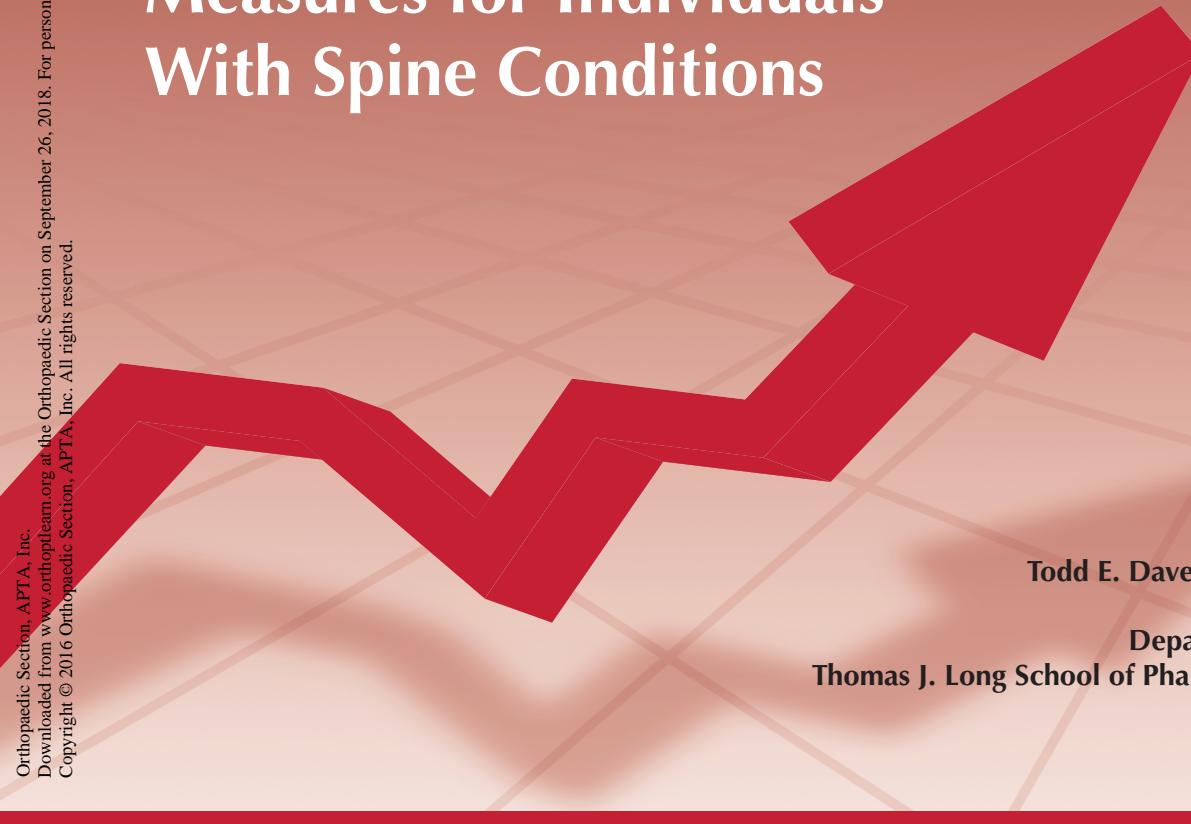


# Outcomes in Orthopaedic Physical Therapy Practice

Independent Study Course 26.1.5

## Patient Self-report Outcome Measures for Individuals With Spine Conditions



Todd E. Davenport, PT, DPT, MPH, OCS

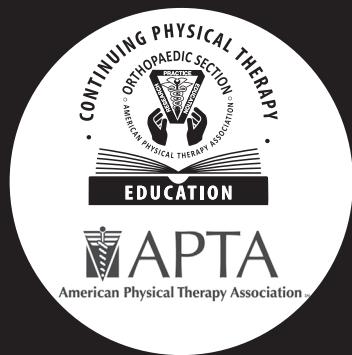
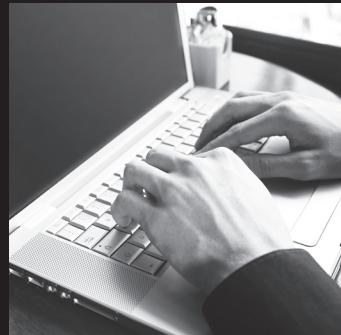
Associate Professor

