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Non-surgical Treatment Choices by Individuals with Lumbar Intervertebral Disc Herniation in the United States: Associations with Long-Term Outcomes

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Abstract

Objectives—1) Evaluate differences between patients with lumbar intervertebral disc herniation (IDH) who received physical therapy (PT) and those who did not; 2) Identify factors associated with receiving PT; 3) Examine the influence of PT on clinical outcomes over the course of one year.

Design—An observational cohort study using data from the Spine Patient Outcomes Research Trial. This study included 363 patients with IDH who received non-surgical management within 6 weeks of enrollment. Baseline characteristics were compared between patients who received PT and those who did not. Multivariate logistic regression examined factors predictive of patients receiving PT. Mixed effects models were used to compare primary outcomes (Short-Form Survey 36 bodily pain and physical function, modified Oswestry Index) at 3 and 6 months, and 1 year after enrollment.

Results—40% of the non-surgical cohort received PT. Higher disability scores, neurological deficit, and patient preference predicted PT use. Compared to other non-surgical management strategies, standard care PT was not associated with a significant difference in pain, disability, or surgery over 1 year.

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Conclusions—Many patients with IDH seek secondary care for persisting symptoms and pursue non-surgical management. The best management strategy is unclear and further research is needed to examine appropriate sequencing and selection of treatment.

Keywords

physical therapy; low back pain; lumbar radiculopathy; sciatica

INTRODUCTION

Low back pain management is costly and expenditures are on the rise.¹ Lumbosacral radicular leg pain, often called sciatica, symptoms are commonly attributed to an intervertebral disk herniation (IDH).² In patients with symptoms longer than 6-weeks who seek healthcare, only 43–60% report significant improvement or resolution.³ Despite marginal success in management of chronic symptoms, persisting or recurring sciatica from IDH is a common reason for seeking additional health care.⁴

A number of non-surgical treatments are advocated for IDH, including epidural injections, medication, education, chiropractic care and physical therapy. The optimal management strategy and sequencing of interventions is unclear.^{5,6} For patients presenting to physical therapy, interventions targeting exercise and joint mobility have been shown to improve physical function.⁷ However, little is known about which patients with persisting sciatica symptoms participate in physical therapy and the subsequent impact on clinical outcomes.

The Spine Patient Outcomes Research Trial (SPORT) was a multicenter study that compared the effectiveness of surgery to non-surgical management for IDH in both an observational and a randomized cohort.^{8,9} Patients in the surgical and non-surgical arms of the study demonstrated improvement in pain and function across time.^{8,9} In the observational cohort, these improvements were significantly greater for those in the surgical group at each time point.⁸ Patients randomized to treatment reported no significant differences between groups for pain and function over time.⁹ Given the breadth of data collected, the SPORT trial provides an opportunity to examine the characteristics and outcomes of patients with IDH managed non-surgically. In both the observational study and the randomized trial, patients in the non-surgery group received “usual care”. While physical therapy was an option for treatment in the conservative care cohort, not all patients received physical therapy, allowing for further analysis of the cohort receiving non-surgical management.

The purpose of this study was to examine the characteristics of lumbar IDH patients treated non-surgically who participated in physical therapy and those who did not. Furthermore, this study examined the subsequent impact of receiving physical therapy on clinical outcomes over the course of one year with a hypothesis that patients receiving physical therapy would have improved clinical outcomes. Specifically, the aims of this study were: 1) evaluate demographic and clinical differences between patients with lumbar IDH at the secondary care level who received physical therapy and those who did not; 2) identify factors associated with receiving physical therapy; 3) examine the influence of physical therapy intervention on clinical outcomes over the course of one year.

METHODS

The study was approved by participating institution's human subjects committee. All participants provided written informed consent prior to collection of data. An independent data and safety monitoring board monitored the study at 6-month intervals. The trial is registered at ClinicalTrials.gov identifier NCT00000410. Funding was provided by The National Institute of Arthritis and Musculoskeletal and Skin Diseases, the Office of Research on Women's Health, the National Institutes of Health, the National Institute of Occupational Safety and Health, and the Centers for Disease Control and Prevention. This study conforms to the STROBE guidelines¹⁰ and reports the required information accordingly (see Supplementary Checklist).

