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## Thrust joint manipulation education: Student perceptions of learning and practical experiences in spinal manipulation within entry-level physical therapist education programs

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THRUST JOINT MANIPULATION EDUCATION: STUDENT PERCEPTIONS OF  
LEARNING AND PRACTICAL EXPERIENCES IN SPINAL  
MANIPULATION WITHIN ENTRY-LEVEL PHYSICAL  
THERAPIST EDUCATION PROGRAMS

by

Joshua Thomas Marks

Bachelor of Science  
Bowling Green State University  
2005

A doctoral document submitted in partial fulfillment of  
the requirements for the

**Doctor of Physical Therapy  
Department of Physical Therapy  
School of Allied Health Sciences  
Division of Health Sciences**

**Graduate College  
University of Nevada, Las Vegas  
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THE GRADUATE COLLEGE

May 7, 2011

This Doctor of Physical Therapy Research Project prepared by

**Joshua Thomas Marks**

entitled

**Thrust Joint Manipulation Education: Student Perceptions of Learning and Practical Experiences in Spinal Manipulation Within Entry-Level Physical Therapist Education Programs**

Is approved in partial fulfillment of the requirements for the degree of

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Merrill Landers, Research Project Coordinator, Department of Physical Therapy

Harvey Wallmann, Chair, Department of Physical Therapy

Ronald Smith, Ph. D., Vice President for Research and Graduate Studies  
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ABSTRACT

**Thrust Joint Manipulation Education: Student Perceptions of Learning and Practical Experiences in Spinal Manipulation Manipulation Within Entry-Level Physical Therapist Education Programs**

by

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Background: Spinal thrust joint manipulation (TJM) education is mandatory in all professional entry-level physical therapy programs, yet TJM is under-utilized in daily practice. This descriptive study expands on previous data about how TJM is taught and includes data for the perceived confidence students have when performing TJM.

Methods: A 39-question descriptive survey inquiring about TJM education and self-perceived confidence in performing TJM was distributed via email to 213 accredited physical therapy programs. Subjects: Respondents ranged in age from 22-45 (mean age=25.61 years). Respondents included 435 professional physical therapy students (84 male, 285 female) who have completed their didactic classes. All participants have completed professional didactic coursework from an accredited physical therapy program in the United States. Results: Survey results showed that laboratory instruction resulted in more confidence in performing TJM and identifying those likely to respond to TJM than not having the information covered. Several classes of instruction, as opposed to



only one class, were more beneficial for confidence levels in identification and performance of TJM. Receiving a TJM benefitted confidence levels performing TJM as well. Conclusion: No method of instruction type or time leads to more confidence in identifying those likely to benefit from TJM or more confidence in applying TJM. Experiencing a TJM resulted in an increased confidence to perform TJM. Spinal manipulation has been shown to be an effective treatment method and is beneficial to those for whom it is clinically indicated. Since, according to research, TJM is underutilized in clinical practice, it is important to understand how students are taught manipulation techniques.

## INTRODUCTION

Thrust joint manipulation (TJM) is defined as a high-velocity low-amplitude thrust technique distinguished from other mobilization techniques that do not utilize a final thrust maneuver.<sup>1-8, 10-11</sup> A study by Boissonnault et al showed that, even though TJM is a more effective treatment for relieving low back pain compared to a placebo, it is under-utilized by clinicians in daily practice.<sup>1</sup> These authors reported that this under-utilization may be due to a lack of personal exposure within instructor and clinical instructor (CI) backgrounds.<sup>1</sup>

A study by Bronfort et al<sup>3</sup> suggests that for patients with acute low back pain, TJM is more beneficial at decreasing pain than mobilization when measured in the short term. To demonstrate the effect of TJM at a one-year follow up, Cecchi et al<sup>4</sup> found that for chronic low back pain, TJM was better at decreasing pain and disability when compared to back school and individualized physical therapy. Evidence also exists for the benefits of thoracic TJM plus exercise to alleviate neck pain and neck pain-associated disability.<sup>5</sup> Additional support for TJM can be found in a study by Childs et al<sup>6</sup>; the authors found that excluding manipulation from an exercise program increased the probability of worsening disability by eight times at the one-week follow-up. The above studies show that the effects of TJM have been found to be beneficial in the care of patients with back and neck pain.

Flynn et al reported that clinicians will use skills in daily practice if those skills were used during their initial training.<sup>7</sup> This supports the idea that critical clinical skills such as TJM should be included and practiced during the physical therapists' education program in order for the skill to be used later on in daily practice. To promote this, the

Commission on Accreditation in Physical Therapy Education (CAPTE) has mandated that TJM be taught in all professional programs.<sup>10</sup>

Although TJM has been mandated to be included within all professional physical therapy education programs, the degree to which manipulation is taught in schools and the types of TJM taught are not specifically regulated. This results in a lack of consistency in training and competency of entry-level clinicians.<sup>2</sup> In order for us to see improvements in the use of manipulation in clinical interventions and in the confidence of performing such manipulations, it is important to investigate the type of educational background current physical therapy students have in regard to these techniques; this process follows Flynn's notion that initial training may result in daily use.<sup>7</sup>

The purpose of this survey was to gain insight into how TJM is taught in professional physical therapy education programs, to assess how confident students were in identifying potential candidates for TJM, to document students' experience receiving TJM, and to assess student confidence levels performing TJM. Our goal was to measure the connection between how TJM is taught and the resultant confidence to utilize TJM in clinical practice. This information could then potentially be used to make recommendations on how best to instruct TJM to improve confidence in the utilization of TJM in clinical practice.

