



# **What practical guidance does the scientific literature provide about awkward postures in client/patient handling?**

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## Outline

- Starting point
- Risk factors – awkward postures
- Evidence from the scientific literature
- Association between awkward postures and MSD
- Effectiveness of interventions to prevent MSD in patient handling
- Practical guidance and future research





## Poll Q

Do you provide solutions to reduce MSD risk factors in healthcare?



## Starting point

### 1990's

- Musculoskeletal Disorders and Workplace Factors: NIOSH / U.S. Department of Health & Human Services
  - “A substantial body of credible epidemiologic research provides strong evidence of an association between MSDs and certain work-related physical factors when there are high levels of exposure and especially in combination with exposure to more than one physical factor (e.g., repetitive lifting of heavy objects in extreme or awkward postures”

### 2000's

- Hignett review: “Systematic review of patient handling activities starting in lying, sitting and standing positions”
- Tullar et al review: “Interventions in health-care settings to protect musculoskeletal health: a systematic review”
- In Ontario, MSD account for 45% of all lost-time claims in healthcare sector



## Risk factors for MSD

### Occupational factors:

- Repetition: high task repetition
- Force: forceful exertions
- Posture: repetitive or sustained **awkward** postures

### Individual Factors:

- Work practices: techniques, body mechanics
- Health habits: smoking, drinking, fitness, nutrition
- Rest and recovery: fatigue, sleep

Source: any biomechanics text, class, website ...



## Awkward Posture

Awkward posture refers to positions of the body that deviate significantly from the **neutral** position while performing work activities. When you are in an awkward posture, muscles operate less efficiently and you expend more force to complete the task.

Awkward Posture | Ergonomics @ Yale  
[ergo.yale.edu/awkward-posture](http://ergo.yale.edu/awkward-posture)

### **Examples:**

Working with the arms raised.

Bending at the back.

Bending at the neck.

Twisting.

Reaching.

Bending the wrists.

Kneeling or squatting.

Washington State OSHA

[http://www.lni.wa.gov/Safety/SprainsStrains/Awkward Postures/](http://www.lni.wa.gov/Safety/SprainsStrains/AwkwardPostures/)

## Patient Handling Risks

**Risks related to the patient:** Patients can not be lifted like loads; so safe lifting “rules” do not always apply

- Patients can not be held close to the body
- It is not possible to predict what will happen while handling a patient
- Patients are bulky and have no handles

**Risks related to the environment:**

- Slip, trip and fall hazards
- Uneven work surfaces
- Space limitations (small rooms, lots of equipment)

**Other risks:**

- No assistance available
- Inadequate equipment
- Inadequate footwear and clothing
- Lack of knowledge or training

- Source: <https://osha.europa.eu/en/tools-and-publications/publications/e-facts/efact28>





## Poll Q2

Do you think that awkward postures are an important risk factor?



## Evidence from the scientific literature

What did I do to prepare this presentation?

I asked an Information Specialist (IWH) to run a search based on the keywords from Tullar et al 2010

