

Thrust Joint Manipulation Clinical Education Opportunities for Professional Degree Physical Therapy Students

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Study Design: Descriptive survey.

Objective: Describe the availability of thrust joint manipulation clinical educational opportunities for physical therapy professional degree students.

Background: In the United States, most of the faculty teaching manual therapy content in physical therapy programs believe that the best way for their students to develop thrust joint manipulation skills is to receive additional training during clinical education experiences. There are no data that describe the availability of such training opportunities.

Methods and Measures: Seventy-three physical therapy programs that include thrust joint manipulation in their curricula were divided into 5 geographic regions. Of these programs, 27% (total, n = 20) were randomly selected per region to participate. Program academic coordinators of clinical education (ACCEs) identified their clinical instructors working in outpatient orthopaedic settings. ACCEs and clinical instructors were surveyed regarding thrust joint manipulation clinical education opportunities for students.

Results: Survey return rates were 100% for ACCEs and 67.4% for clinical instructors. Of ACCEs, 70% were unsure which sites employed clinical instructors trained in thrust joint manipulation and 85% did not consider whether thrust joint manipulation training was provided when scheduling the experience. The ACCEs who did consider availability cited lack of qualified instructors as the number-one barrier to finding sites that offered thrust joint manipulation. Of clinical instructors, 30% provide thrust joint manipulation training including lecture/theory, technique demonstration, practice on "normals," and direct patient care supervision. Clinical instructors who did not teach thrust joint manipulation cited reasons that included the belief that it is not an entry-level skill (57%), lack of qualified staff (53%), liability concerns (46%), and students not being academically prepared (41%).

Conclusions: Results suggest that the availability and scope of thrust joint manipulation clinical educational opportunities are limited, vary considerably, and are not considered when selecting clinical education sites for students. Potential obstacles to offering thrust joint manipulation training were identified, which suggested the need for resources, including clinical education curricula and philosophical guidelines for clinical instructors. *J Orthop Sports Phys Ther* 2005;35:416-423.

Key Words: joint mobilization, manipulation, manual therapy, physical therapy education

The *Guide to Physical Therapist Practice* (the *Guide*)¹ includes small-amplitude, high-velocity therapeutic movements (thrust joint manipulation [TJM]) as one example of mobilization/manipulation techniques under the "Manual Therapy in the Procedural Interventions" chapter. Research shows that physical therapists (PTs) develop TJM skills through a number of postprofessional venues, including academic degree education programs, clinical residency and fellowship training, continuing education seminars and certifications, and informal individual mentoring.⁵ The *Normative Model of Physical Therapist Professional Education, Version 2004 (Normative Model)*² also lists mobilization/manipulation, including thrust and non-thrust techniques, for the peripheral and spinal joints as an intervention appropriate for entry-level students. As such, PTs also develop TJM skills in professional (entry-level) degree programs. Although considerable variation currently exists in how TJM is integrated into professional degree physical therapy program curricula, a majority of faculty responsible for teaching manual therapy believe that the most beneficial way to enhance their students' preparation in TJM is to increase empha-

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sis on this intervention during clinical education experiences.⁵

