

# Optimum deployment of a novel Physiotherapy resource in the Irish healthcare system

Fergal Mehigan

Overseen by Dr. Damien Ryan

Fontys University of Applied Sciences

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# Introduction

Emergency department (ED) overcrowding remains a widespread and longstanding challenge for healthcare systems across the world. Hospital-based emergency care is under increasing strain due to higher patient demand, staff shortages, and increased case complexity (1). Traumatic injury adds substantially to this burden, causing over four million deaths worldwide annually and leaving hundreds of millions with non-life-threatening injury requiring acute treatment (2).

To address and relieve these pressures, healthcare systems have developed models of urgent care delivery to ease ED overcrowding and improve patient flow (1,2). Examples of these alternative interventions include Injury Units, Minor Injury Units (MIUs), Urgent Care Centres (UCCs) and Walk-in Clinics. These facilities focus on the rapid assessment and treatment of non-life and non-limb-threatening injuries, offering an alternative to EDs for patients with less serious conditions (3). The way these services are organised, and the scope of care they provide, differ from one health system to another.

In the United Kingdom, MIUs and Urgent Treatment Centres play an important role within the National Health Service's emergency care pathways. In the United States, UCCs have rapidly expanded, often operating as privately owned, convenient, and lower-cost alternatives to EDs (4). In Australia and New Zealand, Urgent Care Clinics provide a bridge between general practice and hospital emergency departments, operating at extended hours to improve access (2). In Israel, community-based urgent care centres have been introduced, and evidence shows they have reduced ED demand and improved patient satisfaction (5).

Internationally, physiotherapists have been integrated into urgent and emergency care as first-contact practitioners for musculoskeletal injuries, where they diagnose, triage, manage treatment, and refer for imaging as needed. Evidence shows that advanced practice physiotherapists can safely assess and manage these patients while providing care that is comparable to that of medical staff (10). Such roles are increasingly being adopted to improve patient flow and reduce reliance on traditional emergency models, particularly for non-life-threatening injuries, similar to those seen in Irish Injury Units.

In Ireland, Injury Units were introduced through the Health Service Executive's (HSE) Emergency Medicine Programme (EMP), which was launched in 2012 to strengthen the safety and quality of emergency care (1,8). The EMP aimed to reduce waiting times and provide care as close to home as possible by introducing Injury Units to manage non-life-threatening injuries while helping relieve the pressure on EDs (2,3). These units are generally staffed by doctors, advanced nurse practitioners, and radiographers, with access to diagnostic services such as X-ray imaging (3,9). They operate during extended daytime hours, usually seven days a week, though not on a 24/7 basis like EDs (4,5). Studies from Ireland suggest that Injury Units improve patient satisfaction, reduce healthcare costs, and offer shorter waiting times compared to EDs (8). The Irish Association for Emergency Medicine (IAEM) has also published standards outlining their role in providing safe, effective, and efficient care within the urgent care pathway (7).

While the introduction of Injury Units has been shown to be beneficial, there is a lack of evidence on the benefits of physiotherapists within Injury Units, despite Injury Units predominantly focusing on musculoskeletal trauma (10). Additionally, there is a lack of longitudinal studies with limited long-term research on IU performance and little research on the link and effect of IU's impact on primary care, rehabilitation and community services

In 2025, in Ireland, the HSE mooted a new grade of advanced health and social care practitioner for the first time, with 3 Injury Units due to appoint a single Advanced Physiotherapist to their clinical staff in early 2026. This literature review aims to examine the potential role of advanced physiotherapists within Injury Units and their potential impact on patient satisfaction, waiting times, length of stay and patient experience time.

## Methods

### Study Design

This study was conducted as a systematic review, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (13). A systematic review design was chosen because it allows for a comprehensive and structured synthesis of all available evidence to answer the specific research question (11).

Systematic reviews are considered the gold standard in evidence-based practice, as they use explicit, reproducible methods to minimise bias while aggregating findings from multiple studies (12). This approach was deemed most appropriate given the professional context: identifying the optimal role of physiotherapists in injury units required collating diverse studies in a transparent way.

Additionally, conducting a review (rather than new primary research) was feasible within the timeframe and resources available, and it avoided the logistical constraints of recruiting participants, which would have been difficult under the project's time limits. By relying on existing literature, the review could efficiently provide evidence-based conclusions to inform practice.

### Search Strategy

A search strategy based on the Population–Intervention–Comparison–Outcome (PICO) framework was used. The population of interest is patients attending emergency departments (EDs) or injury units, and the intervention/exposure is the involvement of physiotherapists, including advanced practice or primary contact roles. Outcomes of interest included patient flow measures (e.g., waiting time, treatment time, length of stay) and patient-oriented outcomes (e.g., satisfaction, referral rates).