## Methods

### Respondents

Our target population for this survey included students who have completed their didactic classes. There are currently 213 physical therapy professional degree programs in the United States as recognized by CAPTE.<sup>12</sup> According to CAPTE 23, 361 physical therapy students were enrolled during the 2009 -2010 academic year when survey data was collected. Of the enrolled students, our survey targeted only those students who had completed their didactic coursework, accounting for approximately one third of the total enrollment (7787 students). A total of 435 surveys were received. This accounts for approximately 5.58% of the target population for this survey. Student respondents ranged in age from 22-45 (mean age=25.61 years) representing 67 different schools in 32 different states. A full list of descriptive characteristics for our respondents can be found in Table 1.

### Study Design

A survey was designed for physical therapy students in accredited physical therapy education programs who had completed or were near completion of their didactic coursework. This survey provided an opportunity to examine the confidence levels of students regarding identifying and performing manipulation in comparison to the education they received from their educational programs and their personal experience receiving TJM.

### Development of Survey Instruments

The preliminary draft of our survey focused on obtaining data related to how TJM was taught in the respondents' professional education program, how much time was

devoted to teaching TJM, the experience students had receiving TJM, and the respondents' confidence performing TJM. Demographic questions were also included in the survey but were not used during statistical analysis.

A critical review for face and content validity of the survey questions was performed by 6 of the student target population and 6 physical therapy faculty; corrections were made based on the comments received. The revised survey was then transferred to an online format, SurveyMonkey.<sup>a</sup> The final survey instrument included 39 questions and test-retest reliability was assessed. Test-retest reliability was calculated with data from 43 physical therapy students in their final year. Each student completed their respective survey twice separated by one week. Each individual item showed fair to excellent agreement ( $\kappa=.298-1.00$ ). The students included in the development of the original survey were not included in the collected responses for data analysis.

#### Administration of the Surveys

An introductory letter was sent to the Chair/Director of each accredited physical therapist education program via email requesting that they participate in our survey. The list of chairpersons was obtained from the APTA.<sup>11</sup> Each Chair/Director was asked to forward the introductory email to all their current physical therapy students who had completed their didactic coursework. The email directed the potential respondents to SurveyMonkey to complete the appropriate survey. Information about our survey was also posted on an electronic billboard<sup>b</sup> for the professional education section of the APTA.<sup>c</sup> Follow-up emails were sent to each professional physical therapist education

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<sup>a</sup> California Office, 640 Oak Grove Avenue, Menlo Park, CA 94025

<sup>b</sup> <http://www.aptaeducation.org/>

<sup>c</sup> 1111 N. Fairfax Street, Alexandria, VA 22314

program department thanking them for their participation as well as requesting additional encouragement for participation in our study if they had not already done so. Data was collected over a seven month time period.

For the specific questions that were analyzed for each survey, please see Table 2.

### Data Analysis

Data from the completed surveys were analyzed using SPSS 16.0.<sup>d</sup> All survey questions were recorded for descriptive data but only certain questions were analyzed for the purpose of this study.

Multiple one-way analyses of variance were performed to analyze the statistical difference between the levels of the dependent and independent variables. Independent variables consisted of type of instruction, amount of instruction, and experience with receiving a TJM. Dependent variables consisted of the subjective confidence in identifying people who would benefit from TJM and confidence in performing TJM. All variables were collected and analyzed related to specific spinal regions (cervical, thoracic, lumbar, and sacroiliac). When appropriate, Tukey post hoc tests were performed to find the specific differences between the means.

## Results

### Confidence in identification according to instruction type

A significant difference existed among the types of instruction (lab, lecture, video, reading, online, other and not covered) on the respondents' subjective level of preparedness in identifying candidates for TJM in several spinal regions:

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<sup>d</sup> IBM Corporation, Route 100, Somers, NY 10589

pelvic/sacroiliac region,  $F(3,329)=3.510$ ,  $p=.016$ ; lumbar region,  $F(3,360)=4.801$ ,  $p=.003$ ; and the thoracic region,  $F(3,368)=6.804$ ,  $p<.0005$ . There was no significant difference between confidence and instruction type regarding the cervical region,  $p=.158$  (Table 3). Pairwise comparisons are found in Table 4 and Figure 1.

#### Confidence in identification according to instruction time

A significant difference existed among instruction time (one class, several classes, one semester, several semesters, not covered) on the preparedness in identifying candidates for TJM in all spinal regions: pelvis and sacroiliac region,  $F(4,328)=7.439$ ,  $p<.0005$ ; lumbar region,  $F(3,357)=7.048$ ,  $p<.0005$ ; thoracic region,  $F(3,365)=8.953$ ,  $p<.0005$ ; and the cervical region,  $F(4,267)=2.867$ ,  $p=.024$  (Table 5). Pairwise comparisons are found in Table 6 and Figure 2.

#### Confidence in identification according to experience receiving TJM

A significant difference existed among experience receiving TJM (good experience, bad experience, no experience) on the subjective preparedness in identifying candidates for TJM in several spinal regions: pelvic/sacroiliac region,  $F(2,364)=6.912$ ,  $p=.001$ ; lumbar region,  $F(2,363)=4.682$ ,  $p=.010$ ; and the thoracic region,  $F(2,369)=6.010$ ,  $p=.003$ . Experience involving TJM to the cervical region found no significant difference,  $p=.658$  (Table 7). Pairwise comparisons are found in Table 8 and Figure 3.

#### Confidence to perform TJM according to experience receiving TJM

A significant difference existed among experience receiving TJM on confidence performing TJM in all spinal regions: pelvic and sacroiliac region,  $F(2,353)=70.264$ ,  $p<.0005$ ; lumbar region,  $F(2,354)=35.580$ ,  $p<.000$ ; thoracic region,  $F(2,358)=45.122$ ,

$p < .0005$ ; and the cervical region,  $F(2,344)=38.864$ ,  $p < .0005$  (Table 9). Pairwise comparisons are found in Table 10 and Figure 4.

