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Lumbar Traction for Managing Low Back Pain: A Survey of Physical Therapists in the United States

STUDY DESIGN: Cross-sectional survey.

OBJECTIVES: To examine how many physical therapists use traction, the patients for whom traction is used, the preferred delivery modes/parameters of traction, the supplemental interventions used with traction, and whether professional characteristics influence traction usage.

BACKGROUND: Several systematic reviews and clinical guidelines have questioned the effectiveness of traction for managing low back pain, yet some patients may benefit from lumbar traction. While traction usage among physical therapists in other countries has been described, usage among physical therapists in the United States has not been examined.

METHODS: We surveyed a random sample of 4000 Orthopaedic Section members of the American Physical Therapy Association. Associations among respondents' professional characteristics and survey responses were explored with chi-square analyses ($\alpha = .05$).

RESULTS: The response rate was 25.5% (n = 1001), and 76.6% (n = 767) of respondents reported using traction. Most (58.4%) of the respondents used traction for patients with signs of nerve root compression, though many (31.4%) did not. Common delivery modes included manual methods (68.3%) and mechanical tables (44.9%), most often supplemental to other interventions (eg, stabilization exercises, postural education). Levels of professional preparation (doctoral/masters level versus bachelors/certificate level) were associated with many variables, as was attainment of an orthopaedic specialist certification.

CONCLUSION: Most of the orthopaedic physical therapists in the United States who responded to our survey reported that they used lumbar traction, though not necessarily consistent with proposed criteria that identify patients most likely to benefit from traction. They used various traction delivery modes/parameters and used traction within comprehensive plans of care incorporating multiple interventions. Professional characteristics (education levels and clinical specialist credentialing) were associated with traction usage. *J Orthop Sports Phys Ther 2015;45(8):586-595. Epub 25 Jun 2015. doi:10.2519/jospt.2015.6036*

KEY WORDS: *cross-sectional studies, low back pain, physical therapists, physical therapy modalities, traction*

Low back pain (LBP) is a leading cause of disability and work loss in the United States.[24] Physical therapists may choose from myriad intervention options for LBP, but the effectiveness of many of these options is questionable.[22,24,46] One option is spinal traction, in which forces applied via motorized pulleys, manual methods, or through autotraction are thought to distract tissues and joints in the lumbar spine.[6,16,34,48] Authorities have recommended traction for conditions including protruded intervertebral discs,[6,48] spinal muscle spasm,[29,34,38,41,43,45,47,48] and general pain and stiffness.[41]

Despite historical recommendations for traction, several systematic reviews and clinical guidelines conclude that the effectiveness of traction is limited.[8,33,35,49] The UK Royal College of General Practitioners concluded that there was little evidence to recommend traction for nonspecific LBP.[33] The Philadelphia Panel concluded that clinically important benefits of lumbar traction were demonstrated for neither acute nor chronic LBP.[35] More recently, Delitto et al[8] summarized moderate evidence that traction should not be used in patients with acute or subacute nonradicular LBP or in patients with chronic LBP. A Cochrane review concluded that traction as a sole treatment for LBP cannot be recommended.[49] Nevertheless, traction has commonly been used; for example, 15% of patients with LBP in Northern Ireland received traction.[12] Harte et al[16] reported that 41% of physical therapists in the UK used traction, most commonly in patients with subacute LBP who also presented with nerve root symptoms.

The discrepancy between published clinical guidelines and the use of trac-

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tion may be due to several factors. Trials examining traction's efficacy in LBP, for example, might have been underpowered to detect clinically meaningful changes in pain or function.[5,33,35,45,49] Traction parameters, force amplitudes, and patient positioning have often been variable, not described, or not well controlled.[17,35,38,41,45,47,49] Additionally, trials might not have optimized the patients in whom traction was most likely to be beneficial.[5,17,23,26,40,41,45] One classification system, for example, espouses that lumbar traction may be useful for patients with LBP and lower extremity symptoms that move distally (peripheralize) with lumbar extension, or for those who present with a positive crossed straight leg raise test.[9-11,15] Nevertheless, traction's efficacy for LBP has been reviewed extensively and demonstrated limited benefits.[33,35,49]

Many factors may influence whether traction is selected as an intervention and how traction parameters are chosen. Understanding how clinicians make decisions about using traction, how they select patients in whom traction is administered, and how they make decisions about traction parameters is important. While Harte et al[16] described some of those characteristics among physical therapists in the UK, it is not clear how physical therapists in the United States use—or make decisions about using—traction. Therefore, the purpose of this study was to examine how traction is used for managing LBP in the United States. Specifically, we examined (1) the percentage of physical therapists who use traction in their practices, (2) whether clinicians were using traction for patients preliminarily identified as those who may benefit from lumbar traction,[10] (3) the delivery modes and parameters (eg, patient positioning, load, duration) being used, (4) the supplemental interventions in patients' plans of care, and (5) whether professional characteristics influenced clinical decisions regarding the use of traction.

METHODS

Study Design

This was a cross-sectional observational study using a survey. The Mayo Clinic Institutional Review Board approved the study.

Participants

We surveyed physical therapists from July through October 2013 who were American Physical Therapy Association (APTA) members and who designated their practice to be primarily in orthopaedic and musculoskeletal practice settings. There are approximately 16 000 physical therapist members of the Orthopaedic Section of the APTA.[1] We assumed that the members of this group primarily treated patients with LBP and, therefore, we targeted our recruitment at these potential participants. The study inclusion criteria were physical therapist licensure and membership in the APTA's Orthopaedic Section.