Department of Physical Therapy

Thomas J. Long School of Pharmacy and Health Sciences

University of the Pacific

Stockton, California



## REFERENCES

1. Davenport TE, Watts HG, Kulig K, Resnik C. Current status and correlates of physicians' referral diagnoses for physical therapy. *J Orthop Sports Phys Ther.* 2005;35(9):572-579.
2. Murray CJ, Atkinson C, Bhalla K, et al. The state of US health, 1990-2010: burden of diseases, injuries, and risk factors. *JAMA.* 2013;310(6):591-608. doi: 10.1001/jama.2013.13805.
3. Global Burden of Disease Study C. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet.* 2015;386(9995):743-800. doi: 10.1016/S0140-6736(15)60692-4. Epub 2015 Jun 7.
4. Namazi Shabestari A, Saeedi Moghaddam S, Sharifi F, et al. The most prevalent causes of deaths, DALYs, and geriatric syndromes in Iranian elderly people between 1990 and 2010: findings from the Global Burden of Disease study 2010. *Arch Iran Med.* 2015;18(8):462-479. doi: 015188/ AIM.003.
5. Global Burden of Disease study group, Murray CJ, et al. Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990-2013: quantifying the epidemiological transition. *Lancet.* 2015;386(10009):2145-2191. doi: 10.1016/S0140-6736(15)61340-X. Epub 2015 Aug 28.
6. Newton JN, Briggs AD, Murray CJ, et al. Changes in health in England, with analysis by English regions and areas of deprivation, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet.* 2015;386(10010):2257-2274. doi: 10.1016/S0140-6736(15)00195-6. Epub 2015 Sep 14.
7. Taylor RS, Taylor RJ. The economic impact of failed back surgery syndrome. *Br J Pain.* 2012;6(4):174-181. doi: 10.1177/2049463712470887.
8. Martin BI, Deyo RA, Mirza SK, et al. Expenditures and health status among adults with back and neck problems. *JAMA.* 2008;299(6):656-664. doi: 10.1001/jama.299.6.656.
9. Delitto A, George SZ, Van Dillen LR, et al. Low back pain. *J Orthop Sports Phys Ther.* 2012;42(4):A1-57. doi: 10.2519/jospt.2012.0301. Epub 2012 Mar 30.
10. Tosteson AN. Preference-based health outcome measures in low back pain. *Spine (Phila Pa 1976).* 2000;25(24):3161-3166.
11. Bozic KJ, Chiu V. Emerging ideas: Shared decision making in patients with osteoarthritis of the hip and knee. *Clin Orthop Relat Res.* 2011;469(7):2081-2085. doi: 10.1007/s11999-010-1740-7. Epub 2010 Dec 16.
12. Crowe M, Whitehead L, Jo Gagan M, Baxter D, Panckhurst A. Self-management and chronic low back pain: a qualitative study. *J Adv Nurs.* 2010;66(7):1478-1486. doi: 10.1111/j.1365-2648.2010.05316.x. Epub 2010 May 13.
13. Killick L. PE kits, playgrounds and pain: an exploration of children's experiences of risk, pain and injury in sport. In: Scott-Jones JS, Raisborough J, eds. *Risks, Identities and the Everyday.* Hampshire, UK: Ashgate; 2007:51-66.
14. Kotarba J. *Chronic Pain: Its Social Dimensions.* Newbury Park, CA: Sage Publications; 1983.
15. Guide to Physical Therapist Practice. 2nd ed. American Physical Therapy Association. *Phys Ther.* 2001;81(1):9-746.