Searches were conducted in PubMed and CINAHL, searches combined keywords related to emergency care settings, physiotherapy roles, and relevant outcomes, using Boolean operators and truncation, and were adapted for each database. Studies published in English from 2015 to 2025 were included to reflect the development of practice and the implementation of Injury Units. Reference lists of included studies were also screened to identify additional relevant articles.

### Eligibility Criteria

#### Inclusion Criteria:

Studies had to meet all the following conditions to be included in the review (with rationale for each):

- Physiotherapist delivered care in an acute injury/ED setting: The study involved physiotherapists working in emergency departments, injury units, or similar acute care settings. This criterion focuses the review on the context in which physiotherapists can

directly impact wait and treatment times (excluding non-acute or community settings that are not relevant to ED flow).

- Relevant outcomes reported (patient flow or safety/quality metrics): Studies that reported outcomes relevant to advanced practice physiotherapy services, such as waiting times, treatment duration, patient satisfaction, referral rates, safety outcomes, or diagnostic accuracy.
- Quantitative or mixed-methods study design: We included randomised controlled trials, non-randomised quantitative studies, mixed-methods studies, and relevant systematic reviews.
- Publication in English after 2015: This ensured up-to-date and contextually relevant findings and avoided older care models no longer in use, on top of making sure they were after the implementation of injury units.
- Adult population (typically age  $\geq 16$  years): Paediatric emergency care differs in structure and practitioner roles, so these were excluded.
- Comparable healthcare setting to HSE injury units: Ensured local applicability by including systems analogous to the Irish HSE model.
- Aligned with HSE injury unit service criteria: Focused on musculoskeletal minor injuries, not major trauma or non-urgent care. This includes minor trauma back pain, which is occasionally treated in Injury Units.

### Exclusion Criteria:

- Non-acute setting
- Irrelevant outcomes
- Ineligible publication types
- Non-English or pre-2015
- Paediatric population
- Different healthcare systems or service models

All inclusion and exclusion criteria were defined based on the review objectives and stakeholder consultations.

### Screening and Study Selection

The study selection process followed PRISMA guidelines <sup>(13)</sup>. A title and abstract screening phase was carried out. Papers that clearly failed to meet the criteria were excluded. Next, full-text screening assessed eligibility in detail. Reasons for exclusion were logged. Disagreements were resolved through discussion. Ultimately, 6 studies met all criteria. A PRISMA flow diagram (Figure 1) shows the full screening pathway. See Appendix for flow diagram.

### Quality Assessment

Primary research studies ( $n = 4$ ) were assessed using the Downs and Black checklist <sup>(14)</sup>, which evaluates reporting, validity, and power for both RCTs and non-RCTs. Scores ranged from 14–23/28.

One was rated "good" quality; the rest "fair." This tool was selected for its applicability across study designs (14). See figure 2 in appendix

Review articles (n = 2) were assessed using the QATTL tool (16), specifically designed for literature and theory-based reviews. Both scored in the "Good" category. See figure 3 in appendix. Using separate, appropriate tools for primary vs. review studies enabled fair comparisons. All studies were then assessed using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) scale, which rates the certainty of the research evidence (High, Moderate, Low, Very Low). See table 4 in appendix.

## Data Extraction and Synthesis

Data from the 6 included studies were extracted using a standardised form and compiled into a comparison table (Appendix). Key variables included citation, aim, population, year, setting, results, conclusions, and quality score. Narrative synthesis was used due to heterogeneity in design and outcome measures.

## Ethical Considerations

Ethical approval was not required for this study because it did not involve primary data collection or human participants. The study is a systematic review based only on publicly available, peer-reviewed literature. The research was conducted responsibly, following principles of research integrity, including honesty and transparency. Study selection, data extraction, and reporting were carried out carefully and accurately. The limitations of the review were clearly stated to avoid overinterpretation of the findings. All sources were properly cited, and data were handled responsibly throughout the study.

## Stakeholder Engagement

Key stakeholders (client physiotherapist and ED leadership) helped shape the research question, inclusion criteria, and interpreted findings in follow-up meetings. Their practical insights supported relevance and translation to real-world practice. Stakeholder collaboration was a strength of this review, contributing to its applicability and impact (12).

