-load prolonged stretch program
using elbow extension splints**



Methodology

Inclusion Criteria:

- Age >16 years
- Immobile and dependent on caregivers for bedside transferral
- Upper limb power \leq grade 4
- Suffering from underlying diffuse or focal cerebral and spinal pathologic conditions (>one year) including stroke, spinal cord injury, cerebral palsy, multiple sclerosis, traumatic head injury, and dementia
- Elbow flexor spasticity range from 2 to 4 on the modified Ashworth scale (MAS).

Methodology

- We reviewed the hospital notes and compared the mean change in elbow joint passive range of movement (PROM) over 6 months in all high-risk patients in SCH before and after the elbow extension splinting program.
- Data of a current cohort of patients in 2013 who are on elbow extension splints was compared with a historical cohort of patients in 2007 that were not given any elbow extension splint.
- Patients' demographic data, Modified Functional Ambulation Classification (MFAC) score, upper limb muscle strength and elbow flexors' MAS were also documented.

Results

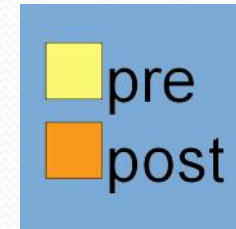
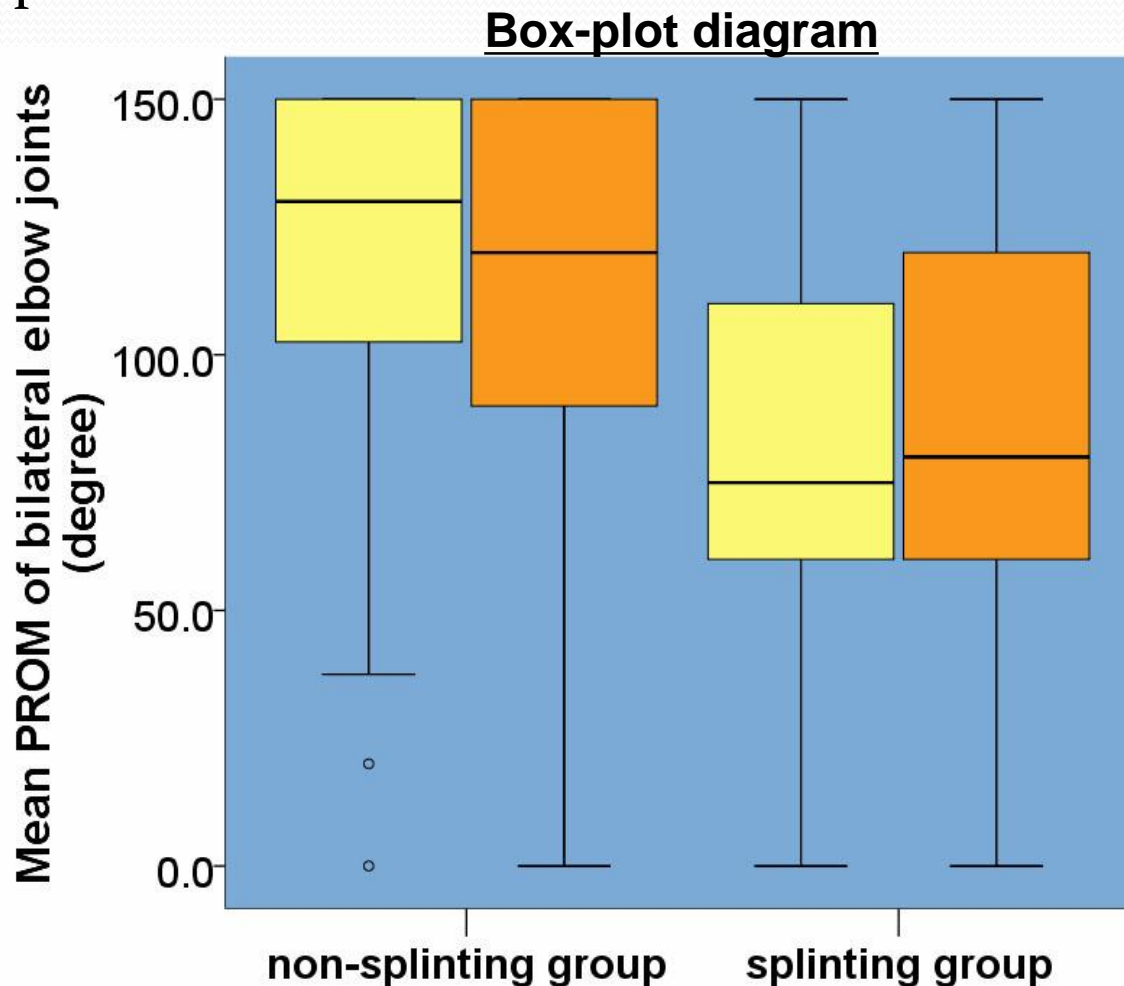
- Table on baseline characteristics of the 2 groups of patients

Characteristics		Non-splinting group n=69	Splinting group n=53
Age, mean±SD*		72.4±16.1	66.3±16.3
Gender, male, n (%)		25 (36.2%)	26 (49.1%)
MFAC	lyer, n (%)	45 (65.2%)	33 (62.3%)
	sitter and walker, n (%)	24 (34.8%)	20 (37.7%)
Charlson's comorbidity index, mean±SD		1.7±1.9	1.4±1.9
Baseline PROM of bilateral elbow joints, mean±SD *		120.1±37.1	81.5±41.1
Baseline strength power of bilateral elbow joints, mean±SD *		1.6±1.2	0.7±1.2
Baseline MAS of bilateral elbow flexor, mean±SD		1.5±1.6	2.0±1.4

