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| **CRITICALLY APPRAISED TOPIC** |

**FOCUSED CLINICAL QUESTION**

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| In a patient with a musculoskeletal injury presenting to an outpatient orthopedic setting(P), how do physical therapists(I) and medical doctors(C) compare in diagnostic accuracy and treatment(O)? |

**AUTHOR**

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**CLINICAL SCENARIO**

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| The patient is a 25-year-old active male runner with right hip and anterior-medial groin pain living in Durham, NC. The pain began about 8 weeks ago. Initially the pain was brought on by exercise, but over the past 3 weeks the pain has become constant, limiting all recreation activities and limiting sitting tolerance to less than 30 minutes. The patient’s goal is to return to his prior level of function, including running, regular walks, and sitting for work without limitation. Will a medical doctor or physical therapist give a more accurate diagnosis of the patient’s condition? Will the medical doctor’s and physical therapist’s treatment plan differ? Will the diagnostic accuracy and treatment of this patient be adequate if she sees a PT via direct access?  |

**SUMMARY OF SEARCH**

[Best evidence appraised and key findings]

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| Comparing medical doctors’ and direct access physical therapists’ diagnoses and treatment strategies of musculoskeletal conditions is a novel topic in the research world, especially when specifically considering hip musculoskeletal disorders. Because of the novelty of this subject, the clinical question was broadened to all musculoskeletal conditions presenting to an outpatient orthopedic setting. After this adjustment was made, 8 studies were found with some clinical relevance.Key Findings* Clinical diagnostic accuracy of musculoskeletal injuries made by US army physical therapists (PT) and orthopaedic surgeons (OS) is significantly greater than non-orthopaedic providers, with no significant difference between PTs and OSs.1
* Compared to US military family practice physicians, US military PTs utilize medication and imaging significantly less and have a significantly higher return to duty rates.2
* Concordance of physiotherapists and orthopedic surgeons on common shoulder primary diagnoses and triage recommendations is high.3
* A multidisciplinary model of care involving physiotherapists as the initial consultant for musculoskeletal disorders can support higher quality orthopaedic care.4,5
* Concordance of physiotherapists and speciality physicians on diagnostic agreement and surgical triage of common knee disorders is high.5
* A musculoskeletal exam conducted by a physiotherapist without using imaging may be adequate in diagnosing or ruling out common knee disorders.5
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**CLINICAL BOTTOM LINE**

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| Though more research is needed in civilian populations in the US, evidence suggests PTs and medical doctors agree on diagnosis and treatment choices for musculoskeletal injuries. If PTs are accessed initially, treatment may be more efficient and avoid unnecessary use of imaging and medications. Additionally, this could alleviate demand and decrease wait times of orthopedic and primary care physicians, improving the quality of the patient care. |

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| ***This critically appraised topic has been individually prepared as part of a course requirement and has been peer-reviewed by one other independent course instructor*** |

*The above information should fit onto the first page of your CAT*

**SEARCH STRATEGY**

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| **Terms used to guide the search strategy** |
| **P**atient/Client Group | **I**ntervention (or Assessment) | **C**omparison | **O**utcome(s) |
| “Musculoskeletal” | “Physical Therap\*,” “Physiotherap\*” | ”Orthopedic Surgeon OR orthopaedic surgeon,” “Orthopedics OR orthopaedics,” “Primary Health Care,” “Physician” | “Diagnos\*,” “Accuracy,” “Reliability,” “Validity” |

**Final search strategy (history):**

*Show your final search strategy (full history) from PubMed. Indicate which “line” you chose as the final search strategy.*

Initially I searched the follow terms [(“Musculoskeletal”) AND (“Physical Therap\*” OR “Physiotherap\*”) AND (“Orthopedic Surgeon” OR “orthopaedic surgeon” OR “Orthopedics OR orthopaedics” OR “Primary Health Care” OR “Physician”) AND (“Diagnos\*” OR “Accuracy” OR “Reliability” OR “Validity.”] This method did not find relevant articles thus I needed to switch my search strategy. Instead of searching terms, I used articles I had already identified as relevant to my PICO. I used the “related articles” function to browse similar articles to *Diagnostic and treatment concordance between a physiotherapist and an orthopedic surgeon—a pilot study by Aiken and McColl* on Pubmed.8 On Web of Science, I found articles that cited *Clinical diagnostic accuracy and magnetic resonance imaging of patients referred by physical therapists, orthopaedic surgeons, and nonorthopaedic providers by Moore et al.1* I repeated this method on Google Scholar. By reading the abstracts, I quickly narrowed down to 9 relevant articles that compared medical doctors and PT’s diagnosis and/or treatment of musculoskeletal injuries.

