

# Patient Perceptions of Athletic Trainers and Orthopaedic Medical Residents as Primary Clinical Support Staff in Sports Medicine Practice

## A Randomized, Double-Blinded Prospective Survey

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**BACKGROUND:** Orthopaedic sports medicine practices utilize a variety of healthcare professionals to assist physicians in the clinic. The purpose of this study was to investigate patients' perception of orthopaedic knowledge and clinical care provided by orthopaedic medical residents and athletic trainers (ATs). **HYPOTHESIS:** ATs will be perceived similarly to orthopaedic medical residents in overall patient care and perceived education level. **STUDY DESIGN:** Randomized, double-blind survey. **LEVEL OF EVIDENCE:** 2. **METHODS:** New patients were randomly selected to receive the survey to complete during an office visit. The survey included 8 questions which rated the patient's perceived level of orthopaedic knowledge and level of patient care provided by the AT and orthopaedic medical residents. A total of 110 surveys were collected during the 2-year study period. The data were analyzed using a multivariate analysis of variance (MANOVA). **RESULTS:** The multivariate effect (Pillai's trace) was not significant between clinicians,  $F_{(8,111)}=0.122$ ,  $p=0.695$ , partial  $\eta^2=0.106$ . Univariate tests showed a significance between patient perceived level of clinician education,  $F_{(1,118)}=5.361$ ,  $p=0.632$ , partial  $\eta^2=0.043$ . Univariate test showed no significant differences on any other dependent variables. **CONCLUSION:** There is no evidence that patients' perception is different when comparing ATs and orthopaedic medical residents in orthopaedic knowledge and clinical care. Although a statistically significant difference was found in the perceived highest level of

education attained, orthopaedic medical residents and ATs were each perceived to have a master's degree level of education. Physicians should continue to use ATs in their practices. *J Allied Health* 2015; 44(4):225-228.

**IN THE ORTHOPAEDIC** sports medicine clinic, clinicians, such as physician assistants (PA), nurses (RN), and medical assistants (MA), have traditionally been utilized by physicians in various capacities. It is important to note that these clinicians maintain the title or credential of their profession (i.e., nurse practitioner, orthopaedic medical resident, or physician assistant) while providing services in the clinic.

The practice of athletic training encompasses the prevention, examination and diagnosis, treatment, and rehabilitation of emergent, acute, subacute, and chronic neuromusculoskeletal conditions and certain medical conditions in order to minimize subsequent impairments, functional limitations, disability, and societal limitations.<sup>7,10,14</sup> An athletic trainer's (AT) credential is dependent upon the completion of an athletic training program accredited by the Commission on Accreditation of Athletic Training Education (CAATE) and passing a National Board of Certification exam. More than 70% of ATs who receive a bachelor's degree in athletic training also go on to obtain a master's degree.<sup>3,11,12</sup> In order to practice as a physician, students can go on to medical residency programs. These programs include 3 to 7 years of professional training under the supervision of senior physician educators in a specific field, such as orthopaedics.<sup>1</sup>

Several studies have reported patients' perception of medical residents involved in their care. Malcolm et al. investigated patient perception of medical residents in a family practice clinic, reporting an overall satisfaction of care and comfort in having medical residents involved in their care, ranking from good to excellent in 91% of patients.<sup>9</sup> Dalia et al. investigated patient per-

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ception of who the “main physician” was between first-year medical residents and attending physicians. Most patients (59%) viewed the first-year medical resident as their “main physician.” It was suggested that the perception towards the medical resident was related to the amount of time spent with the patient in comparison.<sup>4</sup> Huynh et al. investigated patient perception of medical residents in a dermatology clinic in which residents were measured on a scale of 1 to 10 and averaged a score of 9.7 with overall satisfaction by their patients in regards to the overall care given.<sup>8</sup>