Table 1

Article/Author/ Year	1) Direct-access physiotherapy to help manage patients with musculoskeletal disorders in an emergency department- Gagnon 2021	2) Primary contact physiotherapy services reduce waiting and treatment times for patients presenting with musculoskeletal conditions in Australian emergency Departments- Bird 2016	3) Emergency department after-hours primary contact physiotherapy service reduces analgesia and orthopaedic referrals while improving treatment times- Henderson 2020	4) Impact of the primary contact physiotherapy practitioner role on emergency department care for patients with musculoskeletal injuries in New South Wales- Alkhouri 2019	5) Benefits of Musculoskeletal Physical Therapy in Emergency Departments- Matifat 2019	6) The effectiveness of allied health and nurse practitioner models-of-care in managing musculoskeletal conditions in the emergency department- Vella SP 2024

Aim	Evaluate whether direct-access physiotherapy in the ED improves clinical outcomes and reduces resource use for MSK disorders compared to usual physician care	Determine whether primary contact physio (PCP) reduces waiting time and treatment times for ED MSK presentations	Evaluate whether an after-hours primary contact physiotherapy service impacts treatment time, analgesia use, and orthopaedic referrals	Examine the impact of primary contact physiotherapy on ED care for MSK injuries	Investigate the benefits of MSK physiotherapy services delivered in ED's.	Evaluate the effectiveness of allied health and nurse practitioner models of care, including physiotherapy, for MSK conditions in ED's.
Population	Adults with MSK disorders (triage 3-5) presenting to the ED 78 patients total 40 patients(physio) 38 patients(physician)	Adults presenting to ED with MSK complaints (10 hospitals) 14,452 patients	Adults presenting after-hours with MSK injuries Total Patients: not stated	Adults presenting with MSK injuries to ED (19 EDs) Total patients: not stated	MSK presentations across ED settings internationally	Adults with MSK conditions presenting to EDs globally
Study Design	Prospective observational	Prospective observational	Prospective observational	Randomized controlled Trail	Systematic review	Systematic review & meta-analysis
Location	Quebec, Canada	Australia	Australia	NSW, Aus	Worldwide (systematic review) (15 studies)	Worldwide (systematic review & meta-analysis) (multiple studies not stated exact no.)
Model of care/comparator	Direct-access physiotherapy/ usual medical care	PCP/medical and nursing staff	PCP/Secondary contact physiotherapy (SCP)	PCP/SCP	ED physiotherapy model/ usual ED care	Allied health & NP-led models/ Physician-led care
Overall results	physiotherapist group had lower pain scores, improved function, fewer imaging tests, and fewer return visits at 1 and 3 months	PCP significantly reduce waiting times, treatment duration, and ED length of stay compared with standard care	PCP care reduced orthopaedic referrals, reduced analgesia use, and shortened treatment times compared with standard after-hours care	PCP model reduced length of stay, improved time-to-treatment, reduced imaging use, and improved patient satisfaction	Consistent improvements in waiting time, reduced imaging, improved satisfaction, and reduced re-presentations in EDs with physiotherapy services	Allied health-led care reduces wait times, improves flow, and delivers outcomes comparable to or better than standard ED medical care
Quality score	23/28 (good)	15/28 (fair)	14/28 (fair)	16/28 (fair)	Good (4pts)	Good (4pts)

# Results

## Characteristics of included studies and models of care

Six studies published between 2016 and 2024 were included, comprising four prospective observational studies, one randomised controlled trial, and two systematic reviews. The studies examined primary contact or direct-access physiotherapy models for managing musculoskeletal (MSK) conditions in emergency departments (EDs).

Participants were adult patients presenting to EDs with MSK injuries or disorders, primarily low-acuity cases. Sample sizes ranged from 78 patients to over 14,000, with additional international evidence drawn from systematic reviews. Most studies were conducted in Australia, with one from Canada and broader international data were included via systematic reviews. Intervention models involved physiotherapists acting as first-contact practitioners, compared with physician-led or secondary-contact physiotherapy care.

Across studies, physiotherapy-led models consistently resulted in reduced waiting times and length of stay, lower use of imaging and analgesia, fewer orthopaedic referrals, and improved or comparable clinical outcomes and patient satisfaction.

Study quality ranged from fair to good, with stronger evidence from the randomised trial and systematic reviews.

## Clinical Outcomes

Three of the 6 articles recorded clinical outcomes. In a study comparing physiotherapists and clinicians, Gagnon et al. (2021) reported that the physiotherapists showed greater symptom improvement at the 1- and 3-month follow-ups than the control group (CTL). The physiotherapist group similarly demonstrated a lower mean score in both the Numeric Pain Rating Scale (NPRS) (1.6 points) and the Brief Pain Inventory (BPI) (1.1 points) (17).