This observational cohort study was a secondary analysis of subjects recruited from 13 multidisciplinary spine centers throughout the United States between March 2000 and November 2004. Participants were recruited from spine specialty clinics by a research nurse at each site who verified eligibility. Patients receiving any physical therapy within the first six weeks of management were compared to those who did not receive physical therapy during that time. Study measures were collected at baseline, 6-weeks, 3-, 6-, and 12-months. Research nurses and nurse coordinators trained in study procedures collected data at baseline and follow-up.

Participants

Inclusion in SPORT required patients to present with persistent symptoms of lumbar disc herniation (>6 weeks) as identified by lumbar related leg pain extending below the knee or into the anterior thigh and positive neural tensions signs or corresponding neurologic deficit. Confirmatory advanced vertebral imaging (MRI or CT) demonstrating disk herniation corresponding with clinical symptoms was also required. Patients were ineligible if they had a prior history of lumbar surgery, cauda equina syndrome, scoliosis greater than 15°, radiographic evidence of segmental instability, or evidence of vertebral fractures. Additional exclusion criteria included spine conditions of a non-musculoskeletal origin (infections, tumors), pregnancy, and inability or an unwillingness to have surgery.^{8,9}

Eligible patients were invited to participate in a randomized trial comparing surgery to non-surgical management. A cohort study was performed alongside the randomized trial and patients who declined participation in the randomized trial invited to participate in the cohort study. This analysis included all participants receiving *non-operative treatment* in the first 6-weeks of either study and with complete information at follow-up. Out of 1991 eligible and screened for inclusion, SPORT enrolled a total of 1244 patients with IDH. Of these, 256 in the randomized cohort were assigned non-surgical management and 222 in the observational cohort (Figure 1) selected non-surgical management.

Non-surgical management

While patients in the non-surgical cohort could receive any non-surgical interventions deemed appropriate by their provider, participating providers were encouraged to promote a minimum intervention of physical therapy, education/counseling with home exercise

instruction, and non-steroidal anti-inflammatory (NSAID) drugs if tolerated. The physical therapy intervention was not standardized but providers were instructed to use active interventions. These recommendations included flexibility, strengthening, conditioning, stabilization, McKenzie exercises, and joint manipulation.¹¹ If this was not effective, participating providers were encouraged to individualize treatment and aggressively pursue other non-surgical strategies.¹¹ Non-operative treatments received were tracked at each follow-up assessment via self-report, physician report, and structured interviews.

Outcome Measurements

Primary outcome measures included the Medical Outcomes Study 36-Item Short Form Health Survey (SF-36) bodily pain and physical function scales¹² and the American Academy of Orthopaedic Surgeons MODEMS version of the Oswestry Disability Index (ODI).¹³ The SF-36 is a generic health status measure scaled from 0 to 100 with higher scores indicating better health. The ODI measures patient reported disability scored from 0 to 100 with higher scores indicating greater disability. Surgery for IDH was also recorded.

Secondary outcome measures included opioid use, patient self-rated overall improvement, and satisfaction with symptoms. Patients reporting “major improvement” on the self-rated progress scale or “somewhat/very satisfied with symptoms” on the satisfaction with symptoms scale were considered responders.^{14,15} Leg symptom severity was measured with the Sciatica Bothersome Index (SBI).¹³ The SBI is rated from 0–24, with higher scores indicating worse symptoms.

Potential confounders and effect modifiers

Demographic variables including sex, age, race, and marital status were collected by self-report. Health status covariates were collected by self-report, physician report, and structured interviews. Variables included surgery center, smoking status, herniation location, comorbidities, self-rated symptom progression, duration, and treatment preference. Finally, work status was self-reported and included compensation, working location, and work status.