Orthopaedic clinics have started employing ATs in the orthopaedic sports medicine clinic as physician extenders.<sup>14,15</sup> Studies have shown this model can increase patient throughput and productivity up to 30%.<sup>5,13</sup> A recent business case has been developed to demonstrate the projected downstream revenue based on increased patient clinical volumes. Currently, ATs working in the offices of physicians consist of approximately 6% of athletic training jobs and are one of the higher areas of growth in the profession.<sup>2</sup>

Previous studies have reported on patients’ perception of their health care providers and how this relates to the quality of care delivered.<sup>4,8,9</sup> Few, if any, have investigated the patients’ perception of the care they have received by health care providers in the orthopaedic setting.<sup>14</sup> The purpose of this study is to investigate and compare patients’ perception of clinical care and orthopaedic knowledge of orthopaedic medical residents and ATs. It is hypothesized that ATs will be perceived similarly as orthopedic medical residents.

## Methods

IRB approval was obtained for this study through Emory University in Atlanta, Georgia. There were no HIPPA identifiers or demographic data of the participants collected during the study period to ensure anonymity.

Over a 2-year span, an eight-question survey (Appendix 1) was administered in three orthopaedic physicians’ clinics at an orthopaedic sports medicine clinic. The physicians’ specialties included shoulder, knee, ankle, and foot. Each physician had 2 full clinic days per week in which the survey was administered. Patients were randomly chosen by a clinical support AT who was not included as one of the clinicians being studied. Patients were chosen through a randomization of medical record numbers each day. Each clinician was blinded to which patients would be receiving the survey, and patients were blinded to the professional qualifications of the clinician providing care.

Clinicians included an AT or an orthopedic medical resident. The orthopedic medical residents were in their

third or fourth program year (PGY 3–4) while completing a rotation in the sports medicine clinic. ATs were completing a 1-year residency program in the orthopaedic setting at the time of the survey. During the 2-year study period, there were 9 orthopaedic medical residents and 5 ATs each year. This accounted for a total of 18 orthopaedic medical residents and 10 ATs included in the study.

Name badges were removed and clinicians introduced themselves by first name and which specific attending physician they were working with. Both ATs and orthopedic medical residents were responsible for presenting their patients’ clinic findings to the attending physician. This included patient histories, present illness, physical examination findings, ordering radiographs (per supervising physician protocol), and review of previous studies or visits. Orthopedic medical residents also completed heart and lung exams for surgical patients; however, these patients were excluded from the study. Participants were also excluded if they were an established patient, follow-up patient, post-operative patient, failed to complete the survey, or if at any time the identity of the clinician’s profession was disclosed. Content validity of the survey was completed through review of an expert panel which included physicians and ATs. The questions were then reviewed by random patients prior to the onset of the study to ensure question content validity.

The survey results were graded on an 11-point Likert scale to help accurately capture each participant’s subjective measurement. The survey did not capture any identifying information such as name, address, or date of birth. Upon completion of their visit with the attending physician, patients chosen to receive the survey were asked to return the completed survey to the clinical support staff. The survey asked the patient to rate their perceived level of orthopaedic knowledge and perceived level of care provided by the initial clinician they encountered. The data were analyzed using a multivariate analysis of variance (MANOVA). Statistical significance was set *a priori* at 0.05.

## Results

The multivariate analysis of variance (MANOVA) (Table 1) was conducted to assess patients’ perceptions of their clinician interactions with ATs and orthopaedic medical residents. A significant box’s M test (Table 2) ( $p < 0.000$ ) indicates nonhomogeneity of covariance matrices of the dependent variables for each clinician. A *post hoc* power analysis using G\*Power 3.1.6 demonstrated a power of 0.695.