Vella et al. in 2024 looked at 6 records reporting 5 randomised controlled trials and stated that 2 trials provided very low-certainty evidence that there's no difference between physiotherapist and clinician care on pain intensity at emergency department (ED) discharge, 1-month, and 3-month follow-up. Only one study reported pain intensity at 6 months and found no difference between groups. Three studies similarly provided low-certainty evidence of no difference at 1- and 3-month follow-ups between PT, nurse practitioners (NP) and physicians (18) .

Matifat et al 2019 noted that an included RCT demonstrated that patients who received early physiotherapy assessment had significantly less pain upon ED discharge than those who did not receive physiotherapy and noted that another study found no differences between PT, nurse practitioner and physicians in terms of pain reduction at follow-up of 4 weeks or more (19).

The three articles, while one disagrees on the significance of the outcomes, all state that physiotherapists reduce pain to the same extent or more when compared with patients seen by medical staff only.

## Impact on the patient experience time

5 of the 6 articles examined the efficiency of primary contact physiotherapists (PCPs) and their impact on patient experience time (PET). One study found that patients treated by PCPs had shorter wait times, with mean differences of 14 to 52 minutes compared with other practitioners.

It was noted that the greatest impact observed was with a PCP pathway implemented prior to the start of the study (20). This is supported by comparison with secondary contact physiotherapist (SCP). A 2020 study noted that 69%-100% (per month) of patients seen by a PCP were discharged or admitted from the ED within a 4hr period, compared with 22-85% (per month) over the duration of the study (21). A third study further backed this up: over a three-month period, PCPs were more likely to complete treatment and discharge patients than a SCP and usual care models. PCP models were associated with significantly shorter wait times and reduced ED length of stay compared with SCP, which resulted in longer stays due to delays following medical referral (22).

A systematic review noted that multiple studies stated PT-led care in the ED was consistently associated with shorter wait times, with most reporting significant reductions. Patient experience time evidence was mixed, with several studies reporting shorter patient experience time with physiotherapist care, while others found no significant difference compared to physicians. The review noted that multiple studies further reported that ED length of stay was significantly shorter for patients managed by physiotherapists (19).

## Healthcare utilisation and economic outcomes

An observational study found that PTs ordered less imaging, prescribed significantly fewer medications, but advised more over-the-counter medications than emergency physicians. At a 1-month follow-up, participants in the physiotherapist group had fewer unscheduled returns and used less prescription medication, including opioids, than those in the control group. At 1 month, there was no difference between the two groups in the use of prescription medication (e.g. opioids), over-the-counter medication, and imaging tests. At 3 months, the physiotherapy group used less over-the-counter medication, and no significant differences were observed in ED return visits, prescription medication, or imaging tests compared with the control group (17).

A second study reported PCPs referred less to orthopaedics, and prescribed less analgesia, but referred more to General Practice/Primary care medicine on discharge. An additional study demonstrated no difference between physiotherapists and non-physiotherapists in re-presentations to the ED (22). A review study reported that physiotherapy delivered care was associated with lower rates of medication prescribing, including fewer analgesics, opioids, and anxiolytics, compared with usual medical care (19).

Medical imaging results were mixed, with some studies reporting no differences, while others stated physiotherapists ordered significantly less imaging. Rates of re-presentation to the ED were generally similar between groups, and there were no significant differences in healthcare costs, although methodological limitations were noted (19).

Two low-quality trials referenced in a systematic review noted that PTs prescribed less prescription medication than emergency clinicians at ED visits and 1-month follow-up, with no difference at 3 months (17,23). The review noted that findings for over-the-counter medication were inconsistent

across time points and were limited by unclear definitions. No meaningful differences were reported for inpatient admissions and ED re-presentations between PT-led care (18).

## Safety outcomes

Vella noted that only 2 studies with low-certainty evidence reported no adverse events (19). Matifat et al. had 7 of 15 studies that reported on safety-related outcomes, including unexpected re-presentations to the ED, incident reports, misdiagnoses, and complaints, with no consistent differences identified between physiotherapist-led care and usual staff care (18).

Alkhouri et al. reported no adverse events, no increase in missed diagnoses and no difference in ED re-presentations during work hours. Safety outcomes were very limited in all articles.

## Patient and Staff satisfaction

Alkhouri et al. assessed staff satisfaction using a questionnaire adapted from a validated survey, in which staff reported predominantly positive perceptions of the PCP role, particularly regarding effectiveness, efficiency, quality of care, and safety. Patient satisfaction was assessed through anonymous post-care surveys, which yielded high scores across care providers. A comparison of providers showed no indication of poorer satisfaction for patients managed by physiotherapists (21).