16. Organization WH. *International Classification of Functioning, Disability and Health: ICF*. Geneva, Switzerland: World Health Organization; 2001.
17. Godges JJ, Irrgang JJ. ICF-based practice guidelines for common musculoskeletal conditions. *J Orthop Sports Phys Ther*. 2008;38(4):167-168. doi: 10.2519/jospt.2008.0105. Epub 2008 Mar 31.
18. Jette AM. The changing language of disablement. *Phys Ther*. 2005;85(2):118-119.
19. Cieza A, Ewert T, Ustun TB, Chatterji S, Kostanjsek N, Stucki G. Development of ICF Core Sets for patients with chronic conditions. *J Rehabil Med*. 2004;(44 Suppl):9-11.
20. Cieza A, Stucki G, Weigl M, et al. ICF Core Sets for low back pain. *J Rehabil Med*. 2004;(44 Suppl):69-74.
21. Finger ME, Selb M, De Bie R, Escorpizo R. Using the International Classification of Functioning, Disability and Health in Physiotherapy in multidisciplinary vocational rehabilitation: a case study of low back pain. *Physiother Res Int*. 2015;20(4):231-241. doi: 10.1002/pri.1587. Epub 2014 Apr 15.
22. Rundell SD, Davenport TE, Wagner T. Physical therapist management of acute and chronic low back pain using the World Health Organization's International Classification of Functioning, Disability and Health. *Phys Ther*. 2009;89(1):82-90. doi: 10.2522/ptj.20080113. Epub 2008 Nov 13.
23. Stier-Jarmer M, Cieza A, Borchers M, Stucki G, World Health O. How to apply the ICF and ICF core sets for low back pain. *Clin J Pain*. 2009;25(1):29-38. doi: 10.1097/AJP.0b013e31817bcc78.
24. Kirschneck M, Kirchberger I, Amann E, Cieza A. Validation of the comprehensive ICF core set for low back pain: the perspective of physical therapists. *Man Ther*. 2011;16(4):364-372. doi: 10.1016/j.math.2010.12.011. Epub 2011 Jan 26.
25. Bagraith KS, Hayes J, Strong J. Mapping patient goals to the International Classification of Functioning, Disability and Health (ICF): examining the content validity of the low back pain core sets. *J Rehabil Med*. 2013;45(5):481-487. doi: 10.2340/16501977-1134.
26. Lygren H, Strand LI, Anderson B, Magnussen LH. Do ICF core sets for low back pain include patients' self-reported activity limitations because of back problems? *Physiother Res Int*. 2014;19(2):99-107. doi: 10.1002/pri.1566. Epub 2013 Oct 22.
27. Mullis R, Barber J, Lewis M, Hay E. ICF core sets for low back pain: do they include what matters to patients? *J Rehabil Med*. 2007;39(5):353-357.
28. Paul B, Leitner C, Vacariu G, et al. Low-back pain assessment based on the Brief ICF Core Sets: diagnostic relevance of motor performance and psychological tests. *Am J Phys Med Rehabil*. 2008;87(6):452-460.
29. Schwegler U, Anner J, Boldt C, et al. Aspects of functioning and environmental factors in medical work capacity evaluations of persons with chronic widespread pain and low back pain can be represented by a combination of applicable ICF Core Sets. *BMC Public Health*. 2012;12:1088. doi: 10.1186/1471-2458-12-1088.
30. Kirschneck M, Legner R, Armburst W, Nowak D, Cieza A. Can ICF core sets be helpful in preparing a social-medical expert report due to incapacity to work?--a first proposal. *Rehabilitation (Stuttg)*. 2015;54(2):92-101.
31. Escorpizo R, Davis K, Stumbo T. Mapping of a standard documentation template to the ICF core sets for arthritis and low back pain. *Physiother Res Int*. 2010;15(4):222-231. doi: 10.1002/pri.466.
32. Sigl T, Cieza A, Brockow T, Chatterji S, Kostanjsek N, Stucki G. Content comparison of low back pain-specific measures based on the International Classification of Functioning, Disability and Health (ICF). *Clin J Pain*. 2006;22(2):147-153.
33. Portney LG, Watkins MP. *Foundations of Clinical Research: Applications to Practice*. 3rd ed. ed. Princeton, NJ: Prentice-Hall; 2008.
34. Berg KE, Latin RW. *Essentials of Research Methods in Health, Physical Education, Exercise Science, and Recreation*. 3rd ed. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2008.
35. Carter RE, Lubinsky J, Domholdt E. *Rehabilitation Research : Principles and Applications*. 4th ed. St. Louis, MO: Elsevier Saunders; 2011.
36. Domholdt E. *Rehabilitation Research : Principles and Applications*. 3rd ed. St. Louis, MO: Elsevier Saunders; 2005.
37. Jewell DV. *Guide to Evidence-based Physical Therapist Practice*. 2nd ed. Sudbury, MA: Jones & Bartlett Learning; 2011.
38. Hurley WL, Denegar CR, Hertel J. *Research Methods : A Framework for Evidence-based Clinical Practice*. 1st ed. Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins Health; 2011.
39. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33(1):159-174.
40. Guttman L. A basis for analyzing test-retest reliability. *Psychometrika*. 1945;10:255-282.
41. Cronbach LJ, Warrington WG. Time-limit tests: estimating their reliability and degree of speeding. *Psychometrika*. 1951;16(2):167-188.
42. Bolton JE, Humphreys BK. The Bournemouth Questionnaire: a short-form comprehensive outcome measure. II. Psychometric properties in neck pain patients. *J Manipulative Physiol Ther*. 2002;25(3):141-148.