Data Analysis

Baseline characteristics of patients receiving physical therapy to those not receiving physical therapy during the 6-week period after enrollment were examined using two-tailed t-tests and chi-square statistics. Stepwise logistic regression was used to investigate baseline factors associated with receiving physical therapy during the first 6-weeks. Variables correlated with treatment at a significance level of $p < .10$ were entered into the equation. Significance of $p < .05$ was required to be retained in the final model. Baseline demographic characteristics, comorbid health conditions, physical exam findings, treatment preference and outcome measure scores (Tables 1 and 2) were considered for entry. The chi-square statistic was used to compare rates of surgery between groups at one year following enrollment and responders across time points.

A mixed effects model was used to evaluate change from baseline between groups for the primary outcomes using a random individual effect to account for the correlation between

repeated measures from the same participant. Statistical significance was defined as $p < .05$ and all hypotheses were considered two-sided. Bonferroni adjustments were made to correct for Type I error associated with multiple comparisons. Analyses of outcomes at each time point were performed only on individuals continuing with non-surgical management. Patients progressing to surgery were censored from additional analyses occurring after surgery. Consistent with other SPORT analyses, baseline variables associated with missing data or treatment received were included to adjust for potential confounding.^{8,9} SAS procedures PROC MIXED was used for continuous data with normal random effects, and PROC GENMOD for binary and non-normal secondary outcomes, software version 9.1 (SAS Institute Inc, Cary, NC).

RESULTS

Of the 1215 patients in the combined cohorts, 256 in the randomized cohort were assigned to receive non-surgical management and 191 in the observation cohort chose non-surgical management (Figure 1). Of patients assigned or choosing non-surgical management, 362 (76%) had complete information regarding physical therapy utilization and were included in the analysis. One hundred forty three patients (40%) received physical therapy intervention within 6 weeks of enrollment. Among those receiving physical therapy, forty-two patients (29%) attended 3 or fewer physical therapy visits, another 42 attended 4–6 visits, 32 (22%) patients attended 7–10 visits, and 27 (19%) attended 11 visits or more.

There were few differences at baseline between those receiving physical therapy and those who did not (Table 1 and Table 2). Patients who received physical therapy were more likely to have symptoms for less than 6 months ($p=0.031$), be very dissatisfied with their symptoms ($p=0.048$), and report a preference for non-surgical care ($p=0.002$). Additionally, patients in the physical therapy cohort were less likely to have received an injection at baseline ($p=0.042$).

A variety of interventions were reported during the first 6-weeks of treatment (Table 3). Medications and injections were the most commonly used interventions for both groups. Patients receiving physical therapy were noted to have higher use of muscle relaxants ($p=0.003$), medical devices in general ($p=0.006$), and more visits to non-surgeon physicians (i.e. internists, neurologists, etc)($p=0.005$). The final logistic regression model indicated baseline ODI, treatment preference, and the presence of neurologic deficit to be associated with having received physical therapy within the first 6 weeks of enrollment. For every one-point increase in baseline ODI score, there was a 2% increase in the odds of having physical therapy (adjusted OR 1.02 95% CI 1.01, 1.03, $p=0.005$). The presence of any neurologic deficit increased the odds of having physical therapy (adjusted OR=1.82 95% CI 1.11, 2.98, $p=0.018$). Additionally, a preference for non-surgical treatment increased the odds of participating in early physical therapy compared to no preference (adjusted OR=1.83 (95% CI 1.04, 3.21 $p=0.036$); whereas a preference for surgery reduced the odds of physical therapy utilization compared to no preference (adjusted OR=0.36 95% CI 0.15, 0.91, $p=0.03$).

Comparisons of patient-centered outcomes for patients who did or did not receive physical therapy within the first 6 weeks after enrollment are presented in Table 4 and in Figures 2 and 3. Changes in pain and disability were generally equivocal across groups. Additionally, there was no difference in the proportion of responders across groups at any time point (Table 4). During the first year, 61 (28%) patients not receiving physical therapy and 35 (24%) receiving physical therapy progressed to surgery (OR 1.6, 95% CI 0.99, 2.57 $p=0.54$).

Significant differences were noted with only two comparisons, opioid use at 6 weeks and LBP bothersomeness at 1 year. Within the group receiving physical therapy, a greater percentage of patients reported opioid use within the first 6 weeks (12.5, 95% CI 1.9, 23.1, $p=0.02$). The physical therapy group also reported significantly greater improvement in LBP bothersomeness at 1 year (-0.4 , 95% CI -0.8 , 0 , $p=0.05$).