*In the table below, show how many results you got from your search from each database you searched.*

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| **Databases and Sites Searched** | **Number of results** | **Limits applied, revised number of results (if applicable)** |
| **PubMed****Web of Science****Google Scholar** | **8** **67** **12**  |  |

**RESULTS OF SEARCH**

**Summary of articles retrieved that met inclusion and exclusion criteria**

*For each article being considered for inclusion in the CAT, score for methodological quality on an appropriate scale, categorize the level of evidence, indicate whether the relevance of the study PICO to your PICO is high/mod/low, and note the study design (e.g., RCT, systematic review, case study).*

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| **Author (Year)** | **Risk of bias (quality score)\*** | **Level of Evidence\*\*** | **Relevance** | **Study design** |
| **Matif (2019)**6 | **10/13 COSMIN Box B** | **1** | **Moderate**  | **Reliability study** |
| **Moore (2005)**1 | **14/14 QUADAS** | **2** | **Moderate High** | **Retrospective Cohort** |
| ***McGill (2013)***2 | ***10/28 Downs & Black*** | ***2*** | ***High*** | ***Retrospective Chart Review*** |
| **Samsson (2013)**7 | **8/11 PEDro** | **1b** | **Moderate** | **RCT (not blind)** |
| **Aiken (2008)**8 | **7/13 COSMIN Box B** | **2** | **Moderate low** | **Reliability study**  |
| **Marks (2016)**3 | **9/12 COSMIN Box B** | **1** | **Moderate High** | **Reliability study** |
| ***Décary (2017)***5 | ***9/12 COSMIN Box B*** | ***1*** | ***High*** | ***Reliability study*** |
| **Jovic (2019)**4 | **10/12 COSMIN Box B** | **1** | **Moderate High** | **Reliability study** |

\*Scored using COSMIN Reliability Score, Downs & Black Checklist, and PEDro Score

\*\*Use Portney & Watkins Table 16.1 (2009); When Portney & Watkin Table could not be used in the case of Reliability studies, a level 1 indicates well-designed study, a level 2 indicates a study inadequate in design but maintaining some validity

**BEST EVIDENCE**

The following 2 studies were identified as the ‘best’ evidence and selected for critical appraisal. Rationale for selecting these studies were:

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| * **McGill**

There is a lack of research comparing physical therapists’ and medical doctors’ diagnostic accuracy and treatment choices in the US. In many other countries, responsibilities of PTs vary, with some clinicians granted the ability to order imaging and laboratory tests and prescribe certain medications. Additionally, the curriculum to become a PT varies across the globe, thus caution should be taken when investigating studies outside the US. McGill was chosen as ‘best’ evidence for this clinical question due to the high clinical relevancy given use of American PTs, subject condition (MSK compliant without deformity or need for referral to emergency department), and comparison of physical therapist (PT) to family practice (FP) physician as musculoskeletal primary care providers (PCP) in treatment methods.* **Décary**

Décary was chosen as ‘best’ evidence for the focused clinical question as the study compares physiotherapist diagnosis and treatment to physician diagnosis and treatment of the same patient. Though there are some study flaws, this was the best study design relevant to my clinical question. The study’s statistical analysis assesses agreement between physiotherapist and physician diagnosis and triage choice and assesses diagnostic validity of a physical therapist musculoskeletal exam. Unlike other studies which took place in irrelevant settings like the emergency department, this study considered the orthopedic setting, which matches my clinical question.  |

**SUMMARY OF BEST EVIDENCE**

**(1)** Description and appraisal of **Effectiveness of Physical Therapists Serving as Primary Care Musculoskeletal Providers as Compared to Family Practice Providers in a Deployed Combat Location: A Retrospective Medical Chart Review** by **Lt Col Troy McGill, 2013**