The multivariate effect (Table 3), Pillai’s trace, was not significant between clinicians,  $F_{(8,111)} = 0.122$ ,  $p = 0.695$ , partial  $\eta^2 = 0.106$ . Univariate tests (Table 4) showed that there was a significance between patient perceived level of clinician education,  $F_{(1,118)} = 5.361$ ,  $p = 0.032$ , partial

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**TABLE 1.** Patient Descriptive Statistics

	Mean	SD	No.
Knowledge of clinician			
Resident	8.1818	1.30655	55
AT	8.1385	1.65715	65
Total	8.1583	1.50068	120
Knowledge compared to physician			
Resident	7.5091	1.71996	55
AT	7.4615	2.14386	65
Total	7.4833	1.95316	120
Level of education			
Resident	8.1636	1.56067	55
AT	7.4462	1.79436	65
Total	7.7750	1.72214	120
Extent answered questions			
Resident	8.5636	1.13470	55
AT	8.4615	1.85470	65
Total	8.5083	1.56106	120
Extent managed care			
Resident	8.6727	1.24803	55
AT	8.8308	1.25710	65
Total	8.7583	1.25018	120
Demonstration of professionalism			
Resident	9.2727	1.11313	55
AT	9.5077	0.75256	65
Total	9.4000	0.93844	120
Demonstration of communication			
Resident	9.2182	1.16573	55
AT	9.4462	0.90192	65
Total	9.3417	1.03303	120
Overall satisfaction			
Resident	8.9455	1.37999	55
AT	9.0154	1.31687	65
Total	8.9833	1.34091	120

$\eta^2=0.043$ . Univariate test showed no significant differences on any of the other dependent variables.

### Discussion

To our knowledge, no study has compared patient perceptions of an AT or orthopaedic medical resident's level of patient care and orthopaedic knowledge. Seven of the eight questions showed no statistical difference

**TABLE 2.** Box's Test of Equality of Covariance Matrices\*

Box's M	93.807
F	2.417
df1	36
df2	44223.933
Sig.	0.000

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

\*Design: Intercept + Clin.

between ATs and orthopaedic medical residents in patient perception of orthopaedic knowledge or quality of care. A statistically significant difference was found between orthopaedic medical residents and ATs in the question assessing "highest level of education you think this clinician has attained." Although a statistically significant difference was found, both of these averages fell under the survey rating of a master's degree. Trends showed higher scores for the orthopaedic medical residents in patient perceived orthopaedic knowledge, whereas trends for ATs showed higher for patient perceived clinical care.

Both ATs and orthopaedic medical residents in an orthopaedic clinic attained high scores in overall patient satisfaction of care given and orthopaedic knowledge. There is no evidence that patient's perception is different when comparing ATs and orthopaedic medical residents. ATs should continue to be utilized in the orthopaedic sports medicine clinic setting.

There are studies that have investigated patient perception of care in multiple health care settings, such as family medicine clinics and teaching hospitals.<sup>4,8,9</sup> In the study by Dalia et al.,<sup>4</sup> it was suggested that patient perception scores were higher for a first-year medical resident when compared to the attending physician. This is consistent with the AT and orthopaedic medical resident model in a sports medicine clinic. ATs and orthopaedic medical residents provide additional time

**TABLE 3.** Multivariate Tests\*

Effect	Value	F <sup>†</sup>	Hypothesis df	Error df	Sig.	Partial $\eta^2$	Noncent. Parameter	Observed Power <sup>‡</sup>
Intercept								
Pillai's trace	0.991	1457.699	8.000	111.000	0.000	0.991	11661.593	1.000
Wilks' lambda	0.009	1457.699	8.000	111.000	0.000	0.991	11661.593	1.000
Hotelling's trace	105.059	1457.699	8.000	111.000	0.000	0.991	11661.593	1.000
Roy's largest root	105.059	1457.699	8.000	111.000	0.000	0.991	11661.593	1.000
Clin								
Pillai's trace	0.106	1.639	8.000	111.000	0.122	0.106	13.110	0.695
Wilks' lambda	0.894	1.639	8.000	111.000	0.122	0.106	13.110	0.695
Hotelling's trace	0.118	1.639	8.000	111.000	0.122	0.106	13.110	0.695
Roy's largest root	0.118	1.639	8.000	111.000	0.122	0.106	13.110	0.695

\*Design: Intercept + Clin.; <sup>†</sup>Exact statistic; <sup>‡</sup>Computed using  $\alpha=0.05$ .