DISCUSSION

Sciatica secondary to IDH is a common condition that is best approached from a multi-modal, multi-disciplinary perspective.¹⁶ This remains a challenge as there are no clear guidelines on which interventions work best in combination or how to sequence interventions. An estimated 10–40% of individuals develop persisting sciatica and restricted work and leisure activities even with treatment.^{17,18} This study provides important information on conservative interventions for individuals with persisting pain from lumbar IDH in a nationally representative cohort.

Common non-surgical interventions included physical therapy (40%), injections (42%), and NSAID, Cox2, or oral steroid medications (44%). The use of physical therapy in conservative management of IDH in the SPORT cohort was slightly lower, but similar, to prior studies. Atlas and Österman reported the use of physical therapy in 49% and 54% of patients receiving conservative management of IDH.^{17,19} Bed rest/activity restriction and the use of injections were markedly different from prior reports. The Maine Lumbar Spine Study reported only 19% of the conservative care cohort received injections.¹⁷ In that same study, bed rest was used as a management strategy for 41% of the cohort while only 1% of the SPORT cohort reported using activity restriction. Recommendations to stay active reflect best practice guidelines²⁰ and represents a large shift from earlier studies utilizing bed rest during the first week of management as part of the treatment protocol for patients with IDH.²¹ The increase in lumbosacral injections is consistent with trends across the United States, but may also be explained by the geographical variation represented in the SPORT.²²

Factors associated with receiving physical therapy were consistent with other reports linking symptom severity and patient preference with subsequent treatment.^{23,24} The perceived need for care among patients with LBP is more strongly associated with disability rather than pain.²³ It is reasonable to consider that in addition to a preference for conservative care, patients receiving physical therapy were seeking strategies for improving function.

This study failed to identify significant differences in pain and disability among those receiving physical therapy after enrollment compared with those who did not. It is difficult to judge the value of the physical therapy intervention in the current study as it was

unstandardized and specific details were not reported. The dose and specific physical therapy intervention can influence the outcomes of patient with IDH.^{6,7} Unfortunately, this level of detail was unavailable for the current analysis. More research is needed to outline definitive parameters of the most effective physical therapy intervention for patients with IDH. Without a standardized physical therapy protocol it is difficult to know if the treatment effect was attenuated due to practice variation or simply ineffective.²⁵

For patients assessed in secondary care settings, rates of recovery are reportedly worse than for acute cases of sciatica due to IDH.^{3,17,26} Many interventions are advocated without clear benefit of any one intervention long-term.⁶ Future research informing treatment selection and treatment sequencing is needed to optimize the effectiveness of non-surgical management. At present, the equivalency of non-surgical treatment interventions suggests treatment choice should be considered preference sensitive and involve shared decision making between providers and patients.²⁷

Several limitations need to be considered when interpreting the results of this study. Results represent a secondary analysis of patients in a larger trial. The subgroups studied were not randomized and the initial study design of the SPORT trial did not identify these subsets *a priori*. As such, there is risk of selection bias and the possibility of unidentified confounders between comparison groups limiting conclusions on the efficacy of physical therapy as a non-surgical management strategy. Finally, the variation associated with the non-standardized approach to conservative management in the SPORT trial obscures the evaluation of a particular treatment strategy.