* Indicate statistically significant difference between non-splinting group and splinting group as p-value ≤0.05

Results

- Graph on the pre-post PROM of elbow joints for the 2 groups of patients



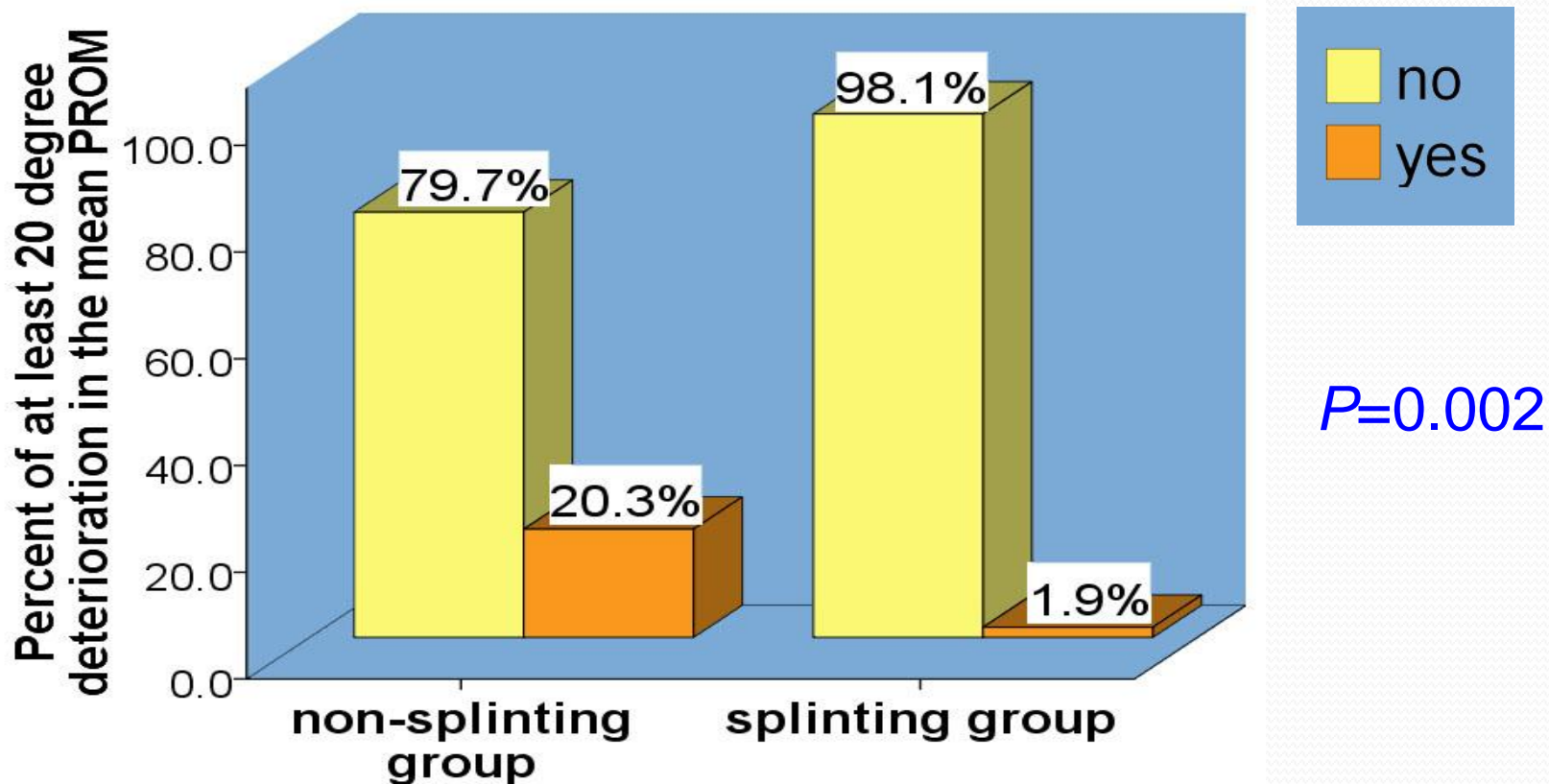
Non-splinting group
mean change of
PROM: -8.1 degrees

Splinting group
mean change of
PROM: +4.6 degrees

$P < 0.001$

Results

- Graph of proportion of patients in the 2 groups with a 20 degree or greater deterioration in the mean PROM of their elbow joints over the 6-month period



Conclusion

- An elbow extension splinting program involving application of a low-load prolonged stretch 3 hours per day, 5 days per week for 6 months can not only prevent further progression of elbow contractures in high-risk long term care residents, but can improve their joint mobility and may thereby prevent the well-known complications and morbidities related to elbow contractures. A larger randomized controlled trial is warranted to confirm this finding.

Acknowledgement

- Mr. Samuel Yui, OTI , SCH & the Occupational Therapy Department of SCH
- Multidisciplinary Team of SCH
- Mr. David Wong, Research Assistant, SCH

Thank You !