Survey Design

We designed the survey to approximate that of Harte et al.[16] We conducted a pilot study with 20 physical therapists from our institution, who completed an initial draft of the survey. Final questions were modified to improve clarity. The survey contained 28 open- and closed-ended questions regarding professional and demographic characteristics of respondents, adherence to classification criteria for lumbar traction, information regarding delivery modes and parameters used during traction, and additional treatment interventions used in conjunction with traction (**APPENDIX**, available at www.jospt.org). Two specific clinical scenarios were presented to assess respondents' clinical decision making regarding traction: the first clinical scenario described a case presentation in which the patient's signs and symptoms matched the traction classification in a treatment-based classification system,[7,10] and the second clinical scenario described a case presentation in which the patient's signs and symptoms departed from the classification. The mailed packet included a cover letter inviting participation, an informed-consent statement, instructions for online completion of the survey for those who opted to respond electronically, and a paper survey with a prepaid, self-addressed envelope for those who opted to return the hard copy.

Data for the study were collected and managed with Research Electronic Data Capture (REDCap) tools hosted at Mayo Clinic.[13] REDCap is a web-based application designed to support data capture for survey research.

Data Analysis

In an accessible population of approximately 16 000 individuals, a margin of error of ± 5 points at a 95% confidence level for a dichotomous variable would require a sample of 375 individuals, whereas a margin of error of ± 2 points would require a sample of approximately 2000 individuals.[39] Because response rates for mailed, nonincentivized surveys of health care professionals may be as low as 15%,[19] we obtained contact information for a random sample of 4000 physical therapists who met the inclusion criteria to obtain a margin of error that would not exceed ± 5 points.

The raw data in REDCap were exported to IBM SPSS Statistics Version 21.0 (IBM Corporation, Armonk, NY). Descriptive statistics, including frequencies of responses, were calculated. Because most of the survey variables represented nominal or ordinal levels of measurement, planned associations among respondents' professional characteristics and responses to survey questions about traction usage were explored with chi-square analyses. Cases containing missing data were omitted from the computations. All testing was conducted at $\alpha = .05$.

RESULTS

Survey Response

Surveys were mailed to 4000 individuals who met the inclusion criteria, and 75 surveys were returned as "nondeliverable." Assuming the re-

maining surveys reached the intended participants, 3925 surveys were distributed. We received 1001 responses, representing a 25.5% response rate; 27.6% (n = 276) of those responded electronically and 72.4% (n = 725) returned hard copies. A majority of respondents (n = 767, 76.6%) indicated that they used traction in their practices.

Respondents' Profile

Demographic and professional characteristics of respondents are presented in **TABLE 1**. Respondents were mostly women (60%), were distributed relatively uniformly across the defined age groups, and worked primarily in hospital-based and private outpatient settings (30.8% and 58.3%, respectively). Their entry-level degrees were uniformly distributed across bachelors, masters, and doctoral degrees (33.5%, 31.8%, and 31.1%, respectively), whereas relatively few earned postbaccalaureate certificates (3.5%). The majority practiced full time (48.2%) or near full time (33.0%). A minority (29.7%) reported having earned a certification through the American Board of Physical Therapy Specialties (ABPTS), most of which were the orthopaedic (22.9%) or sports clinical specializations (2.5%).

While a majority (76.6%) of respondents indicated that they used traction in their practice, using traction was associated with having an ABPTS certification (χ^2 = 24.046, P<.001). A higher proportion of respondents with ABPTS orthopaedic certification reported using traction (88.6%) than did respondents without certification (73.0%).

TABLE 1 Demographics of the Study Respondents (n = 1001)

Demographics	Frequency, n (%)
Sex	
Female	598 (60.0)
Male	399 (40.0)
Age group, y	
20-30	188 (18.9)
31-40	286 (28.7)
41-50	224 (22.5)
>50	297 (29.8)
Region of residence	
South Atlantic (DE, DC, GA, MD, NC, PR, SC, VA, WV, FL)	170 (17.2)
Middle Atlantic (NJ, NY, PA)	133 (13.4)
East North Central (IL, IN, MI, OH, WI)	155 (15.7)
West North Central (IA, KS, MN, MO, NE, ND, SD)	135 (13.7)
East South Central (AL, KY, MS, TN)	35 (3.5)
West South Central (AR, LA, OK, TX)	61 (6.2)
New England (CT, ME, MA, NH, RI, VT)	54 (5.5)
Pacific (AK, CA, HI, OR, WA)	148 (15.0)
Mountain (AZ, CO, ID, MT, NV, NM, UT, WY)	98 (9.9)
Years of practice as physical therapist	
1-5	217 (22.1)
6-10	130 (13.3)
11-15	162 (16.5)
16-20	115 (11.7)
>20	356 (36.3)
Entry-level physical therapy degree	
Certificate	35 (3.5)
Bachelors	333 (33.5)
Masters	316 (31.8)
Doctoral	309 (31.1)

Table continues on page 589.

Adherence to Classification Profiles

In response to the first clinical scenario (**APPENDIX**, questions 13 and 14, available at www.jospt.org), which assigned the patient to the traction classification, 448 traction users (58.4%) indicated that they would incorporate traction into the plan of care, whereas 241 (31.4%) indicated that they would not. Deciding to use traction was associated neither with respondents' levels of entry-level preparation (χ^2 = 5.891, P = .317) nor with having an ABPTS specialty certification (χ^2 = 1.688, P = .890). Traction users most commonly preferred intermittent traction in a neutral supine position (20.6%) or in prone, with adjustments to the spine's extension angle based on centralization responses (16.2%) as part of a comprehensive plan of care including education, exercise, manual therapy, and/or modalities (56.6%).