**TABLE 4.** Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial $\eta^2$	Noncent. Parameter	Observed Power
Clinician	Knowledge of clinician	0.056	1	0.056	0.025	0.875	0.000	0.025	0.053
	Knowledge compared to physician	0.067	1	0.067	0.018	0.895	0.000	0.018	0.052
	Level of education	15.336	1	15.336	5.361	0.022	0.043	5.361	0.632
	Extent answered questions	0.311	1	0.311	0.126	0.723	0.001	0.126	0.064
	Extent managed care	0.744	1	0.744	0.474	0.493	0.004	0.474	0.105
	Demonstration of professionalism	1.645	1	1.645	1.881	0.173	0.016	1.881	0.275
	Demonstration of communication	1.548	1	1.548	1.456	0.230	0.012	1.456	0.224
	Overall satisfaction	0.146	1	0.146	0.080	0.777	0.001	0.080	0.059

with the patient before and after the physician being in the room to address any questions or concerns the patient may have that does not need direct attending physician contact. This allows for further clarity for the patient and all questions to be answered satisfactorily.

Limitations for this study include bias with orthopaedic medical residents participating in the survey who are specializing in fields other than sports medicine. This is a common rotation for orthopaedic medical residents despite not specializing in sports medicine and therefore can skew their overall views toward sports medicine as a focus. An 11-point Likert scale was used for the survey; however, a 5-point Likert scale may have been more appropriate to allow patients less variability in their responses.

This study found that ATs possess a similar level of patient-perceived orthopaedic educational background and provide similar clinical care as do orthopaedic medical residents in a sports medicine clinic. This information suggests that ATs are making a successful transition and should continue to be utilized in the orthopaedic sports medicine clinic. Future studies should investigate physician satisfaction with the use of ATs as a physician extender in the orthopaedic sports medicine clinic.

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## APPENDIX 1. Patient Survey

Please provide a rating for each of the following items by drawing a circle around the number that best represents your perception of the First Clinician you encountered:

### Knowledge of the first clinician in the specialized field of Orthopædics:

None at all		Insufficient		Adequate		Substantial		Advanced		
0	1	2	3	4	5	6	7	8	9	10

### Knowledge of the first clinician in comparison to your scheduled Physician:

None at all		Minimal		Considerable		Substantial		Equal		
0	1	2	3	4	5	6	7	8	9	10

### Highest level of education you think this clinician has attained:

High School		Associates Degree		Bachelors Degree		Masters Degree		Doctoral Degree		
0	1	2	3	4	5	6	7	8	9	10

### Extent to which the first clinician encountered adequately answered all of your questions:

Not at all		Inadequate		Adequate		Very Well		Exceptional		
0	1	2	3	4	5	6	7	8	9	10

### Care:

#### Extent to which the first clinician encountered efficiently managed your care:

Not at all		Inadequate		Adequate		Very Well		Exceptional		
0	1	2	3	4	5	6	7	8	9	10

#### Extent to which the first clinician encountered demonstrated a professional manner:

Not at all		Inadequate		Adequate		Very Well		Exceptional		
0	1	2	3	4	5	6	7	8	9	10

#### Extent to which the first clinician encountered demonstrated strong communication skills:

Not at all		Inadequate		Adequate		Very Well		Exceptional		
0	1	2	3	4	5	6	7	8	9	10

#### Your Overall Satisfaction; from interaction with the first clinician you encountered:

None at all		Minimal		Considerable		Substantial		Exceptional		
0	1	2	3	4	5	6	7	8	9	10