


## REVIEW ARTICLE

# Review article: Methodology for the ‘rapid review’ series on musculoskeletal injuries in the emergency department

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## Abstract

Musculoskeletal injuries are a common presentation to the ED, with significant costs involved in the management of these injuries, variances in care within the ED and associated morbidity. A series of rapid review papers were completed to guide best practice for the assessment and management of common musculoskeletal injuries presenting to the ED. This paper presents the methodology used across the rapid reviews. PubMed, CINAHL, EMBASE, TRIP and the grey literature, including relevant organisational websites, were searched in 2015. The search was repeated consistently for each topic area (injuries of the foot and ankle, knee, hand and wrist, elbow, shoulder, lumbar spine and cervical spine). English-language primary studies, systematic reviews and guidelines that were published in the last 10 years and addressed acute musculoskeletal injury management were considered for inclusion. Data extraction of each included article was conducted, followed by a quality appraisal. The

extracted data from each article was synthesised to group similar evidence together. For each rapid review, the evidence has been organised in a way that a clinician can direct their attention to a specific component of the clinical cycle of care in the ED, such as the assessment, diagnostic tests, management and follow-up considerations from ED. The series of rapid reviews are designed to foster evidence-based practice within the ED, targeting the injuries most commonly presenting. The reviews provide clinicians in EDs with rapid access to the best current evidence, which has been synthesised and organised to assist decision-making.

**Key words:** *emergency medicine, evidence-based practice, musculoskeletal diseases, review, wounds and injuries.*

## Introduction

The demand on EDs throughout Australia is increasing.<sup>1</sup> The

## Key findings

- A protocol for rapid reviews of the literature for the assessment and management of commonly presenting musculoskeletal injuries to the ED is presented.
- Key elements to the protocol include: search strategy, study selection guide, data collection and extraction procedures, and data analysis.
- This protocol can be used to quickly derive the best practice management for musculoskeletal injuries in the ED.

associated congestion in EDs can be attributed to population growth, shortage of affordable alternative services such as bulk-billing general practitioners (GPs), the inadequacy of Medicare item numbers for services offered by GPs and access block.<sup>2</sup> Musculoskeletal injuries are a common presentation to the ED, constituting five of the top 20 diagnostic groups in EDs throughout Australia.<sup>1</sup> There is also an increasing trend for patients with low-acuity complaints, such as musculoskeletal injuries, to use EDs as their primary mode of access to healthcare.<sup>3,4</sup>

‘Musculoskeletal disease’ and ‘Injury’ diagnostic groups are the fourth and fifth highest disease groups in health expenditure in Australia, respectively, incurring a

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Accepted 18 April 2017

total cost of over \$10 billion per year.<sup>5</sup> The financial impact is high, with significant costs for labour, equipment, infrastructure, follow-up care coordination and rehabilitation,<sup>6</sup> which the ED care directly contributes towards. The decisions made in the ED surrounding follow-up care can also influence productivity costs, such as days lost at work following the injury. In addition to this, inappropriate use of resources within the ED setting for some musculoskeletal presentations can consume resources that could otherwise be used for higher acuity care.

Improving the quality and cost of care has become increasingly important to patients, clinicians, organisations, policy-makers and purchasers of care. Musculoskeletal injuries are now managed with different ED models of care, utilising varied clinical personnel,<sup>7</sup> which can drive efficiency in the ED but also introduces variances in the assessment and treatment options for these patients. Medical staff provide a significant proportion of care to musculoskeletal injuries in the ED context. However, there are vastly different levels of clinical experience from the intern through to the Emergency Physician. Furthermore, nurse practitioner and advanced scope of practice physiotherapy roles have gained popularity in the last decade for the management of musculoskeletal injuries in the ED in an effort to ensure the right patients are seen and assessed by the right provider. With variance in the clinical personnel seeing these patients, there are documented differences in the management and follow up of musculoskeletal injuries,<sup>8–12</sup> which can ultimately affect patient experience and outcomes both within the ED and during recovery phases of care.<sup>13–17</sup> Given the rising burden of musculoskeletal diseases and the impact on health expenditure, acute musculoskeletal injuries requiring ED services can, and should, be managed appropriately in this setting.

As Australian EDs continue to become busier, the need for timely, efficient and effective evidence-based practice contributes to, yet transcends the need for, performance against time-based targets. ED staff

have previously raised concerns that time pressures can lead to inappropriate admissions and referrals, impede access to imaging and pharmacy because they are perceived as barriers to meeting targets, compromise clinicians' ability to care for patients and place pressure on staff to make decisions without sufficient time to create a management plan.<sup>18</sup> Consequently, in an already complex environment, this might increase the risk of adverse outcomes, such as missed diagnosis, inferior clinical outcomes, re-representations and poorer patient satisfaction for all patients presenting to the ED, including those with musculoskeletal complaints. Given this, it is imperative that ED clinicians have rapid access to synthesised best evidence in order to maximise the time they spend delivering direct patient care.