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| **Aim/Objective of the Study/Systematic Review:** |
| The McGill study had 4 aims:1. Compare use of medications by a physical therapist (PT) vs family practice (FP) physicians acting as the musculoskeletal primary care provider (PCP)
2. Compare use of imaging by PT vs FP as musculoskeletal PCP
3. Compare return-to-duty (RTD) rate by PT vs FP as musculoskeletal PCP
4. Compare number of visits by PTs vs FP as musculoskeletal PCP
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| **Study Design**[e.g., systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant]Note: For systematic review, use headings ‘search strategy’, ‘selection criteria’, ‘methods’ etc. For qualitative studies, identify data collection/analyses methods. |
| McGill conducted a retrospective chart review that consisted of 149 active-duty or civilian contracted personnel. Using a convenience sampling technique, 54 PT-patient and 95 FP-patient charts were reviewed. McGill was responsible both for collecting the data and being the sole provider of physical therapy in the Department of Defense (DoD) health care system at the deployment location. FP care was provided by two FP active-duty U.S. Air Force physicians. For each chart review, information on use of medication and radiology and return to duty was gathered. Medication and radiology utilizations were categorically divided into “yes” or “no” depending on if it was prescribed or ordered. PTs within the DoD are credentialed to order imaging and prescribe medications “limited to NSAIDS, inflammatories and muscle relaxants.” (*page 1*) RTD is defined as return to all duties and physical training times 7 days/week. If an individual was required to wear body armor to serve, they had to complete 3 days of training in armor without complaints of symptoms to meet RTD status. RTD was also categorized as “yes” or “no” according to the defined criteria. A Fisher’s exact test was used for the 3 variables of interest (imaging, medication, RTD). Number of visits was also recorded and examined, but no description was provided for how this was done. |
| **Setting**[e.g., locations such as hospital, community; rural; metropolitan; country] |
| This study took place in an outpatient family practice clinic at Craig Joint Base Theater Hospital in the deployed combat location of Bagram Airfield, Afghanistan.  |
| **Participants**[N, diagnosis, eligibility criteria, how recruited, type of sample (e.g., purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables; number of dropouts if relevant, number available for follow-up]Note: This is not a list of the inclusion and exclusion criteria. This is a description of the actual sample that participated in the study. You can find this descriptive information in the text and tables in the article. |
| A chart review was performed on 149 patients. Eligibility criteria was active-duty or contract personnel, at least 18 years old and having a musculoskeletal complaint. Patients with fractures, dislocations, trauma with deformity, or fever or pain nonmusculoskeletal in nature were excluded. 54 PT patients and 95 FP patients were randomly selected from the electronic database using a convenience sample technique. Every 12th patient chart was chosen if the patient met the criteria. Patients were not randomized to PT or FP, instead patients were seen on a “first-come, first serve basis.” Only direct access PT patients were included. There were 2 FP PCP providers and a random sample of 95 was chosen, about 50 patients for each provider. This size was chosen out of convenience; no power calculation was utilized. Using the convenience sample technique and eligibility criteria, a total of 54 PT patient charts and 95 FP patient charts were examined. The age range was 19-54 years old and 84% of the population was male. There was a variety of sites of musculoskeletal complaints including foot, ankle, knee, hip, lumbar, neck, shoulder, elbow and wrist regions.  |
| **Intervention Investigated**[Provide details of methods, who provided treatment, when and where, how many hours of treatment provided] |
| *Control* |
| This was a retrospective cohort study attempting to compare utilization of medication and imaging and return to duty rate differences between PTs versus FPs as musculoskeletal PCPs in an outpatient family practice clinic in the deployment location of Bagram Airfield, Afghanistan. The study attempted to make broader conclusions that PTs use medication and imaging less as compared to FP in deployed combat setting. The study also attempted to show a better RTD rate and reduced visit need for PTs as PCP compared to FP as PCPs. |
| *Experimental* |
| NA- As this study was a retrospective cohort study, there was no specific experimental group. Neither group was considered the control or experimental group. |
| **Outcome Measures**[Give details of each measure, maximum possible score and range for each measure, administered by whom, where] |
| The primary measures were radiology utilization, medication utilization, and return to duty rate. One secondary outcome was considered, number of visits. McGill reports use of a Fisher’s exact test was performed for the 3 primary measures of interest (imaging, medication, RTD). Imaging, medication and RTD were divided into “yes” or “no” categories. No raw data was reported. There was no use of standardized outcome measures. |
| **Main Findings**[Provide summary of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc., where provided; you may calculate your own values if necessary/applicable. You may summarize results in a table but you must explain the results with some narrative.] |