CONCLUSION

This secondary analysis of a nationally representative cohort from the SPORT population demonstrates the variety of non-surgical treatments utilized in managing patients with IDH who seek secondary care but do not elect surgical management. The primary non-surgical interventions used were medication, spinal injections and physical therapy. Higher baseline disability, the presence of neurologic deficit, and patient preference for physical therapy were all factors associated with receiving physical therapy as an initial management strategy. Patients receiving physical therapy within the first 6 weeks did not demonstrate any significant differences in primary outcomes of pain and disability compared to those who did not receive physical therapy. These results highlight the variation and complexity in non-surgical management decisions for patients with IDH. There remains a need to identify optimal management strategies and sequencing of treatment for this population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. Martin BI, Turner JA, Mirza SK, Lee MJ, Comstock BA, Deyo RA. Trends in health care expenditures, utilization, and health status among US adults with spine problems, 1997–2006. *Spine*. 2009; 34:2077–84. [PubMed: 19675510]
2. Koes B, Van Tulder M, Peul W. Diagnosis and treatment of sciatica. *BMJ: British Medical Journal*. 2007; 334:1313. [PubMed: 17585160]
3. Vroomen PCAJ, De Krom M, Knottnerus J. Predicting the outcome of sciatica at short-term follow-up. *The British Journal of General Practice*. 2002; 52:119. [PubMed: 11887877]
4. Carey TS, Garrett JM, Jackman A, Hadler N. Recurrence and care seeking after acute back pain: results of a long-term follow-up study. *Medical care*. 1999; 37:157–64. [PubMed: 10024120]
5. Lewis, R., Williams, N., Matar, H., et al. The clinical effectiveness and cost-effectiveness of management strategies for sciatica: systematic review and economic model. 2011.
6. Hahne AJ, Ford JJ, McMeeken JM. Conservative management of lumbar disc herniation with associated radiculopathy: a systematic review. *Spine*. 2010; 35:E488. [PubMed: 20421859]
7. Jewell DV, Riddle DL. Interventions that increase or decrease the likelihood of a meaningful improvement in physical health in patients with sciatica. *Phys Ther*. 2005; 85:1139–50. [PubMed: 16253044]
8. Weinstein JN, Lurie JD, Tosteson TD, et al. Surgical vs nonoperative treatment for lumbar disk herniation: the Spine Patient Outcomes Research Trial (SPORT) observational cohort. *JAMA*. 2006; 296:2451–9. [PubMed: 17119141]
9. Weinstein JN, Tosteson TD, Lurie JD, et al. Surgical vs nonoperative treatment for lumbar disk herniation: the Spine Patient Outcomes Research Trial (SPORT): a randomized trial. *JAMA*. 2006; 296:2441–50. [PubMed: 17119140]
10. von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Lancet*. 2007; 370:1453–7. [PubMed: 18064739]
11. Birkmeyer NJ, Weinstein JN, Tosteson AN, et al. Design of the spine patient outcomes research trial (SPORT). *Spine*. 2002; 27:1361. [PubMed: 12065987]
12. McHorney CA, Ware JE Jr, Rachel Lu J, Sherbourne CD. The MOS 36-Item Short-Form Health Survey (SF-36): III. Tests of data quality, scaling assumptions, and reliability across diverse patient groups. *Medical care*. 1994; 32:40. [PubMed: 8277801]
13. Daltroy L, Cats-Baril W, Katz J, Fossel A, Liang M. The North American Spine Society lumbar spine outcome assessment instrument: reliability and validity tests. *Spine*. 1996; 21:741. [PubMed: 8882698]
14. Deyo RA, Dworkin SF, Amtmann D, et al. Report of the NIH Task Force on research standards for chronic low back pain. *Physical therapy*. 2015; 95:e1–e18. [PubMed: 25639530]
15. Cherkin DC, Deyo RA, Street JH, Barlow W. Predicting poor outcomes for back pain seen in primary care using patients' own criteria. *Spine (Phila Pa 1976)*. 1996; 21:2900–7. [PubMed: 9112715]
16. Stafford MA, Peng P, Hill DA. Sciatica: a review of history, epidemiology, pathogenesis, and the role of epidural steroid injection in management. *Br J Anaesth*. 2007; 99:461–73. [PubMed: 17704089]
17. Atlas SJ, Deyo RA, Keller RB, et al. The Maine Lumbar Spine Study, Part III: 1-year outcomes of surgical and nonsurgical management of lumbar spinal stenosis. *Spine*. 1996; 21:1787. [PubMed: 8855463]
18. Weber H, Holme I, Amlie E. The natural course of acute sciatica with nerve root symptoms in a double-blind placebo-controlled trial evaluating the effect of piroxicam. *Spine (Phila Pa 1976)*. 1993; 18:1433–8. [PubMed: 8235813]