Matifat et al. had 6 of the 15 included studies that reported on patient satisfaction, with several studies reporting higher satisfaction with physiotherapist-led care than usual medical care, particularly regarding education, information provision, time to ask questions and overall treatment satisfaction, while medication management satisfaction was higher for physician-delivered care in one study. Other studies found no difference in overall patient satisfaction between groups (19).

Bird et al. found, through semi-structured interviews, high levels of satisfaction with PCP services among both staff and patients (22).

## Discussion

### Clinical Effectiveness of Primary Contact Physiotherapy

This systematic review demonstrates that primary contact physiotherapy (PCP) is as effective as, and in some cases more effective than, medical or nurse practitioner-delivered care in emergency/urgent care settings. Although most of the research was undertaken in EDs, it remains applicable to Injury Units, given the similar presentation model and patient population across the studies and Injury Units.

When compared with clinicians/physicians and nurse practitioners, the findings are consistent, while the extent of the difference in outcomes shows that PCPs range from no difference to a significant difference in treating patients. At discharge, findings have been mixed: some studies show PCPs are more effective than other healthcare providers, while others show no difference between them.

### Impact on waiting time and patient flow

The finding that remained consistent across all studies was the impact PCPs had on patient flow and wait times. The outcomes of all studies showed that PCPs reduced waiting time to some degree, though some showed greater differences than others. The patient experience time was similarly

shown to have been reduced by PCPs across all studies, with the most significant differences in EDs with PCPs set up prior to the start of the study, indicating implementation maturity.

Compared with secondary contact physiotherapists (SCP), PCPs have significantly reduced patient experience time. This was mainly due to delays in referrals, as SCPs had to wait for the patient to be assessed and then referred, which increased SCPs' PETs.

In comparison with usual care, practitioners, PCPs demonstrated shorter waiting times and significant reductions in length of stay. Regarding treatment duration, findings were mixed between PCPs and doctors, with some studies reporting a significant difference and others reporting no difference. Overall, PCPs can have a significant positive impact on wait time and length of stay, but a mixed impact on treatment time.

## Healthcare Utilisation and Resource Management

When it came to healthcare utilisation and resource management, PCPs were associated with lower prescription medication use; this must be interpreted with caution. Physiotherapists in PCP roles were generally not independent prescribers, and medication use was influenced by local scope-of-practice regulations, collaborative care models, and protocol-driven pathways.

As a result, reductions in prescription analgesia observed in PCP-led care models could reflect limitations on prescribing rather than differences in clinical decision-making alone. Furthermore, several studies reported increased recommendations for over-the-counter medications.

This could further contribute to the underestimation of medication use in PCP groups. These highlight the potential for confounding in the interpretation of medication-related outcomes and underscore the importance of future research on the specific topic.

## Safety and Acceptability of Physiotherapist-Delivered Care

Safety outcomes were limited across all included studies, with no explicit data on outcomes. This was due to the mixed reporting of safety outcomes. A study explicitly commented on them but did not measure them, while others implied reasons without explicitly stating them. However, multiple studies did note no increase in adverse events, misdiagnosis, or unexpected ED re-presentations, possibly suggesting no difference in PCP safety.

-Staff and patient satisfaction and feedback further indicate the safety and acceptability of PCPs, as the majority of feedback was positive, with one study noting higher patient satisfaction with PCPs. The results indicate that physiotherapists are clinically safe in diagnosing patients, but more research is needed, as methodological limitations, including small sample sizes, were noted in one of the RCT articles.

## Quality and Certainty of the Evidence

The quality and certainty of the evidence were assessed using appropriate appraisal tools for the study design. Qualitative studies were assessed using the Modified Downs & Black checklist, which assesses methodological quality at the individual study level, and includes reporting, validity, bias, confounding, and statistical power. One RCT was rated good quality due to the randomised controlled design, clear reporting of objectives, outcomes, and participant characteristics, and appropriate use of statistical analyses. It also uses randomisation when allocating patients. While the remaining observational studies were rated as fair, this was expected given the methodological approach.

Systematic reviews were appraised using Quality Assessment Tool for Theory-based and literature Reviews (QATTL), with both reviews rated as good quality. As can be seen, the studies have fair to good methodological processes, but they all provide very low to moderate-quality evidence, which limits the outcomes and further demonstrates the limitations mentioned in the introduction, highlighting the need for higher-quality evidence before a definitive answer can be given on this topic+.

## Implications for Practice and Future Research

The findings of this review have important implications for emergency department practice, particularly in relation to workforce planning and service delivery for musculoskeletal presentations. Primary contact physiotherapy models demonstrate potential to improve patient flow and reduce waiting times, suggesting that physiotherapists can play a valuable role in addressing ongoing challenges related to emergency department overcrowding. From a clinical perspective, involving physiotherapists as primary contact practitioners may enable medical staff to focus on higher-acuity cases while maintaining safe, effective care for patients with musculoskeletal conditions.