The expectation that TJM training is routinely available to students during clinical education experiences may not be a reasonable assumption. Studies have suggested that despite evidence supporting its use, TJM is underutilized by PTs working in orthopaedic outpatient settings. Jette and Delitto¹⁵ described outpatient physical therapy treatments provided during 2598 episodes of care for patients with lumbar, cervical, or knee impairments. TJM was utilized in 3.7% of the initial stages of treatment for patients with lumbar impairments and in 1.8% of episodes of care for patients with cervical impairments. This level of use was much lower than interventions such as heat, flexibility exercises, strengthening exercises, electrical stimulation, and massage. Mielenz et al²⁰ interviewed 199 patients with acute low back pain (LBP) who had been treated by PTs to assess patient demographics, medical history, health care services utilization, and functional status. TJM of the spine was utilized in 21% of the episodes of care, which was again much less frequent utilization compared to exercise instruction, heat, ultrasound, electrical stimulation, massage, and cold. In addition, Li and Bombardier¹⁸ analyzed survey results from 274 PTs as to their choice of interventions for 3 different patient case scenarios—a patient with acute LBP, a patient with subacute LBP, and a patient with acute LBP with sciatica. Only 5% of the PTs selected TJM of the spine as an appropriate intervention for the patient with acute LBP. Again, these findings represented underutilization as compared to use of home exercise programs, exercise at the clinic, physical agent modalities, back school, and bed rest for this patient case scenario.¹⁸ It appears that clinicians may be underutilizing TJM techniques for patient populations even though there is strong evidence supporting the use of TJM.^{3,4,9,11-14,16,17,22,23} This potential underutilization, along with the variability of TJM curricula in professional degree programs, suggests there may be limited TJM educational opportunities for physical therapy students. However, we were unable to find studies actually describing these opportunities.

The purpose of this study was to describe the TJM clinical education opportunities for professional-degree physical therapy students associated with programs that include TJM content in their curricula. The survey research included investigation of the availability of such clinical education opportunities, the scope of the provided TJM training, and the TJM experience of clinical instructors (CIs) working with students in outpatient orthopaedic clinical settings. Results of this survey may serve as a benchmark for academic and clinical education faculty to assess current manual therapy clinical education opportuni-

ties, and as a guide for developing appropriate TJM training programs and resource materials for educators.

METHODS AND MEASURES

Development of the Survey Instruments

To ensure that respondents clearly understood the research question, the term thrust joint manipulation was operationally defined as a “high-velocity, low-amplitude therapeutic movement within or at the end of the range of motion.” While the authors support the *Guide’s*¹ definition of mobilization/manipulation, the definition used in this study comes from the recently published *Manipulation Education Manual*,¹⁹ and was supported by the panel of experts who helped develop and pilot the survey.

Both the Academic Coordinators of Clinical Education (ACCE) and CI surveys were based on instruments the authors previously utilized to investigate TJM and spinal mobilization curricula in physical therapy professional degree programs.^{5,6} The ACCE survey included items addressing the availability of clinical education experiences that provide TJM training to students, desired CI TJM qualifications, and belief regarding TJM as an entry level skill. The CI survey addressed TJM training made available to students, CI TJM experience and expertise, and relevant CI demographics. A subject matter expert panel consisting of physical therapy program ACCEs, CIs working in outpatient orthopaedic settings, and directors of the American Physical Therapy Association (APTA) Credentialed Orthopaedic Residency and Manual Therapy Fellowship Programs helped establish content validity and pilot the survey. In addition to their written feedback, panel members were contacted by telephone after their completion and review of the survey for a detailed discussion of specific survey items. Based on the collective feedback, the survey was revised and finalized.

Subjects

In the United States, physical therapy professional degree programs (located in states where PTs can utilize TJM as an intervention [n = 194]) recognized by the Commission on Accreditation in Physical Therapy Education (CAPTE) as accredited or candidate were contacted during the Summer and Fall of 2003 and asked whether TJM content was currently included in their curricula. One hundred forty-three programs responded (74%), with 73 programs (51%) indicating they taught TJM. These programs were divided into 5 geographic regions (condensed from the 9 geographic regions per CAPTE⁷): (1) New England and Mid Atlantic, (2) East and West North Central, (3) South Atlantic, (4) East

and West South Central, and (5) Mountain and Pacific. Twenty-five to thirty percent of the identified physical therapy professional degree programs (total programs, $n = 20$) were randomly selected from each of the 5 regions for recruitment of ACCEs. The researchers contacted the program ACCEs to solicit their participation. Each participating ACCE compiled a list of their CIs who were working in an outpatient orthopaedic clinical setting and had supervised a student from the program. The clinical education experience had to be 6 weeks or longer during calendar year 2003, and scheduled after the musculoskeletal portion of the curriculum had been completed.