19. Österman H, Seitsalo S, Karppinen J, Malmivaara A. Effectiveness of microdiscectomy for lumbar disc herniation: a randomized controlled trial with 2 years of follow-up. *Spine*. 2006; 31:2409–14. [PubMed: 17023847]
20. Dahm KT, Brurberg KG, Jamtvedt G, Hagen KB. Advice to rest in bed versus advice to stay active for acute low-back pain and sciatica. *The Cochrane database of systematic reviews*. 2010:6.
21. Weber H. Lumbar disc herniation: a controlled, prospective study with ten years of observation. *Spine*. 1983; 8:131–40. [PubMed: 6857385]
22. Friedly J, Chan L, Deyo R. Geographic variation in epidural steroid injection use in Medicare patients. *The Journal of Bone & Joint Surgery*. 2008; 90:1730–7. [PubMed: 18676905]
23. Ferreira ML, Machado G, Latimer J, Maher C, Ferreira PH, Smeets RJ. Factors defining care-seeking in low back pain—A meta-analysis of population based surveys. *European Journal of Pain*. 2010; 14:747e1–e7. [PubMed: 20036168]
24. Freburger JK, Carey TS, Holmes GM. Physician referrals to physical therapists for the treatment of spine disorders. *The Spine Journal*. 2005; 5:530–41. [PubMed: 16153582]
25. Fritz JM, Cleland JA, Brennan GP. Does adherence to the guideline recommendation for active treatments improve the quality of care for patients with acute low back pain delivered by physical therapists? *Medical care*. 2007; 45:973–80. [PubMed: 17890995]
26. Peul W, Hout W, Brand R, Thomeer R, Koes B. Prolonged conservative care versus early surgery in patients with sciatica caused by lumbar disc herniation: two year results of a randomised controlled trial. *British Medical Journal*. 2008
27. Elwyn G, Edwards A, Kinnersley P, Grol R. Shared decision making and the concept of equipoise: the competences of involving patients in healthcare choices. *The British Journal of General Practice*. 2000; 50:892. [PubMed: 11141876]

Figure 1.
Flow of participants through study.

Figure 2.
Primary outcomes over time.

Figure 3.
Secondary outcomes over time.

Table 1

Baseline demographic characteristics.

	Had Physical Therapy During First 6-Weeks (n=143)	No Physical Therapy During First 6-Weeks (n=219)	p-value
Age (years, M, SD)	43.7 (11.5)	42.9 (11.6)	0.49
Sex (female)	64 (45%)	89 (41%)	0.51
Body Mass Index (kg/m ² , M, SD)	27.5 (5.5)	28 (5.5)	0.40
Race	118 (83%)	192 (88%)	0.22
Education (at least some college)	116 (81%)	159 (73%)	0.08
Marital status (married)	101 (71%)	151 (69%)	0.82
Work Status			0.29
Full or part-time	91 (64%)	152 (69%)	
Disabled	17 (12%)	16 (7%)	
Other	35 (24%)	51 (23%)	
Receiving compensation	25 (17%)	25 (11%)	0.14
Smoker	33 (23%)	57 (26%)	0.61
Co-morbidities			
Depression	18 (13%)	30 (14%)	0.88
Joint Problem	35 (24%)	48 (22%)	0.66
Other ^a	69 (48%)	113 (52%)	0.61
Treatment prior to enrollment			
Physical therapy	100 (70%)	159 (73%)	0.67
Injection	51 (36%)	103 (47%)	0.04*
Symptom duration <6 months	122 (85%)	165 (75%)	0.03*
SF-36-Bodily Pain (M, SD)	32.8 (21.4)	34.2 (21.5)	0.51
SF-36-Physical Functioning (M, SD)	44.8 (24.4)	47.7 (27.1)	0.31
SF-36-Mental Component Score (M, SD)	45.7 (12.1)	46.2 (11.0)	0.64
Oswestry Disability Index (0–100) (M, SD)	42.9 (18.8)	39.0 (21.2)	0.08
Sciatica Frequency Index (0–24) (M, SD)	14.1 (5.2)	14.7 (5.5)	0.32
Sciatica Bothersomeness Index (0–24) (M, SD)	14.3 (5.2)	14.0 (5.6)	0.65
Back Pain Bothersomeness (0–6) (M, SD)	3.9 (1.7)	3.7 (1.9)	0.18
Leg Pain Bothersomeness (0–6) (M, SD)	4.4 (1.6)	4.2 (1.7)	0.42