Proper implementation of primary contact physiotherapy would require clear structures and guidelines, along with multidisciplinary collaboration. Research in the future needs to prioritise high-quality, randomised controlled trials, particularly for clinical outcomes, healthcare utilisation, and safety. Addressing these gaps would strengthen the evidence base and support decisions regarding wider implementation of primary contact physiotherapy models in emergency departments and Injury Units.

## Optimal Role of Physiotherapist within an Injury Unit to Reduce Wait Times

In the context of injury units, the evidence suggests that a primary contact physiotherapy model is the most effective role for physiotherapists in reducing overall waiting times. Across the included studies, PCPs shortened the length of stay for patients presenting with minor musculoskeletal conditions. These presentations closely reflect the typical case mix managed in injury units, supporting the relevance of these findings beyond emergency department settings.

Compared with secondary-contact physiotherapy models, primary-contact physiotherapy allows patients to be assessed and managed earlier, without delays associated with medical referral. These referral delays were consistently associated with increased waiting times. This highlights that the role of physiotherapists in injury units is most effective when they are used in autonomous or at least semi-autonomous roles rather than as an adjunct to medical care.

Overall, positioning physiotherapists as primary contact practitioners within injury units appears to have the greatest potential to reduce waiting times, improve patient throughput, and support more efficient use of healthcare resources. This role aligns well with the scope of practice required to manage the musculoskeletal injuries commonly seen in injury units and directly addresses key operational pressures related to access and timeliness of care.

## Conclusion

The overall evidence in this review indicates that physiotherapists, when utilised as a primary contact, could reduce overall patient flow, as supported by low- to moderate-quality evidence. It was further indicated that physiotherapists may be just as effective as physicians in managing clinical outcomes while maintaining the same diagnostic accuracy.

This evidence links to Injury Units because the patient population consists of ED presentations of minor MSK injuries, the same population as Injury Units. The main reason for the installation was to reduce the strain on EDs due to overcrowding. As shown, the implementation of Primary Contact Physiotherapists could further benefit the aim of reducing overcrowding while improving patient flow.

While the included studies varied in design and were largely conducted in emergency department settings, the consistency of findings across similar patient populations supports cautious transferability to Injury Unit practice. The limited reporting of long-term clinical outcomes highlights an area for future research rather than undermining the observed service-level benefits. Further higher-quality studies would strengthen the evidence base, supporting wider implementation of physiotherapist-led models of care.