Administration of the Surveys

The University of Wisconsin-Madison School of Education Human Subjects Committee approved the study protocol. The survey administration protocol closely followed Dillman's¹⁰ "total design format" for mail surveys. ACCEs completed and returned the short survey. CIs were sent a cover letter, a copy of the survey, and a stamped, return-addressed envelope to return the survey. The cover letter described the study's purpose, emphasized that results would be reported in the aggregate, assured anonymity of individual responses, and stated that participation was voluntary. Each survey was numerically coded to track respondents and facilitate follow-up with nonrespondents. Approximately 3 weeks after the initial mailing a second survey was sent to nonrespondents, followed by a third mailing approximately 4 weeks later. Surveys were mailed between February and June of 2004.

Data Analysis

The complete data set was hand-entered into an Excel spreadsheet (Microsoft Corp, Redmond, WA) by a research assistant. To verify accuracy of the entered data, a second assistant compared hard copy survey responses and the previously entered data. Descriptive statistics were calculated for each of the ACCE and CI variables to determine the availability of TJM experiences, the scope of TJM experiences being offered, and CI TJM experience and expertise. To compare the 2 groups of CIs (those who taught TJM to students and those who didn't), the Fisher's exact test (2-tail) was utilized for CI demographics listed in Table 1. *P* values less than .05 were considered as significant. All analyses were performed using SAS statistical software Version 6.12 (SAS Institute, Inc, Cary, NC).

RESULTS

All 20 of the participating ACCEs completed and returned their surveys for a response rate of 100%. A total of 715 CI surveys were mailed, with 37 returned unopened with a notice that the individual was no longer at that address or the facility was closed. Of the remaining 678 surveys, 457 (67.4%) were returned. Forty-three respondents indicated they had not taken a physical therapy student during the calendar year of 2003, and 6 noted they had already received a copy of the survey (duplicate mailing), leaving 408 (60%) usable CI surveys for data analysis. The CI survey return rate varied somewhat across geographic regions: New England and Mid Atlantic (55%), East and West North Central (79%), South

TABLE 1. Comparing demographics of clinical instructors surveyed.

Demographic	Teach Group*	No-Teach Group [†]	<i>P</i> Value [‡]
Experience as a PT (y) [§]	11.8 (7.5)	11.2 (7.7)	
Time practicing orthopedics (%) [§]	86.5 (19.7)	82.8 (22.1)	
Age (y) [§]	37.4 (7.7)	36.9 (8.4)	
Years using TJM [§]	7.4 (6.5)	3.1 (5.9)	
Postprofessional degree(s) (%)	34.0	19.7	.003
Manual therapy CE (%)	68.6	50.5	<.001
Manual therapy certification (%)	28.8	13.3	<.001
OCS certification (%)	12.7	7.5	>.050
Fellow of AAOMPT (%)	4.2	1.4	>.050
TJM training in physical therapy program (%)	41.5	17.4	<.001
No additional TJM training (%)	5.9	32.6	<.001
Gender			
Female (%)	39.8	51.1	.051
Male (%)	60.2	48.9	.051

Abbreviations: AAOMPT, American Academy of Orthopaedic Manual Physical Therapists; CE, continuing education; OCS, orthopaedic certified specialist; PT, physical therapist; TJM, thrust joint manipulation.

* Clinical instructors who teach TJM to students.

[†] Clinical instructors who do not teach TJM to students.

[‡] Significantly different response rate comparing the teach and no-teach groups, based on the Fisher exact test (2-tailed) analysis.

[§] Values expressed as mean (SD).

Atlantic (57%), East and West South Central (66%), and Mountain and Pacific (51%).

ACCE Survey

ACCE surveys indicated that 55% of the programs were master's level and 45% were doctorate level education (DPT). Asked whether TJM was a first professional (entry-level) PT student skill, 60% of ACCEs said yes, 30% said no, and 10% were unsure.

