



Filling the Gap in Musculoskeletal (MSK) Medicine: Assessing MSK Knowledge of Physician Assistant Students Prior to Graduation

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Introduction

Between 1996 and 2014 health care costs attributed to MSK disorders more than doubled from \$412 billion to \$980 billion. Physicians, medical students and residents are the most in-depth studied group of front-line MSK health care providers and a number of studies have found a lack of knowledge surrounding their diagnosis and treatment of MSK conditions. Physician assistants (PAs) are increasingly being called upon to fill gaps in Musculoskeletal (MSK) medicine, but only one lone published study has examined the MSK knowledge of graduating PAs.

Purpose

The purpose of this study is to evaluate graduating PA students' MSK knowledge both preceding and post graduation, explore methods to identify pre-graduation knowledge gaps, predict MSK PA National Certification Exam (PANCE) performance, and examine the impact of orthopedic rotations on MSK knowledge.

Method

- Five combined cohorts of graduating PA students (N=229) were eligible to participate in this study.
- Evaluate MSK knowledge:** MSK components of three exams were utilized as MSK knowledge assessment tools, with a score of 70% considered "passing":
 - Physician Assistant Clinical Knowledge Rating and Assessment Tool 2 (PACKRAT 2) given 12 weeks prior to graduation.
 - University of Pennsylvania Basic Competency Examination in Musculoskeletal Medicine (UP BCEMM) given 1 month prior to graduation.
 - PA National Certification Exam (PANCE) given after graduation.
- Identify knowledge gaps:** Individual UP BCEMM short answer questions and topic areas were examined in order to identify specific knowledge gap topics prior to graduation.
- Predict PANCE scores:** The predictive value of pre-graduation UP BCEMM and the MSK PACKRAT 2 scores for the post-graduation MSK PANCE scores was evaluated calculating a Pearson Correlation coefficient.
- Impact of Ortho rotation:** The relationship of participation in an orthopedic rotation on the pass rates and scores of the UP BCEMM and MSK PANCE was examined using chi squared test of independence. Differences between exam scores on the UP BCEMM and MSK PANCE for ortho/non-ortho rotation students was examined using Student's t Test. Significance was set at an alpha of $p < 0.05$

Results

Tool	PACKRAT 2	UP BCEMM	PANCE
Pass Rate	38.0%	63.0%	83%
Mean Score	68.9%	74.5%	79%

Table 1: Pass rates and mean scores for UPBCEMM, PACKRAT2, and PANCE (using 70%)