#### Confidence to perform TJM according to instruction type

A significant difference existed among type of instruction on subjective confidence performing TJM in all spinal regions: pelvic/sacroiliac region,  $F(3,313)=17.935$ ,  $p < .0005$ ; lumbar region,  $F(3,341)=6.432$ ,  $p < .0005$ ; thoracic region,  $F(3,347)=8.526$ ,  $p < .0005$ ; and cervical spine,  $F(4,263)=19.888$ ,  $p < .0005$  (Table 11). Pairwise comparisons are found in Table 12 and Figure 5.

#### Confidence to perform TJM according to instruction time

A significant difference existed among instruction time on confidence performing TJM in all spinal regions: pelvic/sacroiliac region,  $F(4,312)=22.062$ ,  $p < .0005$ ; lumbar region,  $F(3,337)=4.084$ ,  $p = .007$ ; thoracic region,  $F(3,343)=3.561$ ,  $p = .015$ ; and the cervical region,  $F(4,246)=14.261$ ,  $p < .0005$  (Table 13). Pairwise comparisons are found in Table 14 and Figure 6.

### Discussion

The premise of our study, set out by Boissonnault, is that TJM is under-utilized by clinicians when TJM is indicated.<sup>1</sup> The purpose of this study was to gather objective information about how TJM is currently being taught in professional physical therapy education programs and determine if the method of instruction adequately prepared students to confidently identify and apply TJM.



Several important trends were observed in this study regarding type of TJM instruction, amount of instruction provided, perceived confidence identifying potential candidates for TJM, perception receiving TJM, and confidence applying TJM.

When laboratory instruction was utilized during TJM training, in all spinal regions except the cervical spine, student confidence levels increased in regards to being able to identify those likely to benefit from TJM, compared to not covering the information. Not covering the information about the cervical spine resulted in statistically the same confidence levels for all types of instruction. Regarding the lumbar spine and identifying patients who would benefit from TJM lab instruction was found to be more beneficial than lecture. During manual therapy techniques, the “feel” of the movement is usually an emphasis of instruction.<sup>14</sup> Possibly, laboratory instruction allows students to have a better feel for a restriction than simple verbal training. With this line of logic, it is puzzling that all spinal areas did not show the same results.

In all areas of the spine, lab and/or lecture instruction resulted in more confidence for the actual performance of the thrust technique as opposed to not covering the information. Having some method of instruction improved confidence in performing TJM in general, however; there appears to be a lack of confidence in performing TJM to the cervical spine regardless of having instruction. Unfortunately, we cannot make a recommendation about which is better, lab or lecture education, we can only state that one instruction or the other gives students more confidence in performing TJM than not covering the information.

For all areas of the spine several classes yielded more confidence than one class in both identifying patients and performing the thrust techniques. This follows Triano’s

notion that the length and extent of prerequisite courses on TJM can benefit students in learning about the technique. Additionally, starting this training early on can make a beneficial difference.<sup>12</sup> From this, it can be inferred that, in order to be confident applying a thrust technique, the student should be confident in identifying who would benefit from it. The lone exception to this trend involves the performance of the technique to the cervical spine. Here, it is important to know that education lasting at least one semester resulted in more confidence than not covering the information. However, the general reported values for the cervical spine showed that students disagreed that they were confident at all in performing cervical manipulation. It could be reasoned that the vulnerability and complexity of the cervical spine may be causing this uneasiness in performing these techniques. It would be interesting to investigate if students are confident in mobilizing the cervical spine, but not applying the thrust.

In feeling prepared to identify those likely to benefit, those who had reported a favorable experience receiving a TJM were more confident than those who had not received a manipulation, except in the cervical spine. It may be considered that, if a student can have a positive experience receiving a TJM, they may better understand that the procedure can be beneficial to those needing it, especially if the receiving student met an inclusion criterion for the manipulation.

Comfort in performing a TJM and experience receiving a technique showed that any experience receiving a manipulation showed a greater confidence in performing it, except in the thoracic spine. The “feel” of the technique, whether good or not, may be an important factor in producing confidence. It is possible that knowing how not to perform a manipulation is just as important as knowing how. In the thoracic spine, having a bad

experience with a manipulation yielded the same lack of confidence in performing a thoracic manipulation compared to not having one. In this instance, having the thrust done correctly appears to be more important than a bad thrust or any at all. The thoracic manipulation, according to the results, seems to need the correct execution of the technique in order to produce confidence applying the manipulation to someone else.

Even with usable results, this study was not without limitations. One of the limitations is that survey choices were not explicitly quantified, meaning that response choices should have been defined using numerical boundaries, such as in response choices between one class and one semester. Since one class typically lasts one semester, this may have created confusion in answering the question. Also, one class could mean a class that lasted for one day. Additionally, respondents were given choices like lab, lecture and other. The term 'other' was not quantified, so only assumptions could be made to its meaning. Future versions of the survey should define 'other' to mean a combination of laboratory and lecture instruction, as this was not the case in the current survey. Lastly, our survey had no security means to prevent participants from taking the survey multiple times; however, there was no incentive to take the survey more than once and no repeated IP addresses or abnormal data input trends were found.

Future research could include a longitudinal study to follow third-year students until they have been in practice for three years. This might help to show beginning and ending levels of confidence, as well as show the longer-term effectiveness of didactic coursework. Additional information regarding how much time was spent in laboratory or lecture instruction would be beneficial. This would help professional physical therapy education programs to identify the most effective method of teaching TJM. Individual

programs could also carry out their own studies to find this information. Further research should investigate the reasons why a student is or is not confident with the subject of TJM, especially when specifically related to region. This might further benefit program curricula in assuring the best way to instruct students. Finally, an interesting descriptive statistic was observed from the raw data in this study where in some responses students reported that TJM information was not covered at all in their program. Therefore additional research should be conducted focusing on whether this report is factual or perceived.