	Had Physical Therapy During First 6-Weeks (n=143)	No Physical Therapy During First 6-Weeks (n=219)	p-value
Very dissatisfied with symptoms	104 (73%)	136 (62%)	0.05*
Symptom status			0.08
Getting better	42 (29%)	53 (24%)	
Staying the same	57 (40%)	113 (52%)	
Getting worse	44 (31%)	52 (24%)	
Treatment Preference			0.002*
Non-Surgical	109 (76%)	133 (61%)	
Surgical	26 (18%)	50 (23%)	
Not Sure	8 (6%)	36 (16%)	

* significant at p = 0.05

^aOther comorbidities include problems related to stroke, diabetes, osteoporosis, cancer, fibromyalgia, chronic fatigue syndrome, post traumatic stress disorder, alcohol drug dependence, heart, lung, liver, kidney, blood vessel, nervous system, hypertension, migraine, anxiety, stomach or bowel.

M, mean; SD, standard deviation

Table 2

Baseline examination findings.

	Had Physical Therapy During First 6-Weeks (n=143)	No Physical Therapy During First 6-Weeks (n=219)	p-value
Pain Radiation	138 (97%)	213 (97%)	0.92
Straight Leg Raise Ipsilateral	89 (62%)	139 (63%)	0.91
Straight Leg Raise Contralateral/Both	13 (9%)	26 (12%)	0.51
Neurological Deficit	109 (76%)	145 (66%)	0.06
Reflexes - asymmetric depressed	55 (38%)	70 (32%)	0.25
Sensory – asymmetric decreased	77 (54%)	96 (44%)	0.08
Motor – asymmetric weakness	49 (34%)	74 (34%)	0.98
Herniation Level			0.18
L2-3/L3-4	17 (12%)	14 (6%)	
L4-L5	53 (37%)	90 (41%)	
L5-S1	73 (51%)	114 (52%)	
Herniation Type			0.29
Protruding	52 (37%)	66 (30%)	
Extruded	78 (55%)	137 (63%)	
Sequestered	12 (8%)	15 (7%)	
Posterolateral herniation	104 (73%)	170 (78%)	0.35

Table 3

Non-surgical treatments received during the first 6 weeks after enrollment.

	Had Physical Therapy During First 6-Weeks (n=143)	No Physical Therapy During First 6-Weeks (n=219)	p-value
Providers/Services/Treatments			
Education/Counseling	13 (9%)	10 (5%)	0.14
Emergency Room Visits	6 (4%)	17 (8%)	0.25
Surgeon	29 (20%)	41 (19%)	0.82
Chiropractor	12 (8%)	14 (6%)	0.61
Internist/Neurologist/etc.	62 (43%)	62 (28%)	0.005 *
Acupuncturist	4 (3%)	5 (2%)	0.97
Other	29 (20%)	31 (14%)	0.17
Injections	60 (42%)	92 (42%)	0.92
Activity Restriction	7 (5%)	5 (2%)	0.30
Medications			
NSAIDs	62 (43%)	91 (42%)	0.82
Cox inhibitors	40 (28%)	53 (24%)	0.50
Oral Steroids	5 (3%)	8 (4%)	0.83
Narcotics	51 (36%)	57 (26%)	0.07
Muscle relaxants	32 (22%)	23 (11%)	0.003 *
Other Medications	57 (40%)	77 (35%)	0.43
Devices			
Brace	6 (4%)	6 (3%)	0.65
Corset	3 (2%)	0 (0%)	0.12
Magnets	4 (3%)	2 (1%)	0.34
Orthopedic pillow	16 (11%)	10 (5%)	0.03 *
Shoe inserts	8 (6%)	4 (2%)	0.10
TENS machine	4 (3%)	3 (1%)	0.57
Other medical devices	5 (3%)	8 (4%)	0.84
None	107 (75%)	189 (87%)	0.006 *
NSAIDs or Cox2 or Oral Steroids	65 (45%)	96 (44%)	0.85