To address these issues, a series of *rapid reviews* of peer-reviewed literature were undertaken. Rapid reviews are an assessment of what is already known about a policy or practice issue, using systematic methodology to review the literature but making concessions to the traditional breadth and depth of the systematic review process.<sup>19,20</sup> This style of review process was chosen as it allows for the completeness of searching and the synthesis and analysis of evidence to be conducted within shortened time frames by limiting particular aspects of the systematic review process, as chosen by the reviewer. This can include focusing the research question, using broader or less-sophisticated search strategies, extracting only key variables and performing 'simple' quality appraisal.<sup>20</sup>

The authors conducted a series of rapid reviews for commonly presenting injuries of the foot and ankle, knee, hand and wrist, shoulder, lumbar spine and cervical spine. These areas represent approximately 90% of all musculoskeletal and orthopaedic diagnostic areas as determined by the Emergency Department Information System (EDIS) for all EDs across Queensland for a 1-year period in 2013–2014. These reviews will present best practice clinical elements of care to guide the management of musculoskeletal injuries within the ED.

## Methods

### Study design

This was a series of rapid reviews of the scientific literature that closely adhered to the National Health and Medical Research Council (NHMRC) guidelines for systematic reviews.<sup>21</sup> The methodology was replicated for each of the reviews, and these were conducted between March and July 2015.

### Search strategy

Database searches were conducted of PubMed, CINAHL, EMBASE and TRIP, combining keywords and MeSH terms for emergency medicine, best practice and the body region or injury of interest. The search terms were structured for individual database searches in order to maintain an overall search methodology that was consistent across the different databases. The year of publication was limited from 2005 to 2015. The grey literature was also searched, including web-based literature and websites of organisations and societies pertaining to musculoskeletal injuries in the ED setting. Duplicates and non-English-language articles were excluded.

### Study selection

The criteria for inclusion were articles that addressed acute musculoskeletal injury assessment, management or prognosis in the context of the ED or acute setting. Articles on paediatrics alone, chronic conditions and pain states (e.g. carpal tunnel syndrome or fibromyalgia) and major trauma (including high velocity trauma and life- or limb-threatening injuries) were excluded. Primary studies, systematic reviews and guidelines were considered for inclusion. Of the primary studies, only Level II studies, as per the NHMRC levels of evidence hierarchy,<sup>22</sup> were included where possible (i.e. highest level of intervention, diagnostic accuracy and prognostic studies). Level III-1 studies or lower were included where safety and ethics concerns might have limited prospective research in that area. Systematic reviews of all evidence levels were

included. Guidelines were included if the methodology for development was clearly documented. Qualitative studies, conference abstracts, commentaries and Letters to the Editor were excluded. The recency of publication and inclusion/exclusion criteria were used to ensure that the included articles were relevant to the majority of ED musculoskeletal injury presentations and to enable the review to be completed within a short time frame while still using systematic methodology.

### *Data collection and extraction*

One reviewer (KS) independently screened all titles, abstracts and full-text articles, eliminating articles at each stage by applying the inclusion and exclusion criteria. Any article where inclusion/exclusion criteria were not obvious was discussed and resolved with the research team at each stage of article elimination. The PRISMA checklist<sup>23</sup> guided the structure and reporting of the reviews. One of two people from the research team extracted data from each included article using a standardised form that was developed for the rapid reviews, and this was reviewed for accuracy by a third person (KS). Core data elements included study design, objective, setting, patient population, methods and interventions, outcomes, appraisal of methodology, main findings and limitations. The core data elements have been tabulated and will be presented in each rapid review. Articles were included in the study regardless of the methodology, sample size and outcomes used. Any biases or limitations identified during the data extraction phase were tabulated. The results and conclusions extracted from each included article form the basis of the 'best practice' evidence.

### *Data analysis*

Each article was independently assigned a level of evidence by two members of the research team. Disagreement was resolved by reaching consensus, and the research team was consulted if agreement could not be reached. The NHMRC levels of evidence hierarchy was chosen to

rate the levels of evidence as the scope of the reviews was quite broad, yielding articles utilising many different research designs (i.e. intervention, diagnosis, prognosis, aetiology and screening studies). Some systematic reviews, and all guidelines, used a quality grading system other than the NHMRC hierarchy; therefore, insufficient information was available to be able to grade these articles against the NHMRC levels of evidence. These articles were still included, and the article's level of evidence and particular quality grading system used were presented alongside their tabulated results.