In response to the second clinical scenario (**APPENDIX**, questions 16 and 17, available at www.jospt.org), which did not assign the patient to the traction classification, 265 (34.6%) indicated that they would use traction in the plan of care, whereas 435 traction users (56.7%) indicated that they would not. Similar to the first scenario, deciding to use traction was associated neither with respondents' entry-level preparation (χ^2 = 6.609, P =

TABLE 1 Demographics of the Study Respondents (n = 1001) (continued)

Demographics	Frequency, n (%)
Hours of practice per week	
<10	55 (5.6)
11-20	39 (4.0)
21-30	89 (9.1)
31-40	322 (33.0)
41-50	411 (42.1)
>50	60 (6.1)
Primary facility/setting	
Acute care hospital	25 (2.5)
Subacute rehabilitation hospital (inpatient)	9 (0.9)
Health system or hospital-based outpatient clinic	306 (30.8)
Private outpatient practice or group practice	580 (58.3)
SNF/ECF/ICF	12 (1.2)
School system (preschool, primary, secondary)	7 (0.7)
Academic institution (postsecondary)	50 (5.0)
Health and wellness facility	3 (0.3)
Research center	1 (0.1)
Industry	2 (0.2)
ABPTS certification	
Orthopaedic	229 (22.9)
Neurologic	10 (1.0)
Geriatric	11 (1.1)
Sports	25 (2.5)
Pediatric	10 (1.0)
Cardiovascular/pulmonary	4 (0.4)
Clinical electrophysiology	4 (0.4)
Women's health	4 (0.4)

Abbreviations: ABPTS, American Board of Physical Therapy Specialties; ECF, extended care facility; ICF, intermediate care facility; SNF, skilled nursing facility.

.158) nor with having an ABPTS specialty certification ($\chi^2 = 6.365$, $P = .173$).

Traction Delivery Modes and Parameters

Among traction users, manual traction was the most common mode of delivery (68.3%). A mechanical traction table permitting multiplanar angles was the second most frequently used mode (44.9%), followed by home traction devices and autotraction techniques at 33.9% and 27.2%, respectively.

Professional characteristics of respondents were associated with several of the preferred delivery modes. First, respondents' entry-level education was associated with preference for manual traction delivery ($\chi^2 = 30.451$, $P<.001$). Respondents educated at the masters or doctoral level of preparation (58.2% and 59.5%, respectively) more commonly used manual traction than those educated at the bachelors or certificate level (28.6% and 42.9%, respectively). Second, having the ABPTS orthopaedic certification was also associated with preferences for delivery modes (manual traction: $\chi^2 = 6.656$, $P = .010$; mechanical traction: $\chi^2 = 9.353$, $P = .002$). Respondents with ABPTS certification reported higher preferences for manual traction and multiplanar traction tables (59.8% and 42.8%, respectively) than those without certification (50.1% and 31.9%, respectively).

Among traction users, patient positioning was generally influenced by clinical examination findings. While the most commonly indicated position for administering traction was supine with knees and hips flexed in a moderate flexion bias (37.4%), many respondents indicated that patient positioning would be diagnosis specific (34.4%). Most indicated that a clinical presentation consistent with degenerative joint disease (58.0%) or a herniated disc (75.9%) would influence their decision to use a flexion bias or extension bias, respectively, when administering traction. Furthermore, preference for patient positioning was associated with having the ABPTS orthopaedic certification ($\chi^2 = 19.663$, $P = .001$). Respondents with ABPTS certification more commonly reported that patient positioning would be diagnosis specific (48.1%) than did respondents without the certification (34.0%). In contrast, respondents without the certification were more likely to report using the supine-lying patient position with a moderate flexion bias (44.9%) than were respondents with the certification (30.5%).

Responses for preferred loading and duration parameters varied. Most administered traction at loads of 30% to 40% (37.5%) or 40% to 50% of body weight (35.2%) over treatment times of 11 to 20 minutes, depending on the patient's condition (**TABLE 2**). Having ABPTS orthopaedic certification, however, was associated with respondents' preferred treatment times in 2 particular conditions. For general mobilization of a stiff spine, respondents without certification were more likely to administer traction for 11 to 15 minutes (41.8%), whereas respon-

dents with certification were more likely not to use traction (28.2%, χ^2 = 13.269, P = .039). Similarly, for generalized pain relief, respondents without certification were more likely to use traction for 11 to 15 minutes (49.0%), whereas respondents with certification were more likely not to use traction (26.2%, χ^2 = 13.539, P = .035).

Supplemental Interventions

Traction users most often implemented traction as one component of a plan of care, rather than in isolation (**TABLE 3**). The most common supplemental interventions included core stabilization exercises (90.5%), education regarding posture and body mechanics (87.0%), mobilization techniques (85.0%), general exercise/fitness program prescriptions (70.0%), and massage or soft tissue mobilization techniques (65.2%).

DISCUSSION

Several systematic reviews and clinical practice guidelines have concluded that spinal traction has limited effectiveness for treating LBP.[8,33,35,49] Despite those guidelines, evidence suggests that a specific subset of patients with LBP may respond positively to traction.[9-11] Furthermore, while traction utilization in some European countries may be declining,[27] physical therapists in the UK have commonly used traction for patients with LBP and symptoms of nerve root compression.[12,15,16] We surveyed physical therapists in the United States about their use of spinal traction, including whether the use of traction was consistent with a classification system identifying patients for whom traction may be beneficial, and their preferred traction delivery modes and parameters, and we examined their use of supplemental interventions. Our findings suggest that a majority of APTA Orthopaedic Section members use traction and use it consistent with recommendations from a classification system that preliminarily identifies patients in whom traction