### Conclusion

In order for students to be able to confidently identify those likely to respond to TJM, information must be presented in one form or another during the students' graduate education. In general, laboratory instruction appears to be the better choice as opposed to not covering the information in terms of instruction type, although, no method leads to more confidence in identifying those likely to benefit from TJM, or more confidence in applying the thrust, more than another. Several classes appear to increase students' confidence more than one class of instruction, for most spinal regions.

Any experience receiving a manipulation, good or bad, can increase the students' confidence to perform a similar TJM, as compared to never receiving one at all. Receiving a manipulation would most likely take place during laboratory instruction, which lends support to the above finding that lab practice is beneficial to adequately learning TJM, improving confidence in identifying potential candidates for TJM and applying TJMs.

Spinal manipulation has been shown to be an effective treatment method in a previous study and has been shown to benefit those for whom it is clinically indicated. Having the confidence to perform these techniques may be a result of proper education, practice and exposure. With the knowledge to appropriately use these skills, one might be able to increase the ability to use these treatment methods.

## BIBLIOGRAPHY

1. Boissonnault W, Bryan JM. Thrust joint manipulation clinical education opportunities for professional degree physical therapy students. *J Orthop Sports Phys Ther.* 2005;35(7):416-423.
2. Boissonnault W, Bryan JM, Fox KJ. Joint manipulation curricula in physical therapist professional degree programs. *J Orthop Sports Phys Ther.* 2004;34(4):171-178.
3. Bronfort G, Haas M, Evans RL, Bouter LM. Efficacy of spinal manipulation and mobilization for low back pain and neck pain: a systematic review and best evidence synthesis. *The Spine Journal.* 2004;4:335-356.
4. Cecchi F, Molino-Lova R, Chiti M, et al. Spinal manipulation compared with back school and with individually delivered physiotherapy for the treatment of chronic low back pain: a randomized trial with one-year follow-up. *Clinical Rehabilitation.* 2010;24:26-36.
5. Cleland JA, Mintken PE, Carpenter K, et al. Examination of a clinical prediction rule to identify patients with neck pain likely to benefit from thoracic spine thrust manipulation and a general cervical range of motion exercise: multi-center randomized clinical trial. *Physical Therapy.* 2010;90:1239-1252.
6. Childs JD, Flynn TW, Fritz JM. A perspective for considering the risks and benefits of spinal manipulation in patients with low back pain. *Manual Therapy.* 2006;11:316-320.
7. Flynn TW, Wainner RS, Fritz JM. Spinal manipulation in physical therapist professional degree education: A model for teaching and integration into clinical practice. *J Orthop Sports Phys Ther.* 2006;36(8):577-587.
8. King PM. The manipulation education manual: Support for evidence-based education. *J Orthop Sports Phys Ther.* 2005;35(7):407-408.
9. American Physical Therapy Association. CAPTE accredited physical therapist education programs.  
[http://www.apta.org/AM/Template.cfm?section=PT\\_Programs&template=/aptaapps/accreditedschools/acc\\_schools\\_map.cfm&process=3&type=PT](http://www.apta.org/AM/Template.cfm?section=PT_Programs&template=/aptaapps/accreditedschools/acc_schools_map.cfm&process=3&type=PT). Accessed June 8, 2009.
10. Commission on Accreditation in Physical Therapy Education. Evaluative Criteria for the Accreditation of Education Programs for the Preparation of Physical Therapists. Alexandria, Va:American Physical Therapy Association;1998.
11. American Physical Therapy Association, ed. *Guide to Physical Therapist Practice.* ; 2001; No. 2nd ed.

12. American Physical Therapy Association. Welcome to CAPTE. Commission on Accreditation in Physical Therapy Education. 2011. Available at: <http://www.capteonline.org/home.aspx>. Accessed April 14, 2011.
13. Triano JJ, Bougie J, Rogers C, et al. Procedural skills in spinal manipulation: do prerequisites matter? *The Spine Journal*. 2004;4:557-563.
14. Olson KA. *Manual Physical Therapy of the Spine*. St. Louis: Saunders; 2009.

Table 1: Student Survey Descriptives

Total Participants	435
Number of Schools Participating	67
Number of States Participating	32
Number of Male Participants	84
Number of Female Participants	285
Number of Masters Programs Participating	17
Number of Doctoral Programs Participating	351
Number of participating programs that are public	188
Number of participating programs that are private	180
Number of participants having received TJM training in school	380
Number of Participants who are APTA Members	308
Age Range	22-45



Table 2

**Student responses for survey questions:**

Q1: For each joint region how was instruction provided and how much time was devoted to each region? For each spinal region (pelvis/sacroiliac, lumbar, thoracic and cervical spines), the student was asked to choose one answer from instruction type and time.

	Instruction Type
1	Lab
2	Lecture
3	Video
4	Reading
5	Online
6	Other
7	Not covered

	Instruction Time
1	One class
2	Several classes
3	One semester
4	Several semesters
5	Not covered

Q2: My program prepared me to confidently identify individuals most likely to benefit from joint manipulation? The student was asked to choose one of the following responses: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree.

Q3: Are you comfortable performing thrust joint manipulation to the spine? The student was asked to choose one of the following for each spinal region: 1=yes, 2=only if I have to for a class, 3=no.

Q4: Was your experience receiving thrust joint manipulation favorable? For each spinal region, the student was asked to choose one of the following: 1=yes, 2=no, 3=never received.

Q5: For each of the regions below, please respond to the following statement: I am comfortable applying thrust joint manipulation techniques to patients with dysfunction in this area? For each spinal region, the student was asked to choose

one of the following: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree,  
5=strongly agree.

Table 3: Means and standard deviations for confidence in identification according to instruction type.