The results from each included article were then grouped together into assessment, diagnostic tests, pharmacological management, non-pharmacological management and follow-up care categories. The results were tabulated alongside each other in these categories, regardless of level of evidence. Article results and conclusions that were consistent with, or similar to, other articles or were of the highest level of evidence were then summarised into clinical cycle-of-care flow charts, highlighting the key practice points drawn from the included articles.

## **Results**

Rapid reviews have been completed for injuries of the ankle and foot, knee, wrist and hand, shoulder, lumbar spine and cervical spine. The reviews have been organised to present best practice guidelines according to five important components of the clinical cycle in the ED: the assessment, diagnostic tests, pharmacological and non-pharmacological management and specific considerations on discharge that might be related to prognosis or certain risk factors.

## **Discussion**

The purpose of this series of rapid reviews is to evaluate the best available literature across the clinical cycle of musculoskeletal injury management in the ED. Musculoskeletal injuries and conditions are a

common presentation to the ED, with associated financial impacts both within the ED and for follow-up care, contributing heavily to the burden of disease in Australia. The reviews are designed to foster evidence-based practice within the ED, which is especially important given that there is now a number of different personnel and models of care involved in the management of musculoskeletal injuries.<sup>7</sup>

Another goal of providing quality care is to accomplish high value for patients, where value is considered the health outcomes achieved per dollar spent.<sup>24</sup> It is recognised in the literature that care delivery needs to be individualised and organised around medical conditions, rather than patients being broadly grouped together. This structure, which is organised around the individual patient's needs, results in care of higher value and improved patient experience.<sup>25</sup> Value-based healthcare is an evolving priority, with campaigns such as 'Choosing Wisely Australia' drawing attention to tests, treatments and procedures that are lacking in evidence and that can have no clinical benefit, expose the patient to undue risk of harm and increase financial costs.<sup>26</sup> These rapid reviews highlight some of the different approaches needed for specific injuries or patient groups, where not every musculoskeletal injury should be assessed, investigated and managed in the same way.

While these rapid reviews target acute injury presentations in the ED context, they are highly relevant to other primary health clinicians who also manage these types of acute injuries. These clinicians include GPs, sports physicians, orthopaedic and neurosurgery specialists, physiotherapists and other musculoskeletal clinicians. It is well recognised, and indeed necessary, that better management in the primary care sector can reduce the burden of musculoskeletal injuries and diseases and also reduce the demand on already busy EDs.

These reviews are the foundation of a broader research project that focuses on measuring the quality of care of patients with a

musculoskeletal injury in the ED. Existing quality indicators for musculoskeletal injuries in EDs cover a very narrow scope, addressing some aspects of pain management and appropriate imaging of the spine only.<sup>27</sup> The development of good-quality indicators involves a rigorous and evidence-based methodology.<sup>28</sup> As such, this project included the completion of the rapid reviews to ensure the indicators are based on the current literature. Prospective multi-centre evaluation will follow to objectively develop musculoskeletal quality indicators for emergency healthcare providers to identify, measure and target areas for quality improvement.

### Limitations

A number of limitations within this series of rapid reviews are acknowledged. First, strict inclusion criteria was used, including only English-language articles of the last 10 years, which might have excluded older, potentially relevant and important articles. However, the inclusion of systematic reviews was expected to capture any relevant results from pre-dated articles. Second, limiting the inclusion criteria to Level I or II evidence, or systematic reviews and guidelines with robust and explicit methodology, might have excluded some lower-level evidence on the NHMRC hierarchy that might still have been of clinical relevance. Third, utilising one author to apply inclusion and exclusion criteria prior to data extraction might have introduced selection bias of included articles. Additional author biases were mitigated by independently using two authors during the data extraction and levels of evidence steps. Last, while the levels of evidence were allocated to primary studies and most systematic reviews, the heterogeneity of study designs for the remainder of articles meant that a formal quality appraisal tool could not be used to critically appraise the evidence in some systematic reviews and all guidelines. Limitations for each of the included studies were extracted, including the identification of any obvious biases or methodological flaws.

### Conclusions

This rapid review series provides the current evidence base for the clinical cycle of care for musculoskeletal injuries in ED, covering the initial assessment, diagnostic tests, pain management and treatment and considerations on discharge and/or follow up.

### Acknowledgements

Funding by the Emergency Medicine Foundation assisted with the completion of these rapid reviews. The research team also acknowledges the contribution of Mr Joseph Danicic.

### Competing interests

AB is a section editor for *Emergency Medicine Australasia*.

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