| Figure 1. Radiology Utilization *Adapted from Figure 2 on page 3 of article.*Utilization of radiology was found in **11.11%** of chart reviews when the **PT** was the PCP. Utilization of radiology was found in **82.11%** of chart reviews when the **FP** was the PCP. McGill defined the difference as **statistically** **significant difference** (p <0.0001).Figure 2. Medication Utilization *Adapted from Figure 3 on page 4 of article.*Utilization of medication was found in **24.07%** of chart reviews when the **PT** was the PCP. Utilization of medication was found in **90.53%** of chart reviews when the **FP** was the PCP. McGill defined the difference as **statistically** **significant difference** (p <0.0001). Number of VisitsNo raw data or percentage descriptors were given for number of visits. McGill defined **no significant difference** between groups (p <0.0001). Return to DutyNo raw data was provided. McGill defined a **statistically** **significant difference** (p <0.0001) between groups. McGill reported RTD rate was **50% greater** when the **PT** was the PCP. |
| **Original Authors’ Conclusions**[Paraphrase as required. If providing a direct quote, add page number] |
| McGill concludes when military physical therapists are used as primary care providers in the DoD health care system in a deployed combat location, PTs can have “significantly better RTD rates while at the same time drastically decreasing the use of medication and imaging studies” compared to FP active-duty U.S. Air Force physicians.(*page 5*) In his discussion, McGill references other studies that suggest that non-military PTs across all the U.S. states are capable of screening all systems and there is no risk of skipping the physician referral step. Instead, PT should be “musculoskeletal gatekeepers,” which could increase efficiency of treatment and decrease cost of medical care.  |
| **Critical Appraisal** |
| **Validity**[Summarize the internal and external validity of the study. Highlight key strengths and weaknesses. Comment on the overall evidence quality provided by this study. |
| Using the Downs and Black Checklist, the quality of the McGill study is poor. McGill earned some points on the checklist by clearly stating objectives, providing patient characteristics, describing the main outcomes, discussing adverse events, and recruiting patients from the same population. The internal validity of this study is lacking due to inability to blind participants, the inadequate statistical tests to assess main outcomes, and McGill’s role as author, data collector, and data processor increasing the potential for bias. The only statistical tests used were Fisher’s Exact Tests and P-value calculations. No raw data was provided to confirm these findings. McGill states there was no statistical difference in the number of visits, but he does provide a record of the number of visits or other details. Even though statistically significant differences are found for 3/4 main outcomes, this is not equal to clinical significance. Finally, power was not calculated before the study. While McGill’s study has many flaws, it is one of very few studies analyzing American PTs. In the future, studies with more rigorous designs should be completed to validate McGill’s findings.  |
| **Interpretation of Results**[This is YOUR interpretation of the results taking into consideration the strengths and limitations as you discussed above. Please comment on clinical significance of effect size / study findings. Describe in your own words what the results mean.] |
| Because McGill’s study design is flawed, significant caution should be taken interpreting the findings. The lack of raw data and minimal statistical analysis decreases the validity of the results. However, the differences in utilization of medication and imaging and RTD rates are drastic between the PT as the PCP and the FP as the PCP. Because the differences are so drastic, it is likely there is validity to the findings, though the study may have influenced the degree of differences. Overall, I am inclined to believe that when a PT acts as the PCP in a combat setting, he/she can decrease medication and imaging usage while increasing RTD rate as compared to a FP physician acting as a PCP. Future studies are needed to confirm this finding. |
| **Applicability of Study Results**[Describe the relevance and applicability of the study to your clinical question and scenario. Consider the practicality and feasibility of the intervention in your discussion of the evidence applicability.] |
| This study is applicable to this focused clinical question as the population in the study had several sites of musculoskeletal complaints, the PTs are American, and there is comparison between PT and medical doctors. Because PTs in the DoD health care system are qualified to perform duties (ordering medication and imaging) that PTs outside the military cannot perform, these findings are less relevant to the civilian orthopedic population. However, there is potential PT’s will gain the ability to order imaging in the future, and these results could become more relevant. The increased RTD rate found when the PT was the PCP is not applicable to the non-military setting. However, a return to prior level of function (PLOF) would be important in the non-military settings. This study does not support this claim but does provide reason to conduct future studies investigating return to PLOF for PTs versus medical doctors. In terms of my clinical scenario, this study has very limited applicability because of the military setting. However, this study provides reason to consider a PT as a first choice for musculoskeletal complaints. The patient in the clinical scenario may be able to receive more cost efficient and effective care if he goes a PT.  |