ACCEs were asked to identify what qualifications a CI should have to meet their students' TJM training needs. ACCEs indicated that CIs should have had an ongoing clinical practice in orthopedics (75%), completed a continuing education program certification (50%), attended continuing-education programs without certification (50%), be a fellow of the American Academy of Orthopaedic Manual Physical Therapy (30%), completed a manual therapy residency or fellowship program (30%), hold orthopaedic certified specialty (OCS) credentialing through the American Board of Physical Therapy Specialties (30%), and/or completed an internal clinic/department competency process for manual therapy (30%).

Of surveyed ACCEs, 70% were not aware of how many of their sites had CIs trained in TJM. For those who knew, the percentage of sites with trained CIs ranged from 10% to 100%, with a mean of 30%. Along with these findings, only 15% of ACCEs considered whether TJM mentoring was provided for their students when selecting outpatient orthopaedic clinical education experiences. When asked about barriers to finding orthopaedic experiences that included TJM mentoring, approximately two thirds of this small group of ACCEs identified lack of qualified instructors to mentor students and CI belief that TJM was not an entry-level skill.

CI Surveys

For the entire group, CIs supervised an average of 2.6 students annually over the previous 3 years, ranging from 1 to 10 students. For all CI respondents, 46.1% did use TJM as an intervention and 53.9% did not. CIs were asked what percent of their treatment plans included TJM. CIs who indicated that they did utilize TJM included it in 16.8% of their care plans (range, 1%-90%). For CIs who did not use TJM, their reasons were insufficient training/practice (65.6%), inappropriate patient population (25.6%), and lack of scientific evidence regarding efficacy (11.5%). For this question respondents could check all items that applied. Additional written comments to this question indicated concerns with legality related to the use of TJM, internal limitations/constraints in their clinic situation, and personal preferences for other interventions. The percentages by body regions that CIs included TJM as an intervention in plans of care are shown in Table 2.

TABLE 2. Clinical instructors' (CIs') use of thrust joint manipulation (TJM) as an intervention in patient care plans for each body region. Values expressed as mean percent (SD) of total use of TJM.

Body Region	All CIs Who Use TJM (n = 188)	Teach Group Who Use TJM (n = 105)*	No-Teach Group Who Use TJM (n = 83)*
Cervical spine	8.2 (13.3)	7.9 (10.4)	6.2 (14.0)
Thoracic spine	33.8 (30.1)	34.8 (29.8)	25.1 (31.0)
Lumbo-pelvic region	27.1 (26.8)	26.6 (23.0)	21.1 (24.7)
Upper extremity	3.3 (9.4)	3.5 (9.0)	2.1 (8.5)
Lower extremity	3.3 (8.8)	3.4 (7.6)	2.5 (8.9)

* Teach group, clinical instructors who teach TJM to students; no-teach group, clinical instructors who do not teach TJM to students. Of the teach group, 88.9% use TJM as an intervention and 28.9% of the no-teach group use TJM as an intervention.

Subgroup Analyses

CI surveys were further analyzed for the 2 subgroups: those who taught by either lecture/discussion, technique demonstration, student practice on normals or supervision during patient care (teach group), and those who did not provide TJM training to students during affiliations (no-teach group). Results showed that 30% of CIs were in the teach group and 70% were in the no-teach group. Across geographic regions, these results varied somewhat as follows: New England and Mid Atlantic (teach group, 30%; no-teach group, 70%), East and West North Central (teach group, 42%; no-teach group, 58%), South Atlantic (teach group, 23%; no-teach group, 77%), East and West South Central (teach group, 31%; no-teach group, 69%), and Mountain and Pacific (teach group, 25%; no-teach group, 75%).