TABLE 2 Preferred Traction Parameters

Parameter	Frequency, n (%)
Load, % body weight	
20-30	156 (22.5)
30-40	260 (37.5)
40-50	244 (35.2)
>50	34 (4.9)
Treatment time, min	
Nerve root with radicular features secondary to a herniated disc	
<5	16 (2.2)
6-10	93 (12.6)
11-15	261 (35.3)
16-20	261 (35.3)
21-25	51 (6.9)
>25	25 (3.4)
I would not use traction for this condition	33 (4.5)
General mobilization of a stiff spine	
<5	15 (2.0)
6-10	45 (6.1)
11-15	191 (25.8)
16-20	179 (24.2)
21-25	37 (5.0)
>25	8 (1.1)
I would not use traction for this condition	266 (35.9)
Degenerative joint/facet disease	
<5	14 (1.9)
6-10	53 (7.2)
11-15	219 (29.6)
16-20	213 (28.8)
21-25	47 (6.4)
>25	12 (1.6)
I would not use traction for this condition	182 (24.6)
Generalized pain relief	
<5	19 (2.6)
6-10	41 (5.5)
11-15	172 (23.2)
16-20	155 (20.9)
21-25	30 (4.1)
>25	7 (0.9)
I would not use traction for this condition	316 (42.7)

TABLE 3 Summary of Interventions Used in Conjunction With Traction

Intervention	Frequency, n (%)
Core stabilization exercises	694 (90.5)
Education regarding posture and body mechanics	667 (87.0)
Mobilization techniques	652 (85.0)
Prescription of general exercise/fitness program	537 (70.0)
Massage/soft tissue mobilization techniques	500 (65.2)
McKenzie direction-specific exercise regimes	454 (59.2)
Neuromobilization techniques	424 (55.3)
Hot packs	350 (45.6)
Interferential current	347 (45.2)
Manipulation techniques	286 (37.3)
Other electrotherapy modalities	142 (18.5)
Other	95 (12.4)

may provide benefit.[9-11,15] In contrast, approximately one third of respondents indicated that they would use traction for patients in a manner that is contrary to that classification, and respondents were quite variable in their selection of traction modes and parameters. Additionally, physical therapists use traction as a component of comprehensive plans of care that include multiple interventions.

A majority of respondents (76.6%) indicated that they used traction in their practices. This proportion is higher than that identified by Harte et al,[16] who reported that 41% of physical therapists in the UK used traction. Whereas Harte et al[16] reported an 83% response rate, our response rate (25.5%) was considerably lower. While reasons for the differential response rates are not entirely clear, the length of the survey (28 open- and closed-ended questions) and potentially the perceived importance of the survey's topic by invited participants are factors that might have contributed to the response rate.[2,4] The differences in the proportions of respondents reporting that they use traction in their practices may reflect a response bias, whereby physical therapists who use traction were more likely to respond. Differences may also be accounted for by varying sampling approaches used in the studies. Harte et al[16] surveyed a random sample of chartered physical therapists in the UK who specialized in musculoskeletal management. The manner in which they determined which therapists specialized in musculoskeletal management, however, was not described. The present study, on the other hand, exclusively surveyed physical therapists who were members of the APTA's Orthopaedic Section. It is, therefore, possible that the sample included a higher proportion of physical therapists whose patient populations were more likely to have LBP. Moreover, differences could also reflect changes in practice over time. Harte et al[16] published their findings a decade ago. While more recent evidence suggests that traction utilization in some European countries may be declining,[27] it is possible that contemporary practice changes might have influenced traction usage rates in the United States, particularly because much of the work regarding a traction classification has occurred since that time.[10,11]

Historically, care for LBP has revolved around the belief that patients with LBP represent a homogeneous group.[7,8] More recently, clinicians have theorized that patients with LBP are heterogeneous and should be classified into subgroups accordingly, and they propose that patients in each subgroup will more likely respond to distinct treatment strategies.[7,9-11,30] While the evidence is preliminary, the subgroup most likely to respond to traction is hypothesized to be patients with signs and symptoms of nerve root irritation who do not centralize with lumbar movements.[10] We therefore examined whether physical therapists in the United States were using traction for patients identified by Fritz et al[10] as those most likely to benefit from traction. The first clinical scenario in the survey (**APPENDIX**, questions 13 and 14, available at www.jospt.org) specifically addressed this purpose, in which the patient presented with peripheralization of symptoms with standing lumbar extension movements and a positive crossed straight leg raise, both of which are signs by which a patient presumably would be classified into the traction subgroup.[7] We hypothesized that most respondents would opt to use traction in that scenario. The results partially supported our hypothesis. While a majority (58.4%) indicated that they would use traction, nearly one third of respondents (31.4%) indicated that they would not use traction in that scenario. Further, we presented a second scenario (**APPENDIX**, questions 16 and 17, available at www.jospt.org) in which the patient presumably would not be classified into the traction subgroup. While most respondents (56.7%) indicated that they would not use traction, more than one third (34.6%) indicated that they would. An implication of these findings is that approximately one third of physical therapists may not incorporate lumbar traction in a manner that is consistent with current recommendations for its use.

We then examined preferred traction delivery modes and parameters. With regard to traction delivery modes, respondents most often administered traction manually (68.3%) or with a mechanical traction table permitting multiple angles

of pull (44.9%). The preference for administering traction manually makes it difficult to ascertain preferred loading magnitudes. The proportion of respondents using manual traction techniques, however, is comparable to the proportion of physical therapists using manual traction in the UK (53%).[16] In contrast, the proportion using mechanical traction tables (44.9%) is considerably less than that reported by Harte et al[16] (79%). Per several ad hoc comments, many respondents indicated that they lacked access to mechanical traction tables in their particular practice settings, which may account for this difference. With regard to magnitude of traction delivery, most respondents preferred to administer lumbar traction at 30% to 50% of body weight. These magnitudes are consistent with the assumptions that intervertebral separation is necessary for therapeutic efficacy and that loads of 20% to 50% of body weight are required to achieve intervertebral separation.[3,20,21,42] Those assumptions, however, have not been confirmed through controlled trials, and our findings suggest only that physical therapists in the United States, with lack of confirmatory evidence to guide clinical decisions for loading most often apply lumbar traction at magnitudes of 30% to 50% of a patient's body weight. As a comparison, Meszaros et al[31] reported that pain-free straight leg raise measurements in patients with LBP and lower extremity pain improved following traction application at 30% and 60% body weight, but not at 10% body weight. Despite that report, evidence-based recommendations for loading parameters have yet to be clearly articulated.