**(2)** Description and appraisal of **Diagnostic validity and triage concordance of a physiotherapist compared to physicians’ diagnoses for common knee disorders** by **S Décary, M. Fallaha, B. Pelletier, P. Frémont, J. Martel-Pelletier, J.-P. Pelletier, D. E. Feldman, M.-P. Sylvestre, P.-A. Vendittoli and F. Desmeules, 2017**

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| **Aim/Objective of the Study/Systematic Review:** |
| The aims of the study by Décary et al. were to determine the agreement of diagnosis and surgical triage between physiotherapists and speciality physicians. Décary et al. also examined the agreement between a PT’s medical diagnosis without imaging to a physician’s medical diagnosis who did have access to imaging. |
| **Study Design**[e.g., systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant]Note: For systematic review, use headings ‘search strategy’, ‘selection criteria’, ‘methods’ etc. For qualitative studies, identify data collection/analyses methods. |
| A prospective diagnostic cohort study that consisted of 179 participants who underwent independent diagnosis and triaging of knee injuries by a physiotherapist and a physicians. One physical therapist with 1 year of clinical experience conducted the PT evaluation. Four physicians were used, 2 orthopedic surgeons and 2 sports medicine physicians, each of which had at least 20 years of clinical experience. The PT assessment was completed first followed by the physician within a 15-minute interval between the evaluations. The PT diagnosis was based solely of the musculoskeletal examination of the patient. The physician had access to radiographs of the knee including 3 views: anteroposterior, lateral, and skylines views, all in weight-bearing. If a ligamentous, meniscal, or other uncertain injury was suspected, magnetic resonance imaging (MRI) was acquired. If available, the physician used previously taken radiographs unless they felt new imaging was necessary. After evaluating the patient’s history, physical examination and imaging, the physician diagnosed the patient. The physician diagnosis was held as the reference standard. In addition to the primary diagnosis and secondary diagnosis, if needed, both the PT and the physician independently choose the next treatment step from 3 options: conservative, surgical or undecided. |
| **Setting**[e.g., locations such as hospital, community; rural; metropolitan; country] |
| The exact location and clinic names were not provided. Participants were recruited from an outpatient orthopaedic clinic, primary care family medicine clinic, and university community. All of the authors of the article have academic experience in Montréal, Canada. French is the primary language spoken in Montreal, and fluency in French is an inclusion criterion for this study. It is likely this study took place in Montreal, or a nearby area. |
| **Participants**[N, diagnosis, eligibility criteria, how recruited, type of sample (e.g., purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables; number of dropouts if relevant, number available for follow-up]Note: This is not a list of the inclusion and exclusion criteria. This is a description of the actual sample that participated in the study. You can find this descriptive information in the text and tables in the article. |
| Participants were recruited from an outpatient orthopaedic clinic and primary care family practice. All patients who visited with new knee complaints between November 2014 and January 2016 were recruited. Participants were also recruited from a university community. Eligibility criteria was: at least 18 years old, knee injury with desire for a diagnosis, and fluency in French. Patients previously diagnosed and treated by one of the speciality physicians, patients who had undergone surgery within 6 months, patients with a history of knee arthroplasty, patients with >3 lower limb pathologies, and patients with systemic inflammatory disorder were excluded. It was decided patients would be removed from the study if their pain moderately or severely increased according to the 3-point Likert scale during the course of the PT evaluation, but this was never necessary. In the end, 179 patients were participants in the study. The minimum sample size required to detect an 80% power was set at 71 participants, which the study exceeded. The mean age of participants was 49.9±16.1 years old and the mean BMI was 29.1±6.5 kg/m2. The majority of participants were female, 63.7%. Below, a chart with more participant information is provided. Table 1 **Participant Characteristics** *Adapted from Table 1 on page 4 of article.*

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| **Characteristic** | **N (%)** | **Mean (SD)** |
| Age |  | 49.9 (16.1) |
| Sex Female Male | 114 (64)65 (36) |  |
| Body Mass Index (Kg/m2) |  | 29.1 (6.5) |
| Recruitment Site Orthopaedic clinic Family medicine unit University community | 142 (80)15 (8)22 (12) |  |
| History of trauma  | 47 (26) |  |
| Bilateral knee pain | 39 (22) |  |
| Duration of pain at the time of consultation <3 months 3-13 months > 12 months  | 17 (10)45 (25)39 (22) |  |
| KOOS – Knee Injury and Osteoarthritis Outcomes Score (%)  Pain Symptoms Activities of Daily Living Sports Quality of Life |  | 58.6 (19.7)71.0 (19.6)66.1 (21.8)31.4 (24.8)40.9 (20.3) |
| K6 psychological distress scale (/30) |  | 26.0 (4.5) |

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| **Intervention Investigated**[Provide details of methods, who provided treatment, when and where, how many hours of treatment provided] |
| *Control* |
| This was a prospective diagnostic cohort study attempting to 1) compare diagnosis and triage of knee injuries by physiotherapists versus speciality physicians and 2) assess the validity of physiotherapists’ musculoskeletal examination of the knee. |
| *Experimental* |
| As this study was a retrospective cohort study, there was no specific experimental group. Instead the physician diagnosis was held at the reference standard to compare with the PT’s diagnosis and triage recommendation. The physician diagnosis and triage choice could be considered the control and the PT diagnosis and triage choice could be considered the experimental group. |
| **Outcome Measures**[Give details of each measure, maximum possible score and range for each measure, administered by whom, where] |
| The first main outcome was concordance between PT and physician diagnosis. Descriptive statistics were used for all outcomes. The primary diagnoses were categorized as follows: ACL injury, meniscal injury, patellofemoral pain, osteoarthritis, or other injuries. Inter-rater agreement for diagnosis was measured using proportions of raw agreement and Cohen’s Kappa with a 95% confidence interval (CI). The Landis and Koch scale was used to interpret the magnitude of Cohen’s Kappa. Décary et al. expressed bias may be an issue due to high or low prevalence of a diagnosis. As a result, bias index, prevalence index, and Prevalence and Bias Adjusted Kappas (PABAK) were calculated for each diagnosis. The second main outcome was concordance between PT and physician of triage recommendation following the examination. The triage categories were “surgical candidate,” “conservative care candidate,” and “uncertain.” Inter-rater agreement for triage recommendation was measured using proportions of raw agreement and Cohen’s Kappa with a 95% confidence interval (CI). Again, the magnitude of Cohen’s Kappa was interpreted using the Landis and Koch scale. No bias calculations were made, likely because the researchers felt the prevalence of each treatment option was reflective of the broader population.The diagnostic validity of the PT’s musculoskeletal examination was compared to the physicians’ final diagnosis based off their own musculoskeletal exam, radiographs and MRI when applicable. Diagnostic validity was measured using sensitivity, specificity, and positive and negative likelihood ratios (LRs). The cut-off values were determined to be a +LR >5 to include a disorder and a -LR <0.2 to exclude a disorder. “Analysis was performed using SPSS version 21 and R version 3.2.3.” (*page 4*) |
| **Main Findings**[Provide summary of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc., where provided; you may calculate your own values if necessary/applicable. Use a table to summarize results if possible.] |
| Table 2 **Concordance between the physiotherapist and physician’s composite or imaging only diagnosis***Adapted from Table 3 on page 5 of article.*