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## Appendix

Table 2

### PRISMA FLOW CHART

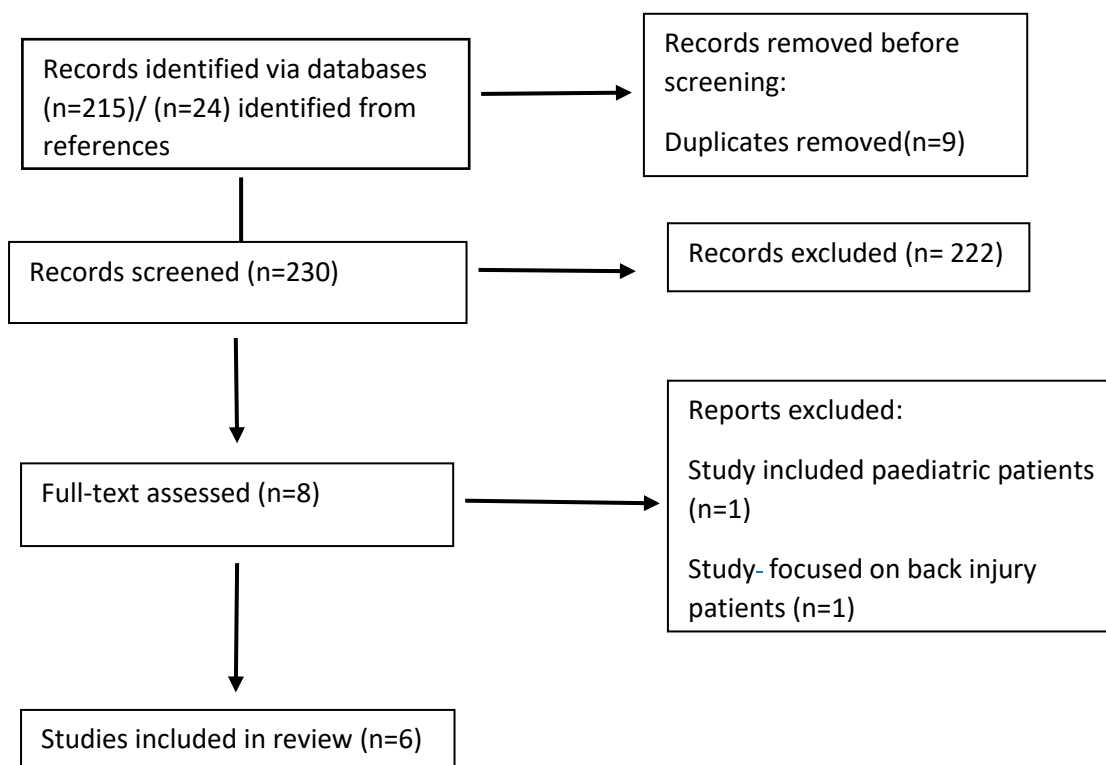


Table 3.

Modified Downs & Black  
(28 point)

Gagnon R et.,al 2021

Bird et al., 2016

Henderson  
et.al; 2020

Alkhoury et  
al., 2019

1) Is the hypothesis /aim/objective of the study clearly described?	Yes- "evaluate effects...direct-access physio..." clear objective for article	Yes- Research question clearly stated "Can PCPs reduce....?"	Yes- aim clearly stated	Yes- aim clearly stated
2) Are the main outcomes to be measured clearly described?	Yes- "primary outcomes pain interference on function..." NPRS and BPI scales were explained	Yes- Waiting time, treatment time, discharge time explained	Yes- treatment time, orthopedic referrals, analgesia prescriptions	Yes- length of stay, wait time, etc. clearly explained
3) Are the characteristics of the patients included in the study clearly described?	Yes- Baseline table + inclusion/exclusion criteria	Yes- Table 2 provides age, sex, triage, etc.	Yes- Table 2 provides age, triage, admissions	Yes- inclusion criteria and patient characteristics (age, triage, diagnosis)
4) Are the interventions of interest clearly described?	Yes- PT's and usual ED process described clearly	Yes- PCP role defined clearly	Yes- primary v secondary contact clearly described	Yes- all roles and models described in details
5) Are the distributions of principal confounders in each group of subjects to be compared clearly described?	Yes- Baseline characteristics table (table 1)	Yes- Table 2 shows baseline differences between PCP and other practitioners	Yes- Table 2 lists triage, admission rate differences, etc.	Yes- Table 1 shows age, triage category, diagnosis differences
6) Are the main findings of the study clearly described?	Yes- Table 2-3 present clear outcome data	Yes- results described in detail	Yes- results section, tables 2-3	Yes- results section with clear findings including figures
7) Does the study provide estimates of the random variability in the data for the main outcomes?	Yes- SDs, CIs, p-values presented in all outcome tables	Yes- SDs and 95% shown in table 3	Yes- SDs and 95% CIs shown in table 2-3	Yes- means +/- SD and p-values reported throughout e.g. figs & tables
8) Have all important adverse events that may be a consequence of the intervention been reported?	Yes- "no adverse events were reported"- stated clearly	No- No adverse events or safety outcomes described	Yes- no adverse or re-presentations	no- no mention of adverse events or safety outcomes

9) Have the characteristics of patients lost to follow-up been described?	Yes- Loss to follow-up + characteristics stated	Not applicable- no follow-up was used	Not applicable- no follow-up; single-episode ED dataset	Not applicable- no follow-up observational data only
10) Have actual probability values been reported?	Yes- P-values reported (tables 2&3)	Yes- exact p-values given	Yes- exact p-values <0.001 reported in tables	Yes- exact p-values reported
11) Were the subjects asked to participate in the study representative of the entire population from which they were recruited?	Unable to determine- limited 13hr recruitment window, no information of total eligible ED patients	No- While 10 hospitals were used no explanation of how hospitals were chosen etc. was provided	Unable to determine- no recruitment detail, no "asked to participate" process	unable to determine- patients recruited via routine care and convenience sampling -> no representativeness data
12) Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	No- refusals were documented but no comparisons made between those whom accepted and rejected	Unable to determine- no information about recruitment flow	Unable to determine- no information on refusals, exclusions, or participation bias	Unable to determine- no info on refusals; ED survey response rates variable
13) Were the staff, places, and facilities where the patients were treated representative of the treatment the majority of patients receive?	Unable to determine- Study conducted within ED with an embedded physiotherapist no comparison made to general EDs	Yes- 10 diverse hospitals	Yes- large Australian tertiary ED with typical staffing	Yes- 19 Eds across NSW including major, urban, rural
14) Was an attempt made to blind study subjects to the intervention they have received?	No- Not possible due to ED study	No- unable to hide difference between PCP and doctor	Not applicable- Physio v doctor differ too obvious	No- cant hide physio v doctor