Physical therapy practice for managing LBP is often characterized by a vast array of intervention approaches, such as stretching and strengthening exercises, direction-specific exercises, manual therapy approaches to mobilize spinal segments, soft tissue mobilization/massage, and the use of electrical or thermal modalities.[26,36] Therefore, we examined supplemental interventions in patients' plans of care. It was clear that respondents used traction as part of comprehensive plans of care incorporating multiple interventions. The most commonly used interventions included core stabilization exercises, education regarding posture and body mechanics, mobilization techniques, prescription of general exercise/fitness programs, and massage or soft tissue mobilization techniques. These findings are largely consistent with those of Harte et al,[16] who reported that advice regarding posture and management, general exercise and physical activity, core stabilization exercises, and mobilization techniques were incorporated into the plans of care by over 50% of their respondents. One difference between our findings and those of Harte et al[16] was that they reported massage as being used by 12.1% of the physical therapists in their study, whereas employing soft tissue mobilization or massage was identified by approximately 65% of our respondents as a supplement to traction. Given limited evidence for the effectiveness of massage for treating LBP when compared against other manual therapy approaches or against exercise and education,[18,25] the extent to which physical therapists in the United States use soft tissue mobilizations/massage in managing LBP may be concerning.

Last, we examined whether professional characteristics of respondents were associated with clinical decisions regarding traction. Two characteristics were associated with traction preferences. First, a higher proportion of physical therapists with ABPTS orthopaedic certification used traction (88.6%) than did physical therapists without certification (73.0%), and physical therapists with certification more commonly reported that patient positioning would be diagnosis specific (48.1%) than did respondents without certification (34.0%). Second, a higher proportion of physical therapists with entry-level degrees at the masters or doctoral level reported using manual traction techniques (58.2% and 59.5%, respectively) than did those educated at the bachelors or certificate level (28.6% and 42.9%, respectively).

Professional characteristics of respondents were also associated with many of the supplemental intervention options illustrated in the **FIGURE**. Respondents with a masters or doctoral level of preparation were more likely to include mobilization, manipulation, neuromobilization, interferential current, hot packs, massage/soft tissue mobilization, education on posture/body mechanics, and/or prescription of general exercise/fitness programs in their plans of care than were physical therapists with a certificate or bachelors level of preparation (**FIGURE**). Similarly, respondents with ABPTS orthopaedic certification were more likely to include mobilization, manipulation, directional-preference exercises, neuromobilization, education on posture/body mechanics, and prescription of general exercise/fitness programs and/or core stabilization exercises than were respondents without certification (**FIGURE**).

It is evident from these collective findings that professional preparation is associated with treatment decisions regarding the use of traction. The finding supports hypotheses generated by others that higher levels of professional preparation may alter the way in which physical therapists practice. Several studies,[28,32,44] for example, have reported that recent graduates and physical therapists with specialty certification differ in terms of knowledge, skills, and attitudes toward evidence-based practice from generalists or those with more experience. Mikhail et al,[32] using clinical vignettes similar to ours to elicit responses from physical therapists about preferred interventions for LBP, reported that therapists who chose interventions with high evidence of effectiveness were more likely to have practiced less than 15 years. Manns et al[28] reported that recent graduates demonstrated better knowledge of evidence-based practice skills than physical therapists with more years of experience. Last, van Bodegom-Vos et al[44] reported that generalists had more difficulty interpreting guidelines for rheumatoid arthritis and that special-

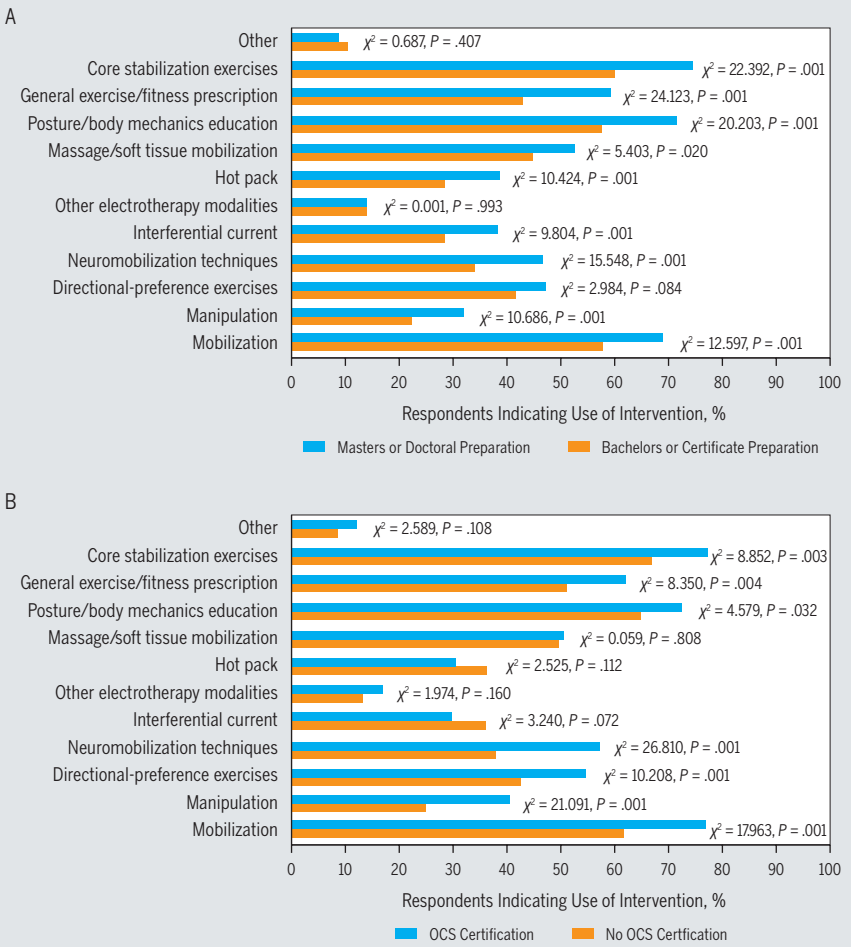

FIGURE. Associations between (A) professional education levels and (B) attainment of an orthopaedic certification through the American Board of Physical Therapy Specialties and supplemental interventions in plans of care for persons with low back pain. Abbreviation: OCS, orthopaedic clinical specialist.