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|  | Raw agreement | Cohen’s kappa | 95% CI | Bias Index | Prevalence Index | PABAK |
| Overall concordance with the physicians’ composite diagnosis | 92.2% (165/179) | 0.89 | 0.83–0.94 | - | - | - |
|  ACL injury |  100.0% (8/8) | 0.94 | 0.82–1.00  | 0.01 | 0.91 | 0.99 |
|  Meniscal injury |  97.2% (35/36) | 0.88 | 0.80–0.93  | 0.03 | 0.57 | 0.92 |
|  Patellofemoral pain  |  91.1 (41/45) | 0.88 | 0.80–0.96  | 0.05 | 0.50 | 0.91 |
|  Osteoarthritis |  91.1 (72/79) | 0.89 | 0.82–0.95  | 0.02 | 0.14 | 0.89 |
|  Other |  81.8 (9/11) | 0.89 | 0.75–1.00  | 0.01 | 0.89 | 0.98 |
| Overall concordance with imaging only diagnosis | 84.4% (151/179) | 0.77 | 0.68–0.85  | - | - | - |

Overall concordance between **physiotherapist and physicians’ composite diagnosis** was 92.2% and inter-rater agreement was **high** (κ=0.89, 95% CI: 0.83–0.94). All PABAK estimates were within the Cohen’s Kappa 95% CI suggesting bias did not influence the Kappa estimate. Overall concordance agreement between **physiotherapist and physicians’ diagnosis with imaging only** was 84.4% and inter-rater was **good** (κ=0.77, 95% CI: 0.68–0.85). Table 3 **Concordance between the physiotherapist and physician for the triage recommendation following consultation***Adapted from Table 5 on page 6 of article.*

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| --- | --- | --- | --- |
|  | Raw Agreement | Cohen’s kappa | 95% CI |
| Overall | 91.6% (164/179) | 0.73 | 0.60-0.86 |
|  Surgical candidates | 91.3% (21/23) |  |
|  Conservative care candidates | 92.6% (139/150) |
|  Uncertain | 66.7 (4/6) |

Overall inter-rater agreement **physiotherapist and physicians’ triage recommendation** was **good** (κ=0.73, 95% CI: 0.60–0.86). 2 surgical recommendations did not match the physicians’ recommendations and 23 surgical cases were misclassified as conservative by physiotherapist. Figure 4 **Diagnostic validity of the musculoskeletal examination performed by the physiotherapist compared to the physicians’ composite diagnosis***Adapted from Table 4 on page 6 of article.*

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| --- | --- | --- | --- | --- |
|  | Sensitivity (95% CI) | Specificity (95% CI) | Positive Likelihood Ratio (95% CI) | Negative Likelihood Ratio (95% CI) |
| ACL injury(n = 8) | 100.0% (52.0–100.0)  | 99.0% (97.0–100.0)  | 171.0 (24.2–1207.0)  | 0.00 (0.00–0.00)  |
| Meniscal injury(n = 36) | 97.0% (85.0–100.0)  | 96.0% (91.0–98.0)  | 23.2 (10.6–50.8)  | 0.03 (0.00–0.20)  |
| Patellofemoral pain (n = 45) | 91.0% (79.0–98.0)  | 97.0% (93.0–99.0)  | 30.5 (11.6–80.5)  | 0.09 (0.04–0.23)  |
| Osteoarthritis(n = 79) | 91.0% (83.0–96.0)  | 97.0% (91.0–99.0)  | 30.4 (10.0–92.8)  | 0.09 (0.04–0.19)  |
| Others(n = 11) | 82.0% (48.0–98.0)  | 100.0% (97.0–100.0)  | 267.6 (16.6–4325.6)  | 0.18 (0.05–0.64)  |