43. Bolton JE, Breen AC. The Bournemouth Questionnaire: a short-form comprehensive outcome measure. I. Psychometric properties in back pain patients. *J Manipulative Physiol Ther*. 1999;22(8):503-510.
44. El-Daly I, Ibraheim H, Rajakulendran K, Culpan P, Bates P. Are patient-reported outcome measures in orthopaedics easily read by patients? *Clin Orthop Relat Res*. Oct 15 2015. [Epub ahead of print]
45. Schmitt MA, Schroder CD, Stenneberg MS, et al. Content validity of the Dutch version of the Neck Bournemouth Questionnaire. *Man Ther*. 2013;18(5):386-389. doi: 10.1016/j.math.2013.01.004. Epub 2013 Feb 19.
46. Schmitt MA, de Wijer A, van Genderen FR, van der Graaf Y, Helders PJ, van Meeteren NL. The Neck Bournemouth Questionnaire cross-cultural adaptation into Dutch and evaluation of its psychometric properties in a population with subacute and chronic whiplash associated disorders. *Spine (Phila Pa 1976)*. 2009;34(23):2551-2561.
47. Soklic M, Peterson C, Humphreys BK. Translation and validation of the German version of the Bournemouth Questionnaire for Neck Pain. *Chiropr Man Ther*. 2012;20(1):2. doi: 10.1186/2045-709X-20-2.
48. BenDebba M, Heller J, Ducker TB, Eisinger JM. Cervical spine outcomes questionnaire: its development and psychometric properties. *Spine (Phila Pa 1976)*. 2002;27(19):2116-2123; discussion 2124.
49. Skolasky RL, Riley LH, 3rd, Albert TJ. Psychometric properties of the Cervical Spine Outcomes Questionnaire and its relationship to standard assessment tools used in spine research. *Spine J*. 2007;7(2):174-179. Epub 2006 Dec 27.
50. Skolasky RL, Albert TJ, Vaccaro AR, Riley LH, 3rd. Patient satisfaction in the cervical spine research society outcomes study: relationship to improved clinical outcome. *Spine J*. 2009;9(3):232-239. doi: 10.1016/j.spinee.2008.03.001. Epub 2008 May 20.
51. Skolasky RL, Carreon LY, Anderson PA, Albert TJ, Riley LH, 3rd. Predicting health-utility scores from the Cervical Spine Outcomes Questionnaire in a multicenter nationwide study of anterior cervical spine surgery. *Spine (Phila Pa 1976)*. 2011;36(25):2211-2216. doi: 10.1097/BRS.0b013e318202a403.
52. Jordan A, Manniche C, Mosdal C, Hindsberger C. The Copenhagen Neck Functional Disability Scale: a study of reliability and validity. *J Manipulative Physiol Ther*. 1998;21(8):520-527.
53. Schellingerhout JM, Verhagen AP, Heymans MW, Koes BW, de Vet HC, Terwee CB. Measurement properties of disease-specific questionnaires in patients with neck pain: a systematic review. *Qual Life Res*. 2012;21(4):659-670. doi: 10.1007/s11136-011-9965-9. Epub 2011 Jul 7.
54. Yapali G, Gunel MK, Karahan S. The cross-cultural adaptation, reliability, and validity of the Copenhagen Neck Functional Disability Scale in patients with chronic neck pain: Turkish version study. *Spine (Phila Pa 1976)*. 2012;37(11):E678-682. doi: 10.1097/BRS.0b013e31824b549c.
55. Hudak PL, Amadio PC, Bombardier C. Development of an upper extremity outcome measure: the DASH (disabilities of the arm, shoulder and hand) [corrected]. The Upper Extremity Collaborative Group (UECG). *Am J Ind Med*. 1996;29(6):602-608.
56. Institute for Work and Health. The DASH Outcome Measure: Disabilities of the Arm, Shoulder, and Hand. 2015. <http://dash.iwh.on.ca/home>. Accessed December 25, 2015.
57. Beaton DE, Wright JG, Katz JN, Upper Extremity Collaborative G. Development of the QuickDASH: comparison of three item-reduction approaches. *J Bone Joint Surg Am*. 2005;87(5):1038-1046.
58. Gummesson C, Ward MM, Atroshi I. The shortened disabilities of the arm, shoulder and hand questionnaire (QuickDASH): validity and reliability based on responses within the full-length DASH. *BMC Musculoskelet Disord*. 2006;7:44.
59. Huisstede BM, Feleus A, Bierma-Zeinstra SM, Verhaar JA, Koes BW. Is the disability of arm, shoulder, and hand questionnaire (DASH) also valid and responsive in patients with neck complaints. *Spine (Phila Pa 1976)*. 2009;34(4):E130-138. doi: 10.1097/BRS.0b013e318195a28b
60. Mehta S, Macdermid JC, Carlesso LC, McPhee C. Concurrent validation of the DASH and the QuickDASH in comparison to neck-specific scales in patients with neck pain. *Spine (Phila Pa 1976)*. 2010;35(24):2150-2156. doi: 10.1097/BRS.0b013e3181c85151.
61. Macdermid JC, Walton DM, Cote P, et al. Use of outcome measures in managing neck pain: an international multidisciplinary survey. *Open Orthop J*. 2013;7:506-520. doi: 10.2174/1874325001307010506. eCollection 2013.
62. Feise RJ, Michael Menke J. Functional rating index: a new valid and reliable instrument to measure the magnitude of clinical change in spinal conditions. *Spine (Phila Pa 1976)*. 2001;26(1):78-86; discussion 87.
63. Ferreira ML, Borges BM, Rezende IL, et al. Are neck pain scales and questionnaires compatible with the international classification of functioning, disability and health? A systematic review. *Disabil Rehabil*. 2010;32(19):1539-1546. doi: 10.3109/09638281003611045.