ists had more knowledge and positive attitudes regarding their use. Additional studies have examined outcomes associated with training levels. Hart and Dobrzykowski,[14] for example, suggested that physical therapists with ABPTS orthopaedic certification treated patients over fewer visits and with a lower overall cost than did noncertified physical therapists. Resnik and Hart[37] reported that physical therapists who achieved superior patient outcomes were more likely to have ABPTS orthopaedic certification, training through the American Academy of Orthopaedic Manual Physical Therapists, or manual therapy certification than were those who achieved more moderate patient outcomes. Collectively, there is a growing body of evidence that higher levels of professional preparation influence clinical decision making and, potentially, patient outcomes. Our findings suggest, similarly, that one's level of degree attainment and/or ABPTS certification may influence how traction is administered or incorporated into plans of care for patients with LBP.

Several limitations might have influenced our findings. First, the survey was conducted among a random sample of APTA Orthopaedic Section members. Findings may not generalize to nonmembers of the section or to non-APTA members. Second, we had a 25.5% response rate. The characteristics of those who responded to the survey (**TABLE 1**) might have differed from those who did not, and therefore external validity of the study may be flawed. Because the survey was administered anonymously, we had no method of determining who the nonresponders were. Third, the high proportion of reported traction users (76.6%) may reflect a response bias; perhaps traction users were more likely to respond than were non–traction users. Fourth, while we asked respondents to indicate their most commonly used traction delivery modes and parameters, including patient positioning, we acknowledge that such decisions are often dependent on the patient's condition, including symptom acuity and severity, and therefore the survey had limited capacity to detect how physical therapists make clinical decisions regarding the use of traction for managing LBP. Despite these limitations, the findings present a novel representation of lumbar traction usage among physical therapists in the United States.

CONCLUSION

While systematic reviews and clinical practice guidelines generally do not provide support for spinal traction in managing LBP without signs of nerve root compression, physical therapists in the United States commonly use traction. Most employ traction consistent with a classification system that preliminarily identifies patients in whom traction may provide benefit, yet approximately one third of respondents indicated traction usage that would be contrary to that classification. Additionally, our findings imply that physical therapists use a variety of traction delivery modes and parameters, dependent on patients' conditions, and use traction as part of comprehensive plans of care incorporating multiple intervention modes. Last, professional characteristics (professional education levels and ABPTS orthopaedic clinical specialist credentialing) are associated with traction usage. ◉

KEY POINTS

FINDINGS: Most orthopaedic physical therapists in the United States whom we surveyed use lumbar traction, though not necessarily in a manner consistent with clinical guidelines. They use various traction delivery modes/parameters and within comprehensive plans of care incorporating multiple interventions. Therapists' professional characteristics, including training levels and ABPTS orthopaedic clinical specialist credentialing, are associated with traction usage.

IMPLICATIONS: Most physical therapists employ traction consistent with a classification system that preliminarily identifies patients in whom traction may provide benefit, yet approximately one third of respondents indicated traction usage that would be contrary to that classification. Adjunctive interventions include core stabilization exercises, education regarding posture and body mechanics, mobilization techniques, prescription of general exercise/fitness programs, and massage or soft tissue mobilization techniques, which are largely consistent with findings from a similar survey in the UK.

CAUTION: A response rate of 25.5% may not reflect how the majority of orthopaedic physical therapists use traction. The survey was conducted among a random sample of APTA Orthopaedic Section members. Findings may not generalize to physical therapists who are not Orthopaedic Section members or to non-APTA members and may reflect a response bias if traction users were more likely to respond than were non–traction users.

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CURRENT USE OF SPINAL TRACTION IN THE MANAGEMENT OF LUMBAR PAIN

You were selected to participate in this study because of your knowledge in the area of orthopaedics and musculoskeletal physical therapy, and your practice setting. The information you provide will stay private. Your answers will never be seen by anyone other than the investigator of this research project. You do not have to answer all the questions, but I ask that you try and provide the best answer you can for each question. If you agree to participate, it will take approximately 10 to 15 minutes to complete the survey.

1. Do you currently practice clinically as a PT?
   - ☐ Yes
   - ☐ No

2. Please indicate your gender
   - ☐ Male
   - ☐ Female

3. Please indicate your age group
   ☐ 20-30 ☐ 31-40 ☐ 41-50 ☐ >50

4. In what region of the United States do you primarily practice?
   - ☐ South Atlantic (DE, DC, GA, MD, NC, PR, SC, VA, WV, FL)
   - ☐ Middle Atlantic (NJ, NY, PA)
   - ☐ East North Central (IL, IN, MI, OH, WI)
   - ☐ West North Central (IA, KS, MN, MO, NE, ND, SD)
   - ☐ East South Central (AL, KY, MS, TN)
   - ☐ West South Central (AR, LA, OK, TX)
   - ☐ New England (CT, ME, MA, NH, RI, VT)
   - ☐ Pacific (AK, CA, HI, OR, WA)
   - ☐ Mountain (AZ, CO, ID, MT, NV, NM, UT, WY)