Using the physician’s composite diagnosis as the reference standard, the physiotherapist’s ability to **rule in** the diagnosis ranged from **82-100%**, with the ability to rule in “others” being on the lower end. The physiotherapist’s ability to **rule out** knee diagnosis ranged from **96-100%**. Diagnosis **positive likelihood** ratios are **all above 5**, reflecting the PT’s ability to include a disorder. The **majority of negative likelihood** ratios are **below 0.2**, reflecting the PT’s ability to exclude a disorder. Two exceptions to note are the -LR for patellofemoral pain (-LR = 0.23) and “others” (-LR = 0.65).  |
| **Original Authors’ Conclusions**[Paraphrase as required. If providing a direct quote, add page number] |
| Concordance between the physiotherapist following a musculoskeletal exam and physicians following a musculoskeletal exam, radiographs and MRI (if applicable) was high for diagnosis agreement and good for triage recommendation agreement. Physiotherapist’s diagnostic validity was moderate to high for diagnosing and ruling out common knee disorders. Décary et al. suggest that, because physiotherapists can diagnosis and triage without imaging, physiotherapists should serve as primary care providers for knee musculoskeletal disorders and increase the efficiency of care and treatment. |
| **Critical Appraisal** |
| **Validity**[Summarize the internal and external validity of the study. Highlight key strengths and weaknesses. Comment on the overall evidence quality provided by this study.] |
| Décary et al. scored a 10/12 on the COSMIN Reliability Checklist. The main strength of this study relative to the focused clinical question is the direct comparison of physiotherapists to specialty physicians in their diagnosis and triage choices of the same patients. Additionally, most of the patients were recruited from orthopedic clinics, matching my focused clinical setting. Other strengths include the blinding of physiotherapist and physicians to each other’s responses, the sample size significantly exceeding the required sample size calculated for 80% power, and the short interim time between examinations. The physician evaluation began within 15 minutes of the completion of physiotherapist’s evaluation, assuring the participants were stable in the interim period. The final strength I will comment on is the attempt to standardize evaluation techniques to improve concordance. The physiotherapist and 4 physicians “participated in the standardization of the techniques, interpretation of the physical tests and definition of the related diagnoses and all agreed to comply with the proposed definitions during their respective evaluation.” (*page 3*)Although there was an attempt to standardize examination techniques, Décary et al. did not attempt to assess or standardize the physiotherapist’s or physicians’ evaluation skills. Because this is a prospective diagnostic cohort study, not an experimental study, internal validity is relatively low. External validity is hindered by the use of only 1/4 physicians in creating the composite reference standard for each individual participant. This study only considered common knee musculoskeletal disorders, limiting the findings to a small realm of musculoskeletal disorders. Another weakness was that Décary et al. never explicitly stated who performed the statistical analysis of the data. Ideally the assessor would be blinded to the key outcome measures, though this study design does not allow complete blinding. Because details of the assessor were not provided, it is likely the assessor played a key role in the research study and may have had some bias. Finally, the physiotherapist only had one year of clinical experience while all 4 physicians had more than 20 years of clinical experience. The author justifies the physiotherapist’s short clinical experience by noting the that schooling should “adequately train therapists in musculoskeletal examination.” (*page 7*) However, with this reasoning, the physicians could have been prepared with less clinical experience, yet all 4 had ample clinical experience. Overall, the weaknesses of this study design limit the application of the results; however, it was the most rigorous study design I found relevant to my clinical question. |
| **Interpretation of Results**[This is YOUR interpretation of the results taking into consideration the strengths and limitations as you discussed above. Please comment on clinical significance of effect size / study findings. Describe in your own words what the results mean.] |
| Compared to other research on the subject of PT’s ability to diagnose, treat, and refer patients with musculoskeletal injuries as compared to medical doctors, Décary et al.’s study methodology was more thorough and thus more trustworthy. Unlike other studies, Décary provided the raw data and performed multiple statistical analyses of each outcome measure. Although Décary et al.’s sample size was 179 and only 71 participants were required to detect overall inter-rater Kappa value considering 80% power, 179 is still a small sample size. There was no formal assessment of the clinician’s skills, and only 1 PT and 4 physicians contributed to the study findings. Further, only 1/4 physicians created the reference standard. One also must question the validity of establishing the physician’s composite diagnosis and triage recommendation as the reference standard. Despite these limitations, Décary et al. are able to establish creditable evidence that physiotherapists in Canada should play a primary role in the evaluation and triage decision making for patients with common knee disorders. This study also suggests physiotherapists can provide more efficient and cost-effective treatment, as they were able to diagnose and triage without the use of imaging, which is often unnecessary. Additional research is needed to confirm these findings in more clinic settings, different locations around the world, with rigorous study design, and with more musculoskeletal disorders in order to suggest the study findings apply more broadly.  |
| **Applicability of Study Results**[Describe the relevance and applicability of the study to your clinical question and scenario. Consider the practicality and feasibility of the intervention in your discussion of the evidence applicability.] |
| This study is moderately applicable to my clinical question. It directly compares physical therapists’ (I of PICO) and medical doctors’ (C of PICO) diagnostic accuracy and treatment (O of PICO). The study’s population, patients with knee musculoskeletal disorders is more focused than my clinical question examining any musculoskeletal disorder. The biggest issue in applying these study results is the study took place in Canada. Physiotherapists are trained differently, and Canada has a different health care system, thus limiting the applicability of the results to my clinical question. The Décary study is even less applicable to my clinical scenario. My clinical scenario focuses on a 25 y.o. male runner with a primary compliant of hip and groin pain for about 2 months. The majority of participants in this study are female, with primary complaints involving the knee, and the majority had a duration of symptoms greater than 3 months. As a student earning my doctorate in physical therapy, I would recommend the patient in the clinical scenario consult a physical therapist for his hip and groin pain. However, the results of this study do not directly apply to the clinical scenario. More research and an expansion of the view of PT’s role in maintaining health and wellness is necessary. By considering practicality and feasibility, we see how to direct attention in the future to better serve patients like the one in my clinical scenario.Practicality: Décary et al. discuss the need to create more “interdisciplinary evaluation and triage strategies in the context of innovative and potentially more efficient care trajectories for patients with common musculoskeletal disorders” (page 6). Until heath care providers shift to a more interdisciplinary approach, the practicality as PTs acting as primary care providers for musculoskeletal disorders is not practical on a broad scale. Additionally, physical therapists in the US are not qualified to perform tasks, such as ordering imaging. If PT’s qualifications are expanded, they may gain more respect amongst other health providers and consumers and be able to provide better care. Feasibility: In all 50 states, D.C. and the U.S. Virgin Islands there is direct access to physical therapy services. However, there are different levels of direct access, and many states limit access with provisions. Further, direct access is often not fully utilized due to a lack of education in the general and medical populations about the scope of physical therapy.  |