Teach Group Concerning the 30% of CIs who do teach TJM, the majority (85.3%) teach it only to students who have demonstrated appropriate knowledge base and skill level. Teaching was accomplished through several venues, including demonstration (92.2%), practice on normals (84.5%), direct supervision (78.5%), and lecture/discussion (66.3%). Within this teach group, 11.1% did not use TJM in their patient care plans, but did offer TJM training to their students via other staff members. However, 30% of the teach group do not allow their students to utilize TJM as an intervention with patients. This subgroup's reasons included concerns about medical liability (57.9%), belief that TJM was not an entry-level skill (39.5%), and students not being academically prepared (21.0%). Again, respondents could check all that applied. Last, CIs rated themselves on their own qualifications to teach TJM on a scale of 1 to 5, with 1 representing a rating of minimally qualified and 5 representing a rating of well qualified. The teach group rated themselves an average of 3.5 out of 5 (median and mode, 4).

No-Teach Group The CIs who did not teach TJM were asked why. Their most frequent responses included the following: the belief that TJM is not an entry-level skill (57.2%), lack of expertise (their own as well as that of other staff members) (53.3%), liability concerns (46.0%), and the belief that students were not academically prepared (41.3%).

In addition, 26.4% of those in the no-teach group indicated that TJM was not an appropriate intervention for their patient population, 18.3% cited lack of time, and 11.5% indicated that there was a lack of scientific evidence supporting the use of TJM. Respondents' written comments to this question centered primarily on legal and liability concerns. Of those in the no-teach group, 8.8% did allow their students to use TJM as an intervention in their patient care plans. As for the self-rating of qualifications to teach TJM, the no-teach group rated themselves an average 1.9 out of 5 (median and mode, 1).

CI Demographics

CI demographic information was collected as to first professional physical therapy degree, years since graduation from physical therapy school, years working as a PT, postprofessional degrees, postprofessional specialist/residency/fellowship recognition, percent of practice experience in orthopedics, training in TJM in entry-level program, postprofessional training in TJM, and years utilizing TJM as an intervention. This information is shown in Tables 1 and 3. Demographics of CIs who do and those who do not teach TJM were relatively similar with some exceptions. Exceptions included TJM training in the CIs' own entry-level education programs (41.5% in the teach group versus 17.4% in the no-teach group; $P < .001$), attended TJM continuing education seminars (68.6% in the teach group versus 50.5% in the no-teach group; $P < .001$), continuing education in TJM with certification (28.8% in the teach group versus 13.3% in the no-teach group; $P < .001$), and no additional training in TJM since graduation (5.9% in the teach group versus 32.6% in the no-teach group; $P < .001$). In addition, CIs who taught TJM were almost twice as likely to have a postprofessional degree (34.0% in the teach group versus 19.7% in the no-teach group;

$P = .003$). Lastly, there appears to be a gender difference between the teach group (39.8% female) and the no-teach group (51.1% females; $P = .051$), although it is not statistically significant.

DISCUSSION

Our survey results demonstrate that TJM clinical education opportunities are not widely available to professional-degree physical therapy students. This is not an unexpected finding, based on physical therapy clinicians' apparent underutilization of TJM as an intervention^{15,18,20} and the reported variability of TJM curricula in physical therapy programs.⁵ Possible reasons for the varied clinical education experiences can be traced to results from both ACCE and CI surveys. It appears the availability of TJM mentoring is not typically considered when assigning students to clinical education experiences. Only 30% of ACCEs knew the percentage of their sites with CIs trained in TJM and only 15% considered whether TJM mentoring was provided for their students when selecting outpatient orthopaedic experiences. This finding may be explained by the numerous other considerations ACCEs have to face when placing students in clinical sites, and the fact that TJM is a relatively small component of the total curriculum. Those ACCEs who do consider the availability of this experience indicated they have difficulty finding such sites, due to a lack of CIs with this expertise and CI belief that TJM was not an entry-level skill. In addition, while 60% of ACCEs felt that TJM was an entry level skill, all of the surveyed ACCEs' program curriculums included TJM training, which indicated that the program, or at least certain faculty in the program, thought it was an appropriate skill for entry-level students. With 30% of ACCEs believing TJM was not an entry-level skill and 10% unsure, possible questions might be raised about faculty unity in curriculum philosophy and design specific to what is entry level.