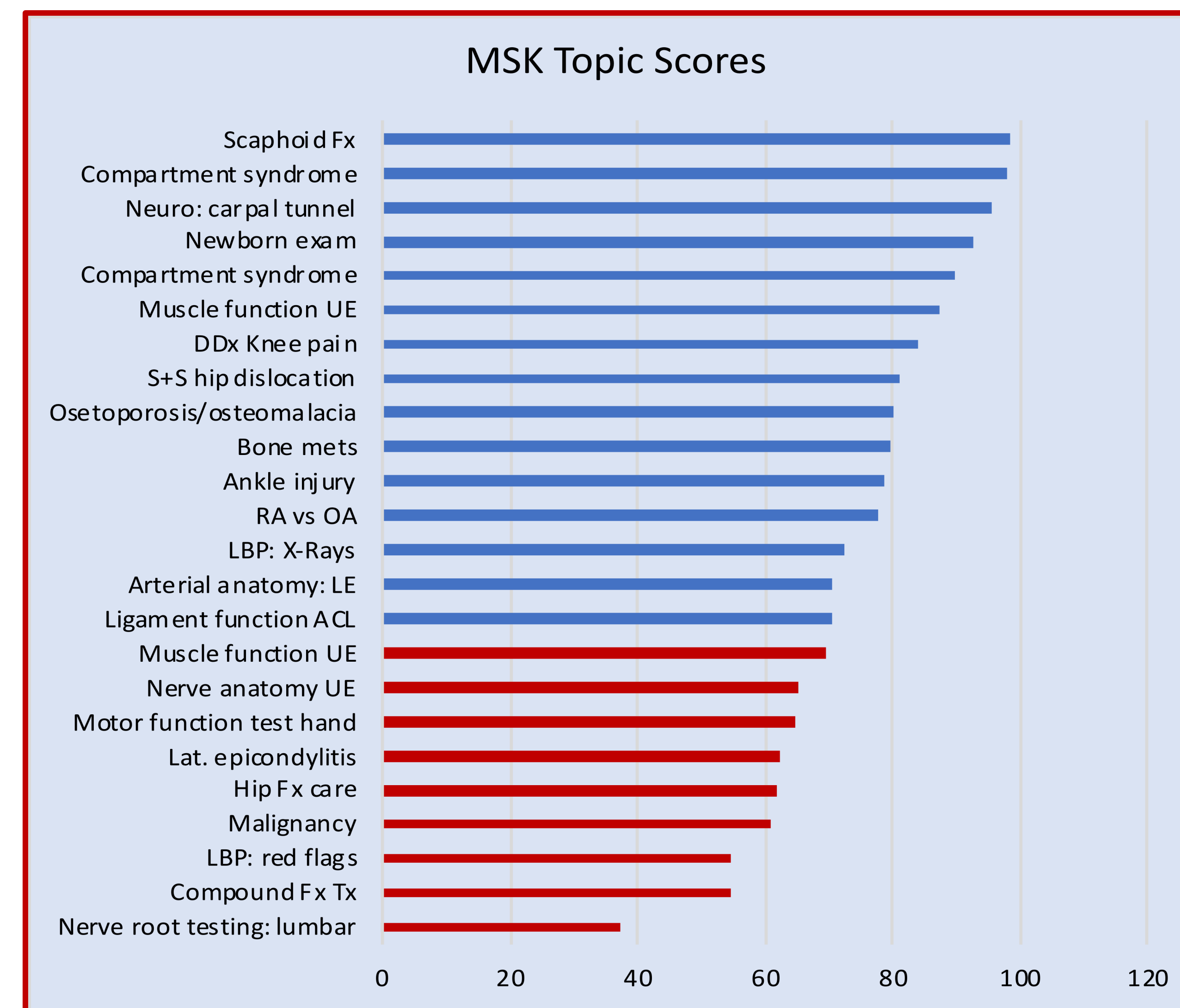


Figure 1. Mean percent scores for UP BCEMM topics (Red indicates <70%)

	Question Category			
	Clinical Red Flag	Clinical Anatomy	Theoretical Anatomy	Theoretical Red Flag
Mean % Score	59.8	70.4	72.5	93.8

Table 2: Mean % scores based on UP BCEMM question category

	UP BCEMM % score	UP BCEMM. % Pass rate	MSK PANCE % score	MSK PANCE % Pass Rate
ortho	76.4	69.5	81.2	88.4
non-ortho	73.5	59.7	77.5	79.1
difference	2.8	9.8	3.7*	9.3

Table 3: Impact of orthopedic rotation on test scores and pass rates (* $p = 0.0015$)

Results (cont.)

- Response rates for PACKRAT 2 ,UP BCEMM, and PANCE were 100%, 94.7%, and 99.6% respectively
- Pass rates for PACKRAT 2 ,UP BCEMM, and PANCE were 38%, 63%, and 83% respectively.(Table 1)
- Mean exam scores for PACKRAT 2 ,UP BCEMM, and PANCE were 68.9%, 74.5%, and 79% respectively.(Table 1)
- Knowledge gaps were identified in neurology, anatomy, fracture care, and clinical "red flag" case scenarios. (Figure 1, Table 2)
- There was a weak correlation between the UP BCEMM and the PACKRAT 2 ($r = 0.052$), the UP BCEMM and PANCE ($r = 0.067$), and the PACKRAT 2 and PANCE ($r = 0.123$).
- MSK PANCE exam scores were significantly higher for students who participated in an orthopedic rotation compared to those who did not. Pass rates revealed no significant difference between groups. (Table 3)

Conclusions

UP BCEMM performance was higher than reported in previous studies with medical students, residents, and PA students. However, a pass rate of 63% and a mean score of 74.5% may fall below many current PA program benchmarks. UP BCEMM can serve to highlight specific knowledge gaps prior to graduation. PACKRAT pass rates and mean scores (38% and 68.9% respectively) were comparatively low and were useful in identifying overall MSK knowledge prior to graduation. PACKRAT results likely served as a useful study tool to enhance MSK PANCE performance. There was weak correlation of mean scores among the UP BCEMM, MSK PACKRAT2, and MSK PANCE indicating that, although these tools are useful in evaluating MSK knowledge, they are not reliable predictors of PANCE scores. Although MSK PANCE performance was favorable, it can only be used to identify gaps post-graduation, after PA program intervention is no longer possible. Since PAs are increasingly being called upon to fill gaps in MSK medicine, further MSK knowledge studies triangulating data from both current widely accepted tools and new assessment tools should be undertaken to assess knowledge and identify gaps prior to graduation. Required orthopedic rotations should be considered to enhance MSK knowledge.

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