	Lab		Lecture		Other		Not covered	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pelvis/SI	3.98	1.007	3.60	.995	4.00	1.000	3.32	1.71
Lumbar	3.93	1.000	3.21	1.188	4.25	.957	2.33	1.528
Thoracic	3.93	1.008	3.35	1.115	4.25	.957	1.67	.577
Cervical	3.95	1.036	3.50	1.202	4.00	1.000	3.89	1.036

Table 4: *Pairwise comparison results for confidence in identification according to instruction type*

	Lab vs. Lecture	Lab vs. Other	Lab vs. Not Covered	Lecture vs. Other	Lecture vs. Not Covered	Other vs. Not Covered
Sacroiliac	0.382	1.000	<b>0.019</b>	0.921	0.807	0.696
Lumbar	<b>0.048</b>	0.923	<b>0.034</b>	0.272	0.159	0.064
Thoracic	0.099	0.923	<b>0.001</b>	0.381	<b>0.040</b>	<b>0.005</b>
Cervical	Not significant					

Table 4: *Numbers in bold represent significant differences*

Table 5: Means and standard deviations for confidence in identification according to instruction time.

	One class		Several classes		One semester		Several semesters		Not covered	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pelvis/SI	3.72	.881	4.12	.955	2.78	1.716	3.89	1.364	3.337	1.257
Lumbar	3.51	.968	4.04	.929	3.59	1.501	4.25	1.215	-	-
Thoracic	3.53	.941	4.09	.936	3.52	1.504	4.14	1.167	2.00	-
Cervical	3.57	1.058	4.09	.954	3.73	1.486	3.83	1.602	3.84	1.065

Table 6: *Pairwise comparison results for confidence in identification according to instruction time*

	One Class vs. Several Classes	One Class vs. One Semester	One Class vs. Several Semesters	Several Classes vs. One Semester	Several Classes vs. Several Semesters	Several Classes vs. Not Covered	One Semester vs. Several Semesters
Sacroiliac	<b>0.012</b>	0.054	0.988	<b>0.001</b>	0.961	<b>0.015</b>	0.124
Lumbar	<b>0.000</b>	0.988	0.078	0.169	0.896		0.250
Thoracic	<b>0.000</b>	1.000	0.127	0.059	0.997		0.266
Cervical	<b>0.010</b>	0.983	0.977	0.711	0.975	0.587	1.000

Table 6: *Numbers in bold represent significant differences*

Table 7: Means and standard deviations for confidence in identification according to experience receiving TJM.

	Yes		No		Never received	
	Mean	SD	Mean	SD	Mean	SD
Pelvis/SI	4.02	1.022	3.64	.990	3.59	1.115
Lumbar	3.95	1.054	3.57	.941	3.53	1.109
Thoracic	3.93	1.054	3.62	.903	3.28	1.131
Cervical	3.93	1.112	3.83	.930	3.82	1.060

Table 8: *Pairwise comparison results for confidence in identification according to experience receiving TJM*

	Yes vs. No	Yes vs. Never Received	No vs. Never Received
Sacroiliac	0.104	<b>0.002</b>	0.971
Lumbar	0.070	<b>0.048</b>	0.098
Thoracic	0.276	<b>0.004</b>	0.424
Cervical	0.858	0.649	0.997

Table 8: *Numbers in bold represent significant differences*



Table 9: Means and standard deviations for confidence to perform TJM according to experience receiving TJM

	Yes		No		Never received	
	Mean	SD	Mean	SD	Mean	SD
Pelvis/SI	3.92	.974	3.25	.937	2.46	1.167
Lumbar	3.88	1.033	3.24	.860	2.49	1.121
Thoracic	4.02	.983	2.96	.999	2.40	1.248
Cervical	2.61	1.175	2.15	.942	1.60	.806

Table 10: *Pairwise comparison results for confidence performing TJM according to experience receiving TJM*

	Yes vs. No	Yes vs. Never Received	No vs. Never Received
Sacroiliac	<b>0.001</b>	<b>0.000</b>	<b>0.000</b>
Lumbar	<b>0.001</b>	<b>0.000</b>	<b>0.003</b>
Thoracic	<b>0.000</b>	<b>0.000</b>	0.096
Cervical	<b>0.019</b>	<b>0.000</b>	<b>0.003</b>

Table 10: *Numbers in bold represent significant differences*

Table 11: *Means and standard deviations for confidence to perform TJM according to instruction type*

	Lab		Lecture		Other		Not covered	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pelvis/SI	3.75	1.035	3.33	1.138	4.33	.577	2.10	.768
Lumbar	3.76	1.023	3.38	1.193	4.25	.500	1.33	.577
Thoracic	3.89	1.044	3.60	1.056	4.50	.577	1.00	.000
Cervical	2.62	1.123	2.04	.978	2.33	.577	1.34	.565

Table 12: *Pairwise comparison results for confidence to perform TJM according to instruction type*

	Lab vs. Lecture	Lab vs. Other	Lab vs. Not Covered	Lecture vs. Other	Lecture vs. Not Covered	Other vs. Not Covered
Sacroiliac	0.342	0.759	<b>0.000</b>	0.400	<b>0.001</b>	<b>0.003</b>
Lumbar	0.559	0.780	<b>0.000</b>	0.452	<b>0.010</b>	<b>0.001</b>
Thoracic	0.707	0.652	<b>0.000</b>	0.414	<b>0.001</b>	<b>0.000</b>
Cervical	0.056	0.988	<b>0.000</b>	0.989	<b>0.027</b>	0.451

Table 12: *Numbers in bold represent significant differences*

Table 13: *Means and standard deviations for confidence to perform TJM according to instruction time*

	One class		Several classes		One semester		Several semesters		Not covered	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Pelvis/SI	3.24	1.131	3.89	.949	4.38	.518	4.25	.886	1.94	.639
Lumbar	3.41	1.073	3.84	.965	4.00	1.333	4.00	1.000	-	-
Thoracic	3.62	1.122	3.96	.979	4.06	1.349	4.38	.650	1.00	-
Cervical	2.32	1.046	2.61	1.145	2.77	1.092	2.75	1.258	1.36	.525