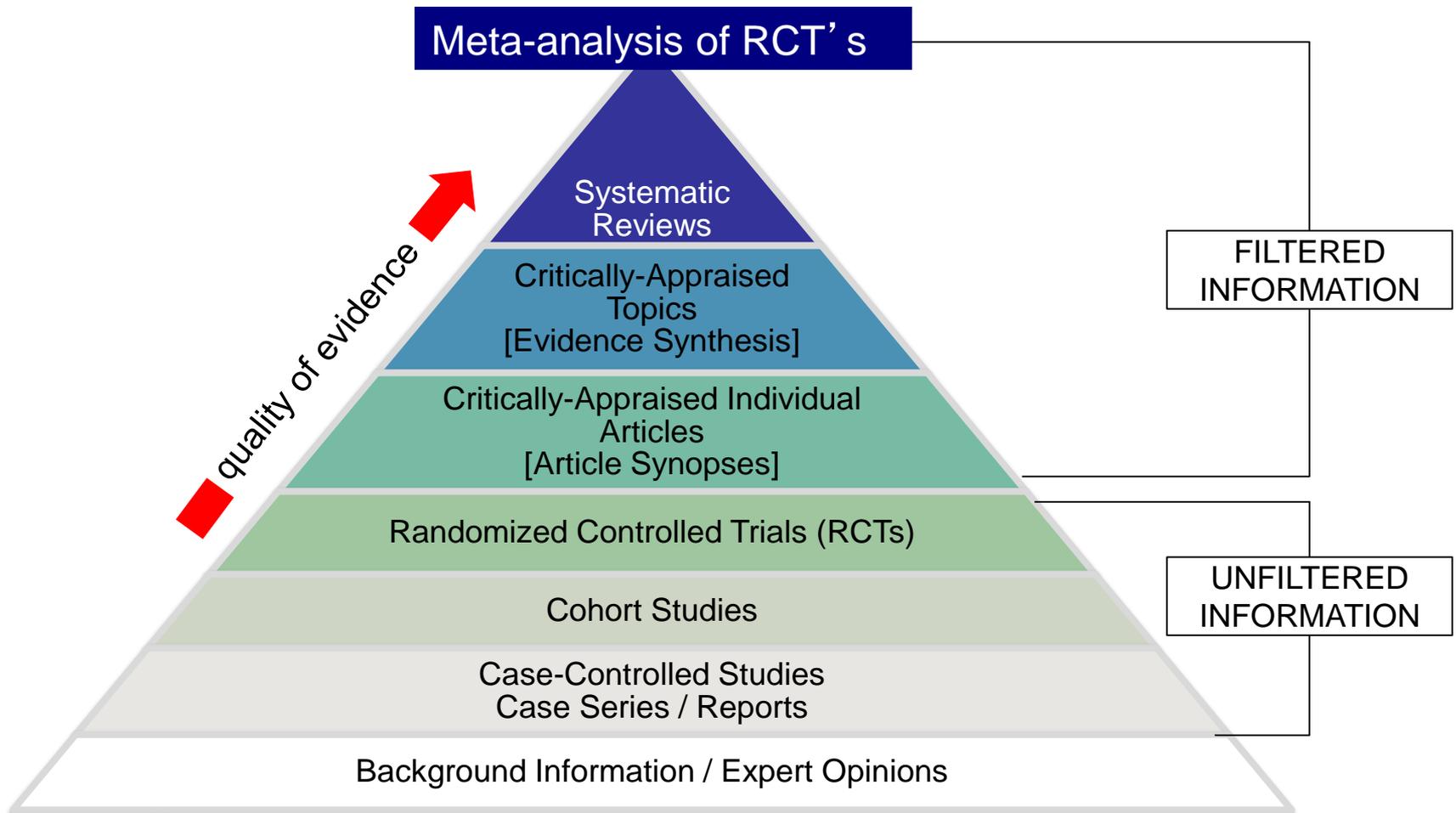
- Adding keywords related to posture and awkward posture to focus the search to the current topic
- Focussed on last 10 years

Looked for systematic reviews:

- Examining the association between awkward postures and MSD disorders in patient handling
- Examining effectiveness of interventions to reduce MSD related to patient handling

**NOTE: this is not a systematic review!!**

## Levels of Evidence





## Association between awkward postures and MSD

Found 13 reviews that explored the association between posture and MSD (10 systematic reviews, 3 literature reviews).

All of the reviews included patient handling studies.

The three literature reviews (Choi 2016; Milhem 2016; Galinsky 2001) reported that awkward postures in patient handling were associated with increased risk of MSD.

Choi SD, Brings K. *Work*. 2015;53(2):439-48.

Galinsky T, Waters T, Malit B. *Home Health Care Services Quarterly* 2001;20(3):57-73.

Milhem M, Kalichman L, Ezra D, Alperovitch-Najenson D. *International Journal of Occupational Medicine and Environmental Health* 2016;29(5):735-47.





## SR - Positive association

Author, year	Finding
da Costa and Vieira, 2010	The most commonly reported biomechanical risk factors with at least <b>reasonable evidence for causing WMSD</b> include excessive repetition, <b>awkward postures</b> , and heavy lifting.
Griffiths et al., 2012	Found <b>small to moderate ORs</b> for the association of mechanical exposures (including <b>non-neutral posture</b> ) and low back pain, although the relationships were complex.
Yassi and Lockhart, 2013	Overall studies showed that nursing activities <b>conferred increased risk for, and were associated with back disorders</b> regardless of nursing technique, personal characteristics, and non-work-related factors. <b>Patient handling</b> appears to confer the highest risk, but other nursing duties are also associated with elevated risk, and confound dose–response assessments related to patient handling alone.