**SYNTHESIS AND CLINICAL IMPLICATIONS**

[Synthesize the results, quality/validity, and applicability of the two studies reviewed for the CAT. Future implications for research should be addressed briefly. Limit: 1 page.]

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| Overall, both studies in this CAT indicate PTs may provide more efficient and cost-effective treatment for musculoskeletal disorders. The first study consisted of a retrospective chart review of military personnel. McGill found PTs utilize medication and imaging drastically less than family practice physicians, and PTs have a higher return to duty rate. McGill’s conclusions must be taken with caution given the lack of internal validity, potential for bias given that McGill was the author, PT, and data assessor, the missing raw data, and inadequate statical analyses. Future studies are needed with blinded data assessors, sample size of adequate power, use of multiple PTs and more physicians, additional statistical calculations, and expanded setting locations to confirm and expand McGill’s findings.Décary et al. conducted a prospective diagnostic cohort study investigating how a physiotherapist and a physician would compare in their diagnosis and triaging of knee injuries on the same patients. The physiotherapist used only a musculoskeletal exam to inform the decision and the physicians used the musculoskeletal exam and imaging. Concordance between physiotherapist and physician was high for diagnosis and good for triage recommendation. The study also found physiotherapists are equipped to diagnose and rule out common knee conditions without the use of imaging. Décary et al. only used one physiotherapist for all participants, and the physiotherapist only had one year of clinical experience. Future studies should involve many more physiotherapists with a variety of clinical experience and more physicians, also with varied clinical experience. Findings could be strengthened if each patient was assessed by multiple PTs and physicians, however this may be less feasible. Findings can be further strengthened and broadened with more rigorous study designs, musculoskeletal pathologies involving other sites than the knee, and more clinical locations. The studies suggest PTs are able to diagnosis and treat musculoskeletal injuries. If PTs are used via direct access, unnecessary imaging and medication prescription may be avoided. Patients with musculoskeletal complaints, like the male in the clinical scenario, should be encouraged to seek out physical therapy care as their initial treatment. To encourage people to use physical therapists’ direct access, more research is needed to prove the role of PTs in providing primary care for musculoskeletal disorders. In addition, patient care with a greater emphasis on interdisciplinary care could enhance the role of PTs. Finally, education of the general population and medical providers on the role of PTs is necessary.  |

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