Table 14: *Pairwise comparison results for confidence to perform TJM according to instruction time*

	One Class vs. Several Classes	One Class vs. One Semester	One Class vs. Several Semesters	One Class vs. Not Covered	Several Classes vs. Not Covered	One Semester vs. Not Covered	Several Semesters vs. Not Covered
Sacroiliac	<b>0</b>	<b>0.016</b>	<b>0.045</b>	<b>0</b>	0	0	0
Lumbar	0.008	0.105	0.27				
Thoracic	0.043	0.365	0.063				
Cervical	0.405	0.617	0.982	0	0	0	0.072

Table 14: *Numbers in bold represent significant differences*

Figure 1: Type of instruction and confidence identifying TJM candidates

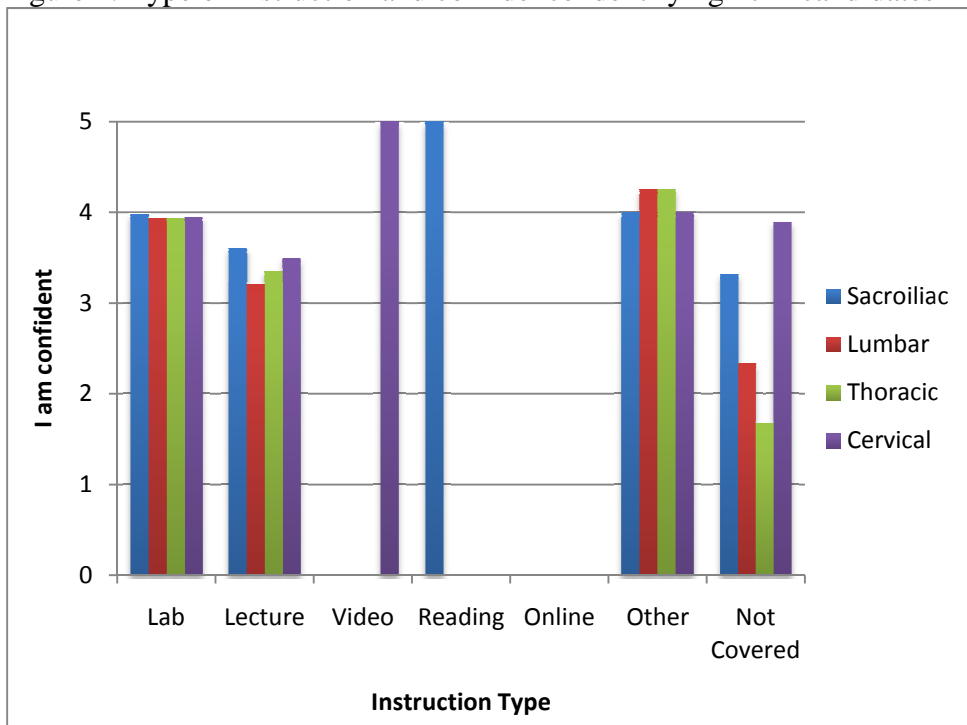


Figure 1: Confidence to identify those who would benefit from TJM according to instruction type. Strongly agree =5, neutral =3, strongly disagree=0.

Figure 2: Amount of instruction time and confidence identifying TJM candidates

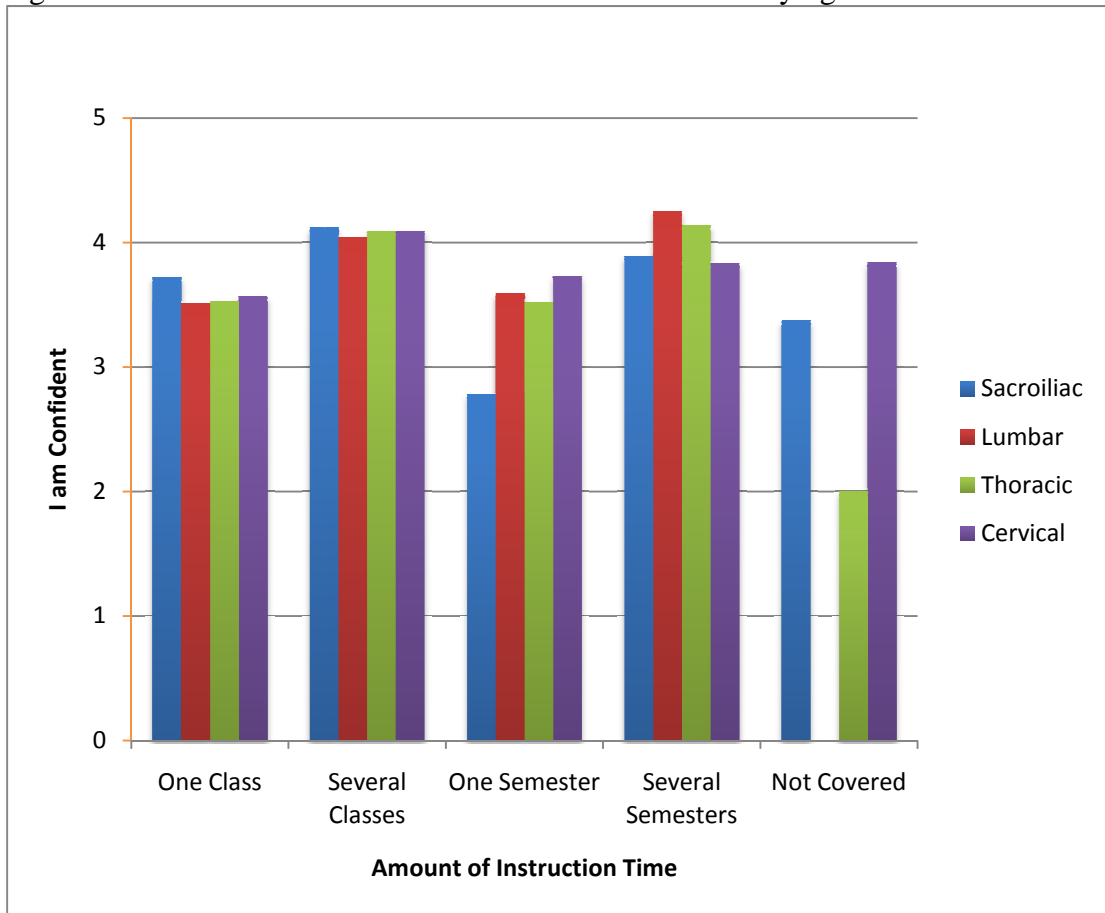


Figure 2: Confidence to identify those likely to benefit from TJM according to instruction type. Strongly agree=5, neutral=3, strongly disagree=0