## SR - Conflicting evidence of association

Author, year	Finding
Bakker, 2009	Evidence for associations for working with ones trunk in a bent and/or twisted position and LBP was <b>conflicting</b>
Ribeirio et al., 2012	Did <b>not find a clear dose–response relationship for work posture exposures and LBP</b> . Limited evidence was found for ROM and duration of sustained flexed posture as risk factor for LBP.
Wai et al., 2010	The results of this study indicate that there was <b>conflicting evidence</b> available to support a <b>causal relationship between bending and LBP</b> for the criteria association, dose-response and biological plausibility, and strong evidence against the criterion temporality. Based on the evidence reviewed, it was not possible to establish a clear causal relationship between occupational bending and LBP.
Wai et al., 2010	This review uncovered several high-quality studies examining a relationship between <b>occupational lifting</b> and LBP, but these <b>studies did not consistently support any of the Bradford-Hill criteria for causality</b> . There was moderate evidence of an association for specific types of lifting and LBP. Based on these results, it is unlikely that occupational lifting is independently causative of LBP in the populations of workers studied.



## SR - No evidence of association

Author, year	Finding
Roffey et al., 2010	There was <b>strong evidence</b> from six high-quality studies that there was <b>no association between awkward postures and LBP</b> .
Roffey et al., 2010	Studies reviewed <b>did not support a causal association between</b> workplace manual handling or <b>assisting patients and LBP</b> in a Bradford-Hill framework. It appears unlikely that workplace assisting patients is independently causative of LBP in the populations of workers studied.
Wai et al., 2010	This review <b>failed to identify high-quality studies</b> that supported any of the Bradford-Hill criteria to establish causality between occupational carrying and LBP. Based on these results, it is unlikely that <b>occupational carrying</b> is independently causative of LBP in the populations of workers studied.

Evidence from systematic reviews about the association between awkward posture and MSD is conflicting!

## Why are the messages not consistent?

- New studies add to the evidence base
- Heterogeneity
  - Outcomes
  - Measures
- Bias
  - Perhaps the biggest reason why literature review findings differ from systematic review findings...





## Traditional vs. systematic reviews

	<i>Non-systematic</i>	<i>Systematic</i>
QUESTION	Often broad on scope	Often a focused clinical question
SOURCES AND SEARCHES	Not usually specified Potentially biased	Comprehensive source and explicit strategy
SELECTION	Not usually specified Potentially biased	Criterion-based Uniformly applied
APPRAISAL	Variable	Rigorous Critical appraisal
SYNTHESIS	Qualitative summary (common)	Qualitative summary +/- Meta Analysis
INFERENCES	Sometimes evidence-based	Evidence-based



## Poll Q3

Now that you have seen the evidence from the scientific literature did this change your mind that awkward postures are an important risk factor related to MSDs?



## Evidence about interventions to prevent MSD

Found 7 systematic reviews that explored the effectiveness of interventions to prevent MSD in healthcare settings.

Categorized the findings according to intervention type.





## Training

Author, year	Finding
Clemes et al., 2010	The review identified <b>little evidence supporting the effectiveness</b> of both technique- and educational-based <b>manual handling training</b> . In addition, there was considerable evidence supporting the idea that the principles learnt during training are not applied in the working environment. Strength and flexibility training shows promise; however, further research is needed to ascertain whether such an intervention is sustainable over the long term.
Dawson et al., 2007	The review identified <b>moderate level evidence</b> from multiple trials that <b>manual handling training in isolation is not effective</b> and multidimensional interventions are effective in preventing back pain and injury in nurses. Single trials provided moderate evidence that stress management programs do not prevent back pain and limited evidence that lumbar supports are effective in preventing back injury in nurses. There is conflicting evidence regarding the efficacy of exercise interventions and the provision of manual handling equipment and training.