5. Please indicate your number of years as a practicing physical therapist
   ☐ 1-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ >20

6. Please indicate your entry-level PT degree
   ☐ Certificate ☐ Bachelors ☐ Masters ☐ Doctoral

7. Please indicate your highest degree level attained
   ☐ Bachelors ☐ Masters ☐ DPT ☐ Transitional DPT ☐ PhD
   ☐ Other (please specify)_____

8. Please indicate the average number of hours you practice each week
   ☐ ≤10 ☐ 11-20 ☐ 21-30 ☐ 31-40 ☐ 41-50 ☐ >50

9. Please indicate your primary work location
   - ☐ Acute care hospital
   - ☐ Subacute rehabilitation hospital (inpatient)
   - ☐ Health system or hospital-based outpatient clinic
   - ☐ Private outpatient practice or group practice
   - ☐ Skilled nursing facility/extended care facility/intermediate care facility
   - ☐ School system: preschool/primary/secondary
   - ☐ Academic institution (postsecondary)
   - ☐ Health and wellness facility
   - ☐ Research facility
   - ☐ Industry

APPENDIX

10. Do you have APTA board certification (please check one)?
    - ☐ Yes
    - ☐ No

11. If you answered yes to the above question, in what area(s) are you certified (please check all that apply)?
    - ☐ Orthopaedic
    - ☐ Neurologic
    - ☐ Geriatric
    - ☐ Sports
    - ☐ Pediatric
    - ☐ Cardiovascular and pulmonary
    - ☐ Clinical electrophysiologic
    - ☐ Women's health
    - ☐ Other (please specify)_____

12. Do you use spinal traction in your practice?
    - ☐ Yes
    - ☐ No

If you do not use spinal traction in your practice, please check "no," stop the survey at this point, and return the survey in the stamped envelope included with your mailing.

The following clinical scenario is presented to assist you with making a decision regarding the use of spinal traction.

Scenario 1: a 49-year-old man presents to your practice with 7 days of back and right lower extremity pain. He has numbness extending down his thigh and leg that has been present for the past 24 hours. Sitting is his worst position and causes an increase in his right lower extremity symptoms. Walking relieves his right lower extremity symptoms. On physical examination, you find the following:

- Increased right lower extremity peripheralizing symptoms with standing lumbar extension movements
- Loss of pinprick sensation in the web space between the great and second toes on the right side
- Decreased right ankle jerk reflex
- Positive crossed straight leg raise test at 45°

13. If you were to use lumbar traction on this patient, please indicate which parameters you would use.
    - ☐ Supine intermittent traction, neutral spine
    - ☐ Supine static traction, neutral spine
    - ☐ Prone intermittent traction with adjustments to extension angle based on centralization of patient symptoms
    - ☐ Prone static traction with adjustments to extension angle based on centralization of patient symptoms
    - ☐ I would not use traction on this patient
    - ☐ Other (please specify)_____

14. In the above scenario, which of the following additional therapeutic interventions would you use, if any?
    - ☐ Traction alone, no other interventions
    - ☐ Traction with patient education (posture, spine care and protection)
    - ☐ Traction with manual therapy (manipulation/mobilization, nerve flossing techniques)
    - ☐ Traction as part of a package of care (education, exercises/range of motion, manual therapy, and other modalities)
    - ☐ Package of care without traction (education, exercises/range of motion, manual therapy, and other modalities)
    - ☐ Exercises only

APPENDIX

15. What acuity of low back pain do you most often treat (please use 1, 2, or 3, where 1 is most often, 2 is second most often, and 3 is least often)?
    (*a*) <6 weeks' duration
        1 Most often
        2 Second most often
        3 Least often
    (*b*) 6-12 weeks' duration
        1 Most often
        2 Second most often
        3 Least often
    (*c*) Over 12 weeks' duration
        1 Most often
        2 Second most often
        3 Least often

The following clinical scenario is presented to assist you with making a clinical decision regarding the use of spinal traction.

Scenario 2: a 55-year-old man presents to your practice with 6 months of low back pain and stiffness. Standing and walking are his worst positions. His diagnosis is degenerative joint disease, lumbar spine. On physical examination, you find the following:

- Lumbar range of motion is limited in all directions secondary to pain and stiffness
- Standing lumbar extension movements cause focal lower back pain only
- Supine knee-to-chest pulls ease his back pain
- Prone lying aggravates his back pain
- Loss of passive intervertebral motion testing at several lumbar levels

16. If you were to use lumbar traction on this patient, please indicate which parameters you would use
    ☐ Supine intermittent traction, neutral spine position
    ☐ Supine static traction, neutral spine position
    ☐ Prone intermittent traction
    ☐ Prone static traction
    ☐ I would not use traction on this patient
    ☐ Other (please specify)_____

17. In the above scenario, which of the following additional therapeutic interventions would you use, if any?
    ☐ Traction alone, no other interventions
    ☐ Traction with patient education (posture, spine care and protection)
    ☐ Traction with manual therapy (manipulation/mobilization, nerve flossing techniques)
    ☐ Traction as part of a package of care (education, exercises/range of motion, manual therapy, and other modalities)
    ☐ Package of care without traction (education, exercises/range of motion, manual therapy, and other modalities)
    ☐ Exercises only

18. Please check the types of lumbar traction setups you currently use (check all that apply)
    ☐ Autotraction
    ☐ Manual traction (performed by the therapist only)
    ☐ Table that allows multiplanar/angle mobilization
    ☐ Home lumbar traction unit

APPENDIX

19. Please check the most common treatments you likely would use in conjunction with spinal traction (check all that apply)
    - ☐ Mobilization techniques
    - ☐ Manipulation techniques
    - ☐ McKenzie regimens
    - ☐ Neuromobilization techniques
    - ☐ Interferential current
    - ☐ Other electrotherapy modalities
    - ☐ Hot packs
    - ☐ Massage/soft tissue techniques
    - ☐ Advice regarding posture and management strategies
    - ☐ General exercise/fitness
    - ☐ Core stabilization exercises
    - ☐ Other (please specify)_____