15) Was an attempt made to blind those measuring the main outcomes of the intervention?	No- Self-reported follow-up measures -> no blinding control	No- outcomes extracted from routine ED data- no blind reported	No- outcomes extracted from routine ED system- no blinding reported	No- data extracted from FirstNet- no blinding mentioned
16) If any of the results of the study were based on “data degrading” was this made clear	Yes- showed no unplanned exploratory analyses, no data degrading occurred	Unable to determine- No statement on exploratory analyses	Unable to determine- no statement acknowledging or denying analyses	Unable to determine- no explicit statement about exploratory analyses
17) In trails and cohort studies do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls?	Yes- all participants have same scheduled follow-up points nparLD method does not require imputation	Not applicable- no follow- up single ED episode only	Not applicable- no follow- up period; only ED visit data	Not applicable- no follow- up longitudinal
18) Were the statistical tests used to assess the main outcomes appropriate?	Yes- appropriate tests used; chi-squared tests, log-linear models, and nparLD	Yes- Welch’s t-tests, chi-square, regression models appropriate	Yes- T-tests + chi-square appropriate	Yes- ANOVA, Bonferroni, Fisher’s tests appropriate
19) Was compliance with the intervention/s reliable?	Yes- no crossover, 2 CTL participants left before physician consult but still included in follow-up -> biases toward null	Yes- Clear division between the two groups	Yes- ED timestamps & electronic records of prescriptions are objective	Yes- timestamps from ED system
20) Were the main outcome measures used accurate (valid and reliable)?	Yes- NPRS + BPI validated tools	Yes- waiting time, treatment time, discharge time taken from ED timestamps	Yes- Same ED, same time windows	Yes- All patients from same ED system

21) Were the patients in different intervention groups (trail and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?	Yes- Same ED, same recruitment period	Yes- all groups drawn from same EDs during same period	Yes- both groups seen during the same shift window	Yes same ED shift and 2014-2015 window
22) Were study subjects in different intervention groups (trails and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?	Yes- one recruitment period	No- Data extracted from same calendar period	No- observational- no randomization	No- observation no randomization
23) Were study subjects randomized to intervention groups?	Yes- Block randomization described	Not applicable- no randomization assignment	Not applicable- no randomization	Not applicable- no randomisation
24) Was the randomized intervention assignment concealed from both patients and health care staff until the recruitment was complete and irrevocable?	Yes- sealed opaque envelopes	Not applicable- No study was randomized	No- table 2 shows differences in triage, admission rate	No- differences in age, triage, diagnose
25) Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	Yes- age and sex differences controlled as covariates	Not applicable- some covariates but key baseline differences not adjusted sufficiently	Not applicable- no follow- up; ED episode only	Not applicable- no follow- up

26) Were losses of patients to follow-up taken into account?	Yes- losses were reported nparLD avoids need for imputation	Yes- regression adjusted for age, diagnosis, indigenous status, gender, arrival mode, episode end status	No- Only unadjusted t-tests and chi square used- no regression adjustment	Yes- analysis being adjusted to triage categories
27) Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?	Yes- formal power calculation + power achieved reported	No- no sample size or power analysis reported	No- no mention of sample size justification	Yes- sample size reported for satisfaction survey
<b>Total</b>	23/28 (good)	15/28 (fair)	14/28(fair)	16/28 (fair)

Table 4.

GRADE Score Table		
Study	Design	GRADE Score
Gagnon 2021	RCT	Low-moderate
Bird 2016	Observational	Low
Henderson 2020	Observational	Very low-low
Alkhoury 2019	Observational	Low
Matifat 2019	Systematic review	Low-moderate
Vella 2024	Systematic review & meta-analysis	Very low-low

Table 5

## Quality Assessment Tool for Theory- based and Literature review studies (QATTL)

	Matifat et.al 2019	Vella et al. 2024
1) Is the review question clearly and explicitly stated?	Yes	Yes
2) Is the search strategy adequate (databases, terms, timeframe?)	Yes	Yes

3) Were the inclusion/exclusion criteria clearly described and appropriate	Yes	Yes
4) Was the quality of included studies assessed and reported	Yes	Yes
5) Was the method of data extraction clearly described	Yes	Yes
6) Was the synthesis method appropriate for the data	Yes	Yes
7) Were limitations of the review clearly stated	Yes	Yes
Score-	Good	Good