* significant at p = 0.05

Table 4

Primary and secondary outcomes for patients who received or did not receive physical therapy during the first 6 weeks after enrollment.^a

Outcome	6-Week				3-Month				1-Year			
	PT 143	No PT 219	Treatment Effect (95% CI)	p-value	PT 117	No PT 165	Treatment Effect (95% CI)	p-value	PT 100	No PT 139	Treatment Effect (95% CI)	p-value
<i>Number of patients</i>												
SF-36 Bodily Pain	16.1 (1.8)	18.1 (1.5)	-2.0 (-6.7, 2.7)	0.41	22.6 (2.0)	25.2 (1.6)	-2.6 (-7.7, 2.5)	0.31	28.9 (2.1)	29.6 (1.7)	-0.7 (-6.1, 4.7)	0.79
SF-36 Physical Function	11.9 (1.7)	12.1 (1.4)	-0.2 (-4.6, 4.2)	0.93	16.8 (1.8)	18.1 (1.5)	-1.2 (-6.1, 3.6)	0.61	23.6 (1.9)	22.3 (1.6)	1.3 (-3.7, 6.4)	0.61
SF-36 Mental Component Summary	2.8 (0.8)	3.1 (0.7)	-0.3 (-2.3, 1.8)	0.79	3.5 (0.9)	4.8 (0.7)	-1.3 (-3.6, 0.9)	0.24	2.8 (0.9)	4.4 (0.8)	-1.6 (3.9, 0.8)	0.19
Oswestry Disability Index (0-100)	-8.7 (1.5)	-10.1 (1.2)	1.4 (-2.5, 5.2)	0.49	-12.8 (1.6)	-15.5 (1.3)	2.6 (-1.5, 6.8)	0.21	-18.0 (1.6)	-16.2 (1.4)	-1.7 (-6.1, 2.6)	0.43
Sciatica Bothersomeness Index (0-24)	NA	NA	NA	NA	-6.3 (0.5)	-6.3 (0.4)	0 (-1.3, 0.5)	0.99	-7.5 (0.5)	-7.0 (0.4)	-0.5 (-1.9, 0.8)	0.43
Leg Pain Bothersomeness (0-6)	NA	NA	NA	NA	-1.9 (0.2)	-2.0 (0.1)	0.1 (-0.3, 0.5)	0.73	-2.6 (0.2)	-2.2 (0.1)	-0.4 (-0.8, 0)	0.07
Low Back Pain Bothersomeness (0-6)	NA	NA	NA	NA	-1.2 (0.1)	-1.1 (0.1)	-0.1 (-0.5, 0.3)	0.59	-1.6 (0.1)	-1.2 (0.1)	-0.4 (-0.8, 0)	0.05*
Opioid Use (%)	31.6	19.1	12.5 (1.9, 23.1)	0.02*	15.5	14.8	0.7 (-8.0, 9.4)	0.87	6.9	9.7	-2.8 (-9.4, 3.8)	0.40
Responders:												
Very/Somewhat Satisfied with Symptoms (%)	23.1	24.7	-1.6 (-11.3, 8.1)	0.74	33.1	35.7	-2.6 (-15.0, 9.8)	0.67	49.6	46.6	3.0 (-11.1, 17.2)	0.68
Self-Rated Progress: Major Improvement (%)	37.9	35.2	2.7 (-8.6, 14.1)	0.64	54.2	49.5	4.6 (-8.6, 17.9)	0.48	60.7	51.9	8.8 (-5.1, 22.7)	0.23

^aValues represent mean change from baseline (standard error) or percentages where indicated. Values have been adjusted for center, age, sex, marital status, smoking status, race, compensation, herniation location, working location, working status, stomach comorbidity, depression, other comorbidity, self-rated symptom progression, duration, treatment preference and baseline scores (for SF-36 and ODI). NA indicates data was not assessed.