## Small Aids

Author, year	Finding
Freiberg et al., 2016	To date, there is no convincing evidence (from [3] low-quality studies) for the preventability of musculoskeletal complaints and diseases by the use of <b>small aids</b> . The literature also lacks evidence for the opposite.
Hignett, 2003	<b>Evidence support the use</b> of hoists (for non-weight bearing patients), standaids, sliding sheets (double thickness rollers), lateral transfer boards, walking belts and adjustable height beds and baths. [Moderate and Limited evidence]





## Lifts and more

Author, year	Finding
Burdorf et al., 2013	The <b>best scenario</b> , based on observational and experimental studies, showed a <b>maximum reduction in LBP prevalence</b> from 41.9% to 40.5% and in MSD injury claims from 5.8 to 5.6 per 100 work-years. This study indicates that good implementation of lifting devices is required to noticeably reduce LBP and injury claims.
Verbeek et al., 2012	<b>None</b> of the 18 included RCTs and CCTs <b>provided evidence</b> that training and provision of assistive devices prevented LBP when compared to no intervention or another intervention.
Tullar et al., 2010	<b>moderate level of evidence</b> for exercise interventions and multi-component patient handling interventions. A multi-component intervention includes a policy that defines an organizational commitment to reducing injuries associated with patient handling, purchase of appropriate lift or transfer equipment to reduce biomechanical hazards and a broad-based ergonomics training program that includes safe patient handling and/or equipment usage.



## Review of reviews plus realist review

Author, year	Finding
Thomas and Thomas, 2014	<p>Five of the six systematic reviews covered interventions involving either staff training or training and equipment supply. One review covered multi-component interventions. <b>All concluded that training staff by itself was ineffective.</b> There were <b>differing conclusions regarding the effectiveness of training and equipment interventions and multi-component programmes.</b></p> <p>The realist synthesis noted the need for management commitment and support, and <b>six core programme components</b>; a <b>policy</b> requiring safe transfer practices, <b>ergonomic assessment</b> of spaces where people are transferred, transfer <b>equipment</b> including lifts, <b>specific risk assessment</b> protocols, <b>adequate training</b> of all care staff, and coordinators coaches or <b>resource staff</b>. These programme components are likely to be synergistic; omitting one component weakens the impact of the other components.</p>



## Types of reviews

Type:	Systematic Review	Realist
Feature:		
Question	Focused	Broad: complex theory-based
Search strategy	Described, comprehensive	Known, and Iterative
Selection of studies	Uniformly applied criteria, rigorous	Known, and iterative
Inferences	Clearly based on scientific evidence	Explanatory rather than 'judgmental'
Advantages	Replicable, resolve discordance	Contextualized (what works, for who, when?)

## Why are the messages not consistent?

- New studies add to the evidence base
  - Inclusion criteria based on study design
- Heterogeneity
  - Outcomes
  - Measures
  - Interventions
- Analysis methods
- Bias





## Limitations and strengths

This is not a systematic review of the literature! One persons selection and synthesis

The search was limited but focussed on recent years (~last 10)