CIs participating in the study also reported a variety of responses and opinions. Table 2 shows CIs use of TJM as an intervention by body region. Comparing the information for all CIs who use TJM to that of the teach group and the no-teach group, it appears that those CIs who do not teach it are more conservative in selecting TJM as an intervention. This finding is further corroborated by CI responses to the question about their qualifications to teach and supervise students using TJM. As reported earlier, the teach group rated themselves higher in their qualifications to teach TJM (3.5/5) than the no-teach group (1.9/5).

The results indicated that 30% of those in the teach group did not allow their students to use TJM as an intervention in their patient care plans. Almost 58% of this subgroup had concerns about professional liability issues and 40% felt that TJM was not

TABLE 3. First professional degree earned by clinical instructors comparing those who do (teach group) and those who do not teach (no-teach group) thrust joint manipulation to students.

First Professional Degree	Teach Group	No-Teach Group
Bachelor	44.9%	53.4%
MPT	20.3%	20.5%
MSPT/MSc/MA	32.2%	23.7%
DPT	1.7%	1.1%
Certificate	3.4%	3.5%

an entry-level skill. It is of interest that, despite their belief that TJM is not an entry-level skill, these CIs were willing to offer training to the students. Regarding concerns about professional liability/legality issues, this research utilized programs in states where PTs can legally utilize TJM as an intervention; but programs typically send students to other states, some of which have practice acts that may prohibit PTs from utilizing TJM on patients. However, on review of addresses to which the investigators sent the surveys directly, none of the CIs resided in the 3 states (Arkansas, Washington, and West Virginia) that currently have TJM practice restrictions. Additionally, 5 CIs contacted the investigators wondering if they should complete the survey, stating their state's practice act did not allow PTs to use TJM, when in fact there was no such practice restriction. This raises questions about CI knowledge of their state practice acts specific to TJM.

The no-teach group's primary reasons for not teaching TJM included their beliefs that TJM was not an entry level skill (57.8%) and that students were not academically prepared (41.5%). These 2 responses suggest a discrepancy between the offerings of physical therapy education programs and the beliefs of their respective CIs. This sample of CIs was selected from programs that were teaching TJM. However, many of CIs affiliated with these programs either did not agree with, or were unaware of, the training that students received during their academic experience. Interestingly, 8.8% of those in the no-teach group did allow the students to use TJM as an intervention during patient care episodes. This was an unexpected finding, which may indicate that these CIs had confidence in the students' academic preparation and abilities pertaining to TJM.

Of those in the no-teach group, 11.5% cited lack of scientific evidence as a reason for not teaching TJM. This statistic is similar to the 7% of academic faculty respondents reported by Boissonnault et al⁵ who cited lack of evidence as a reason their program did not include joint manipulation in the curriculum. Although TJM is but one of many interventions PTs utilize to relieve symptoms and restore function, promoting development of this skill appears to be warranted, based on the existing evidence.^{3,4,9,11-14,16,17,22,23} Survey questions did not differentiate whether these CIs were unaware of the actual evidence or if they were not practicing based on best available evidence. Both the beliefs that TJM is not an entry-level skill and that scientific evidence is lacking are likely quite complex and, as such, resistant to change. Future studies designed to investigate the underlying values and attitudes associated with these beliefs could provide information that may be useful in effecting change.