Figure 3: Confidence identifying candidates for TJM and experience receiving TJM

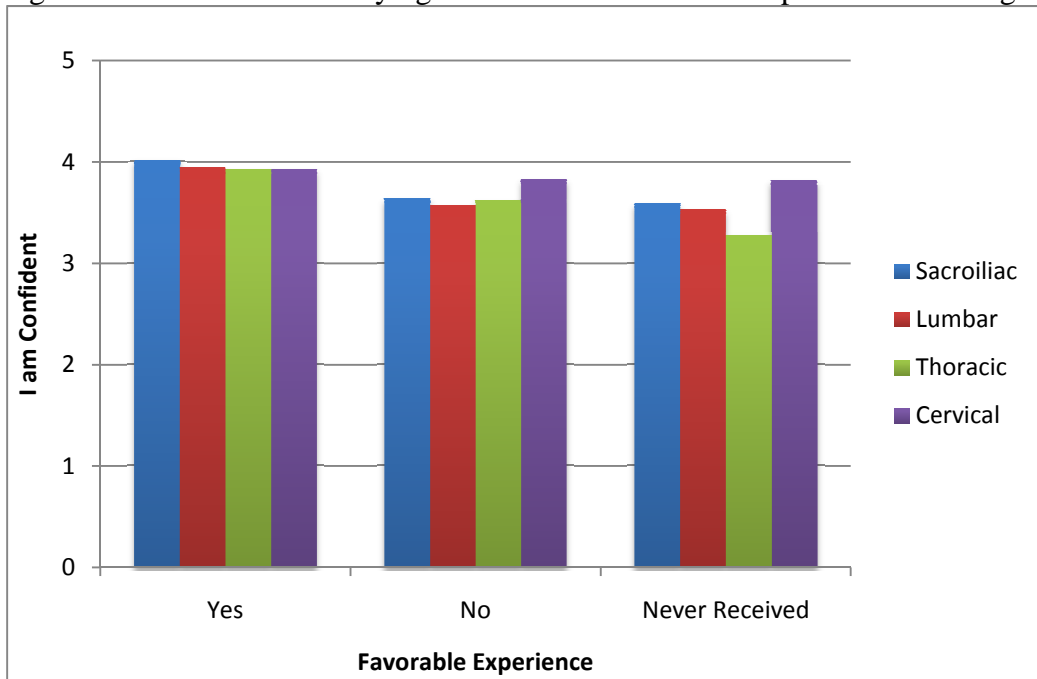


Figure 3: Confidence to identify those likely to respond to TJM according to experience receiving TJM. Strongly agree=5, neutral=3, strongly disagree=0.

Figure 4: Confidence performing TJM and experience receiving TJM

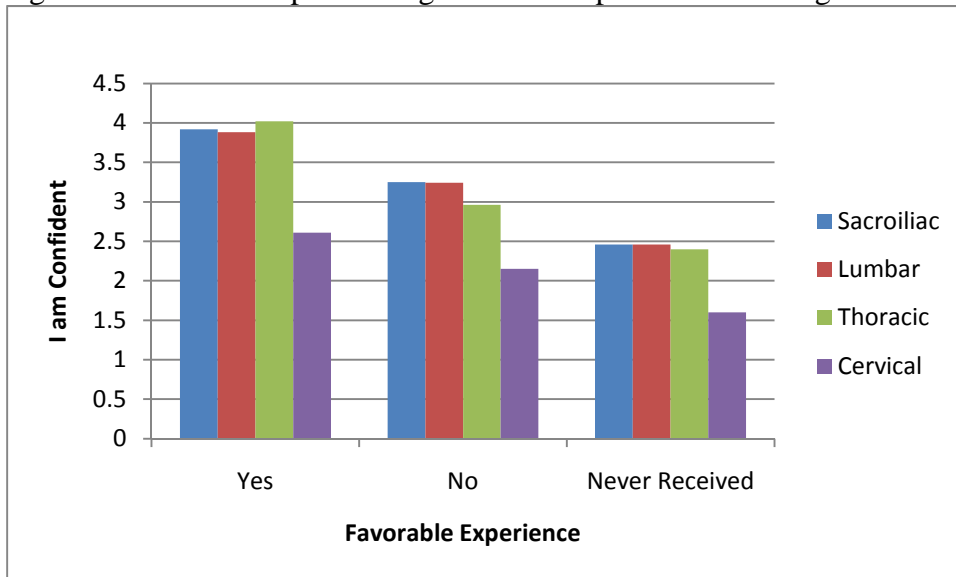


Figure 4: Confidence to perform TJM according to experience receiving TJM. Strongly agree=5, neutral=3, strongly disagree=0.