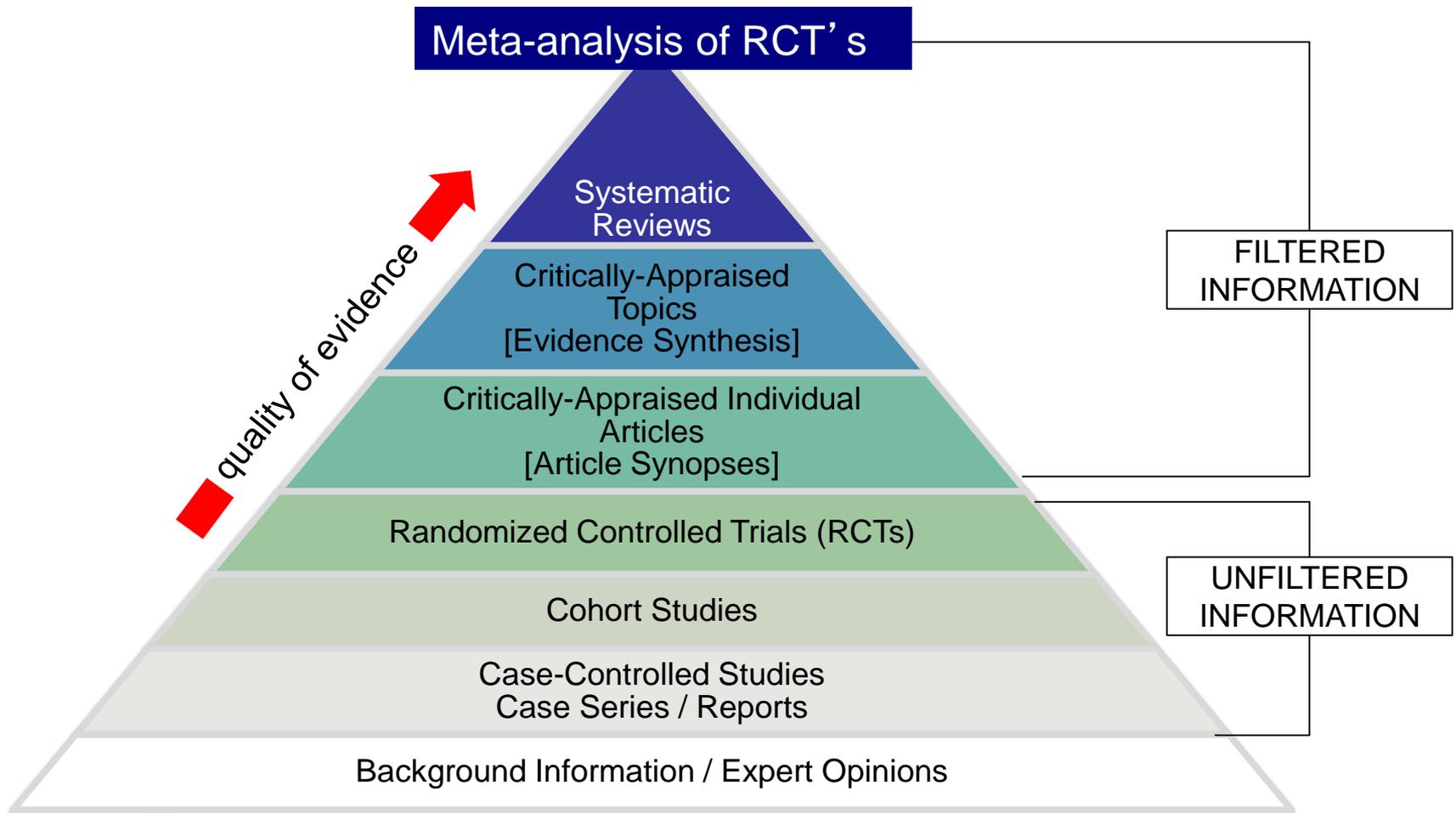
Found systematic reviews that were on topic but synthesis was rapid and lacked critical review of methodology

Found one review of reviews





## Levels of Evidence





## Practical guidance

Posture is one of many factors to consider as a risk for MSD in healthcare settings. The scientific evidence is not consistent due to the challenges of measurement (both exposure and outcome). It is difficult to disentangle the contribution of posture in patient handling.

The evidence from the scientific literature about the effectiveness of interventions to prevent MSD is also conflicting, however

- There seems to be consistent evidence that training alone is not effective
- There is a support for multi-component interventions as effective to prevent/reduce MSD
- Implementation of interventions is important



# Evidence Based Practice (EBP)

## Evidence from:



Practitioner  
expertise



Best available  
research



Client/Worker  
experience

Adapted from Sackett et al. (1996) *Evidence based medicine: what is it and what isn't it.*



## Final words

The lack of evidence from the scientific literature is due to the lack of high quality studies with:

- Consistent good quality measures (exposure and outcome)
- Well implemented interventions

More high quality research is necessary **BUT** only with good quality measures and well implemented interventions!

*The lack of practical guidance for many patient handling interventions reflects the lack of available studies, not necessarily the effectiveness of the interventions.*



## Poll Q4

Will this summary of the scientific evidence change your current practices?



# Thank you





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The views expressed in this document are those of the authors and do not necessarily reflect those of the Province of Ontario.



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