Demographic information collected was similar for the 2 groups, with some notable exceptions. While

review of Tables 1 and 3 might indicate that CIs in the teach group had more recent first professional degrees (fewer bachelor degrees and more masters-level degrees), this does not appear to be the case, as years of practicing as a PT were very similar for the 2 groups. Realizing that therapists mostly practice and teach what they have been taught, it is not surprising that experiencing TJM training in an entry-level program appears to have an impact on clinical practice as well as mentoring students. Of CIs who had this education in their entry-level program, 41.5% were in the teach group, as compared to 17.4% of those who had this experience in school and were in the no-teach group. Also, as might be expected, those with postprofessional TJM training (eg, manual therapy certification) were more likely to teach TJM to their students (28.8% of the teach group versus 13.8% of the no-teach group), compared to those who had no additional training in TJM since graduation (5.9% of the teach group versus 31.4% of the no-teach group). These findings, together with the CIs' self-assessments of their ability to teach and supervise students on TJM, indicate that they are practicing within their realm of expertise as appropriate. Accordingly, those who feel only minimally qualified to teach TJM and have less training and experience in TJM tend to not use it as an intervention and are not teaching it to their students. The findings also indicate that the teach group had more postprofessional education, including academic degrees—which may or may not be related to manual therapy—and continuing-education seminars with and without certification. Last, the wide variety of educational venues that CIs used to advance their TJM skills is similar to the variety reported by academic faculty who teach TJM in physical therapy academic programs.⁵

The *Normative Model*² describes the integral role clinical education plays in the preparation of students for entering the profession of physical therapy. Fulfillment of this role is based on the assumption that appropriate training is made available to students during their clinical education experiences. In addition, the recently published *CAPTE Evaluative Criteria for Accreditation of Education Programs for the Preparation of Physical Therapists*⁸ (effective January 1, 2006) makes specific reference to thrust and nonthrust joint manipulation techniques under the category of "Manual Therapy Techniques."⁸ This change, together with our findings that many CIs do not have training or experience in TJM, highlights the importance of, and possibly a sense of urgency for, establishing a critical mass of clinical-education instructors offering experience in TJM. To facilitate such a process, a committee of the APTA Manipulation Task Force has developed the *Manipulation Education Manual*.¹⁹ This manual is designed to support the

efforts of physical therapy academic and clinical educators to provide appropriate, evidence-based instruction in TJM.¹⁹

A need and potential opportunity exists for professional degree physical therapy programs to partner with their clinical education communities, sharing resources to address this issue relative to teaching TJM in the clinical setting. Linking development of this skill to evidence-based practice may be a key issue in changing attitudes as to what is/should be an entry-level skill versus what should be considered more germane to specialist practice. This linkage would also be an opportunity to actively promote evidence-based practice within the professional physical therapy community.

Limitations

Any survey with less than a 100% response rate raises questions of generalizability. In this case, it is therefore questionable whether the survey findings can be generalized to all CIs. However, the survey's overall return rate of 67.4% is within the range (60%-80%) considered to be an excellent return rate.²¹ The percentages of CIs in the teach and no-teach groups were very similar when comparing early responders and late responders to the survey, which helps support the concept that respondents were a representative subset of the larger sample. As mentioned in the Results section, there were some differences in the CI response rates and the percentages of teach and no-teach groups across geographic regions. Further exploration of regional differences was beyond the scope of this research but may merit further investigation. Finally, our research only addressed programs that included TJM in their curriculum, such that teach and no-teach percentages may differ from a sample of CIs from all programs regardless of curriculum.

CONCLUSIONS

Our results illustrate that TJM training is not available in many orthopaedic clinical education opportunities associated with physical therapy programs that include TJM in the curriculum. Potential barriers to students receiving this training are numerous and varied. The belief that TJM is not an entry-level skill appears to prevail within the professional community, even though programs are increasing the curriculum hours in TJM.⁵ Other barriers include ACCE lack of consideration of availability of TJM training when scheduling outpatient orthopaedic affiliations, lack of qualified CIs with TJM experience, lack of CI understanding of TJM being included in the curriculum, professional liability and legal concerns, and the inaccurate perceived lack of supporting scientific evidence. The varied nature of the

described barriers suggests that utilizing a multifaceted initiative, such as the *Manipulation Education Manual*,¹⁹ coupled with training opportunities, may be very appropriate to help effect change in practice and education patterns.

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