Figure 5: Type of instruction and confidence applying TJM

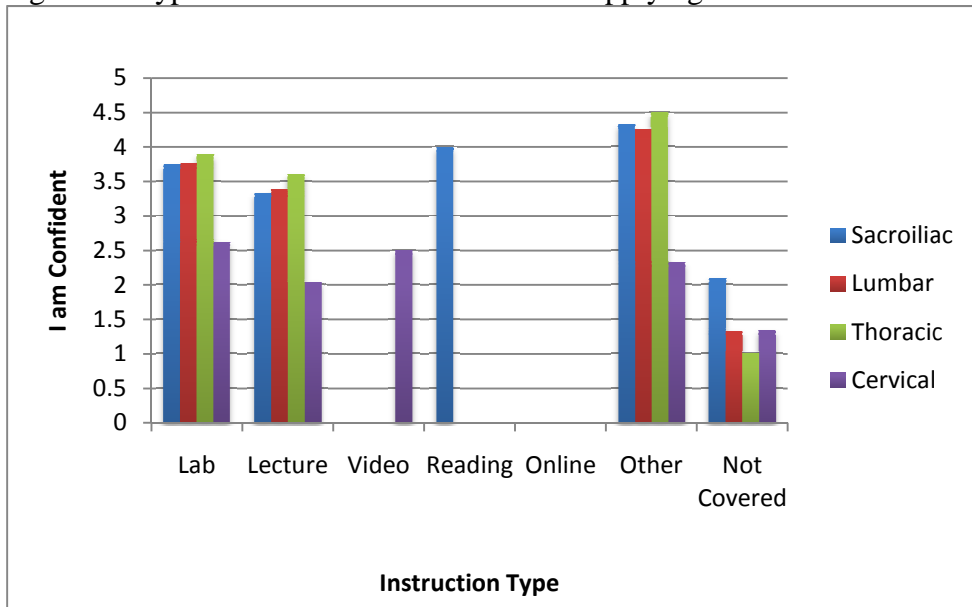


Figure 5: Confidence to perform TJM according to instruction type. Strongly agree=5, neutral=3, strongly disagree=0.

Figure 6: Amount of instruction time and confidence applying TJM

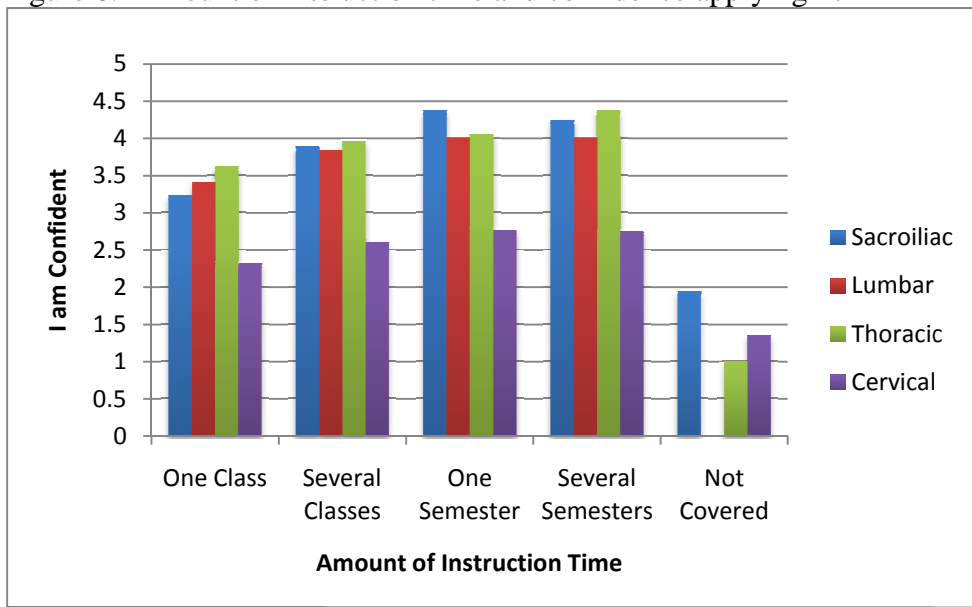


Figure 6: Confidence to perform TJM according to instruction time. Strongly agree=5, neutral=3, strongly disagree=0.



## **Biomedical IRB – Exempt Review Approved as Exempt**

**DATE:** June 1, 2009

**TO:** **Dr. Louie Puentedura**, Physical Therapy

**FROM:** Office for the Protection of Research Subjects

**RE:** Notification of IRB Action by Dr. Charles Rasmussen, Co-chair  
Protocol Title: **Thrust Joint Manipulation Education: Student and Novice Clinician Perceptions of Learning and Practical Experiences in Spinal Manipulation Education within Entry-Level Doctor of Physical Therapy Programs**  
OPRS# 0905-3118

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This memorandum is notification that the project referenced above has been reviewed by the UNLV Biomedical Institutional Review Board (IRB) as indicated in Federal regulatory statutes 45CFR46.

The protocol has been reviewed and deemed exempt from IRB review. It is not in need of further review or approval by the IRB.

**PLEASE NOTE:**

Attached to this approval notice is the **official Informed Consent/Assent (IC/IA) Form** for this study. The IC/IA contains an official approval stamp. Only copies of this official IC/IA form may be used when obtaining consent. Please keep the original for your records.

*Any* changes to the exempt protocol may cause this project to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**.

If you have questions or require any assistance, please contact the Office for the Protection of Research Subjects at [OPRSHumanSubjects@unlv.edu](mailto:OPRSHumanSubjects@unlv.edu) or call 895-2794.

VITA

Graduate College  
University of Nevada, Las Vegas

Joshua Thomas Marks

Degree:

Bachelor of Science, Biology, 2005  
Bowling Green State University

Special Honors and Awards:

Cum Laude, Bowling Green State University, 2005

Doctoral Document Title: Thrust Joint Manipulation Education: Student Perceptions of Learning and Practical Experiences in Spinal Manipulation Within Entry-Level Physical Therapist Education Programs

Doctoral Examination Committee:

Chairperson, Dr. E. Louis Puentedura, PT, DPT, GDMT, OCS, FAAOMPT  
Committee Member, Dr. Merrill Landers, DPT, OCS