20. Please indicate which of the following effects you believe traction may have (check all that apply)
    - ☐ Intervertebral and foraminal opening
    - ☐ Facet joint gapping
    - ☐ Reduction of disc protrusion
    - ☐ Relaxation of muscle spasm
    - ☐ Stretching muscle/mobilizing soft tissues
    - ☐ Reduction of pain through neuromodulation using the gate control theory
    - ☐ Other (please specify)_____

21. Please indicate the patient position you most commonly use for administering lumbar traction (please check only one)
    - ☐ Supine lying with pillows under the knees (mild flexion bias)
    - ☐ Supine lying with knees and hips flexed to 90° using a stool or pillows (moderate spinal flexion bias)
    - ☐ Prone lying (neutral spine with no flexion or extension bias)
    - ☐ Prone lying with a spinal extension bias
    - ☐ Patient position would be determined by therapist and be diagnosis specific

22. Please indicate whether the following factors influence your decision to choose a lumbar flexion or extension bias when using traction
    (*a*) If the patient has degenerative joint disease evident on radiographs
    - ☐ Yes
    - ☐ No

    (*b*) If the patient's clinical presentation is that of degenerative joint disease
    - ☐ Yes
    - ☐ No

    (*c*) If the patient has a disc herniation on MRI
    - ☐ Yes
    - ☐ No

    (*d*) If the patient's clinical presentation is that of disc herniation
    - ☐ Yes
    - ☐ No

23. Please indicate the percent of the patient's body weight you would use for a lumbar traction at the first treatment session
    ☐ 20-30 ☐ 30-40 ☐ 40-50 ☐ >50

APPENDIX

24. For each condition below, please indicate whether you would apply static or intermittent lumbar traction during the first treatment session
    (*a*) Nerve root with radicular features secondary to a disc herniation
        ☐ Static
        ☐ Intermittent
        ☐ Both
        ☐ I would not use traction on this patient
    (*b*) General mobilization of a stiff spine
        ☐ Static
        ☐ Intermittent
        ☐ Both
        ☐ I would not use traction on this patient
    (*c*) Degenerative joint/facet disease
        ☐ Static
        ☐ Intermittent
        ☐ Both
        ☐ I would not use traction on this patient
    (*d*) Generalized pain relief
        ☐ Static
        ☐ Intermittent
        ☐ Both
        ☐ I would not use traction on this patient

25. Assuming your patient had a positive response to the initial traction session, please indicate what parameter you would modify at a subsequent treatment session (please check your first choice)
    ☐ Increase traction time
    ☐ Increase traction weight
    ☐ Increase both traction time and weight
    ☐ Change angle of traction pull
    ☐ Other (please specify)_____

26. Please indicate the maximum length of treatment time you would consider using traction for each of the following conditions

(*a*) Nerve root with radicular features secondary to a disc herniation

- ☐ <5 minutes
- ☐ 6-10 minutes
- ☐ 11-15 minutes
- ☐ 16-20 minutes
- ☐ 21-25 minutes
- ☐ >25 minutes
- ☐ I would not use traction on this patient

(*b*) General mobilization of a stiff spine

- ☐ <5 minutes
- ☐ 6-10 minutes
- ☐ 11-15 minutes
- ☐ 16-20 minutes
- ☐ 21-25 minutes
- ☐ >25 minutes
- ☐ I would not use traction on this patient

(*c*) Degenerative joint/facet disease

- ☐ <5 minutes
- ☐ 6-10 minutes
- ☐ 11-15 minutes
- ☐ 16-20 minutes
- ☐ 21-25 minutes
- ☐ >25 minutes
- ☐ I would not use traction on this patient

(*d*) Generalized pain relief

- ☐ <5 minutes
- ☐ 6-10 minutes
- ☐ 11-15 minutes
- ☐ 16-20 minutes
- ☐ 21-25 minutes
- ☐ >25 minutes
- ☐ I would not use traction on this patient

APPENDIX

27. Please indicate, on average, how often you would see a patient for treatment using traction for the following conditions
    (*a*) Nerve root with radicular features secondary to a disc herniation
        ☐ Daily
        ☐ 1 time per week
        ☐ 2 times per week
        ☐ 3 times per week
        ☐ I would not use traction on this patient
        ☐ Other (please specify)_____
    (*b*) General mobilization of a stiff spine
        ☐ Daily
        ☐ 1 time per week
        ☐ 2 times per week
        ☐ 3 times per week
        ☐ I would not use traction on this patient
        ☐ Other (please specify)_____
    (*c*) Degenerative joint/facet disease
        ☐ Daily
        ☐ 1 time per week
        ☐ 2 times per week
        ☐ 3 times per week
        ☐ I would not use traction on this patient
        ☐ Other (please specify)_____
    (*d*) Generalized pain relief
        ☐ Daily
        ☐ 1 time per week
        ☐ 2 times per week
        ☐ 3 times per week
        ☐ I would not use traction on this patient
        ☐ Other (please specify)_____

28. Have any of your patients experienced any of the following adverse effects using lumbar traction (please check all that apply)?
    (*a*) Short-term exacerbation of their spine pain
        ☐ Yes
        ☐ No
    (*b*) Increasing pain on release of the traction pull
        ☐ Yes
        ☐ No
    (*c*) Headaches
        ☐ Yes
        ☐ No
    (*d*) Difficulty relaxing
        ☐ Yes
        ☐ No
    (*e*) Short-term increase in upper or lower extremity pain/symptoms
        ☐ Yes
        ☐ No
    (*f*) Other (please specify)_____