Teaching Musculoskeletal Clinical Skills: A Best Evidence in Medical Education (BEME) Systematic Review of Techniques and Their Efficacy

Alexandra O’Dunn-Orto, Lisa Hartling, Sandy Campbell and Anna Oswald

Faculty of Medicine and Dentistry
University of Alberta
Edmonton, Canada
Our Team

• Alexandra O’ Dunn-Orto, BA
  – 2nd year medical student, summer studentship
• Lisa Hartling, MSc, PhD
  – Director, Alberta Research Centre for Health Evidence &
  – Director, University of Alberta Evidence-based Practice Center
• Sandy Campbell, BA, MLS, AALIA (CP)
  – Public Services Librarian & library liaison to our Faculty
• Anna E. Oswald, MD, MMEd, FRCPC
  – Consultant Rheumatologist
  – MSK Preclinical course coordinator
  – Royal College of Physicians and Surgeons of Canada Clinician Educator
Who Cares? – We do!

- Musculoskeletal (MSK) complaints: 12-20% primary care visits in Canada

- MSK physical examination (PE) skills weak in practicing physicians

- Shortage of specialist faculty able to effectively teach this subject
Study Methods

• Key Inclusions:
  – Medical trainees & Drs
  – Structured teaching interventions
  – Controlled comparative studies only
  – Learner attitude, knowledge, skills, behaviour outcomes
  – English language

• Key Exclusions:
  – Learner reaction/Teacher Evals
  – Non structured teaching (e.g. shadowing, mentoring, clinical experience)
  – MSK knowledge or procedural skills without clinical skills teaching
  – Uncontrolled studies (e.g. uncontrolled before-after, prevalence assessments, needs assessments…)
Title and abstract screening: 2 independent reviewers

Potentially relevant studies identified from databases (n = 5,089) and reference lists (n = 354)

Excluded abstracts (n = 4,847)

Application of inclusion form to full texts: 2 independent reviewers

Full text articles obtained from electronic databases, reference lists (n = 242) and grey literature (n = 23)

Excluded studies (n = 239)

Comparison of studies for multiple publications or overlapping data: 1 reviewer

Studies relevant to review question (n = 26)

Excluded studies (n = 2)

Final number of included articles (n = 24)

Methodology assessment: 2 independent reviewers

Assessment of methodological quality

Data extraction: 1 reviewer + cross check of 20% of articles by a 2nd reviewer

Data synthesis
Review Characteristics

• Total number of participants involved in the trials reviewed > 2500

• 18/24 studied undergraduate medical students
  – Remainder studied residents, practicing physicians or a combination of training levels

• 15/24 studies: MSK OSCEs as primary outcome
  – Remainder measured knowledge via written test scores or student confidence
Patient educators (9/24)

Small groups, interactive learning (5/24)

Computer assisted learning (4/24)

Other (6/24)
Patient Educator Studies (9/24)
Small group interactive learning (5/24)
Computer assisted learning (4/24)
## Quality Assessments

<table>
<thead>
<tr>
<th>Type of study</th>
<th>Number</th>
<th>Common sources of bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomized controlled trials</td>
<td>12</td>
<td>10/12: inadequate blinding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6/12: incomplete/unclear data presentation</td>
</tr>
<tr>
<td>Cohorts</td>
<td>12</td>
<td>9/12: unclear/absent description of blinding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8/12: incomplete/absent control of participant characteristics</td>
</tr>
</tbody>
</table>

• Only 3/24 studies provided power calculations
Conclusions

- Majority of effective MSK clinical skills teaching interventions maximize engagement and realistic context.
- Most studies supported patient educators, interactive small group learning and computer-assisted learning.
- Alternate instructional methods may maximize teaching efficiency when instruction time and resources are limited.


Potentially relevant studies identified from electronic databases \( (n = 5,089) \) and reference lists \( (n = 354) \)

- Abstracts excluded based on screening criteria \( (n = 4,847) \)

- Full text articles obtained for potential inclusion from electronic databases and reference lists \( (n = 242) \) and grey literature \( (n = 23) \)

- Studies excluded based on inclusion/exclusion criteria \( (n = 239) \)

- Studies relevant to review question \( (n = 26) \)

- Studies excluded due to multiple publications or overlapping data \( (n = 2) \)

Final number of included articles \( (n = 24) \)