64. Stewart M, Maher CG, Refshauge KM, Bogduk N, Nicholas M. Responsiveness of pain and disability measures for chronic whiplash. *Spine (Phila Pa 1976)*. 2007;32(5):580-585.
65. Wei X, Xu X, Zhao Y, et al. Validation of the simplified Chinese version of the functional rating index for patients with nonspecific neck pain in mainland China. *Spine (Phila Pa 1976)*. 2015;40(9):E538-544. doi: 10.1097/BRS.00000000000000806.
66. Lee H, Nicholson LL, Adams RD, Maher CG, Halaki M, Bae SS. Development and psychometric testing of Korean language versions of 4 neck pain and disability questionnaires. *Spine (Phila Pa 1976)*. 2006;31(16):1841-1845.
67. Ansari NN, Feise RJ, Naghdi S, Mohseni A, Rezazadeh M. The functional rating index: reliability and validity of the Persian language version in patients with neck pain. *Spine (Phila Pa 1976)*. 2012;37(14):E844-848. doi: 10.1097/BRS.0b013e31824b5bde.
68. Tonga E, Gabel CP, Karayazgan S, Cuesta-Vargas AI. Cross-cultural adaptation, reliability and validity of the Turkish version of the spine functional index. *Health Qual Life Outcomes*. 2015;13:30. doi: 10.1186/s12955-015-0219-3.
69. Chansirinukor W. Thai version of the Functional Rating Index for patients with back and neck pain: Part 1 Cross-cultural adaptation, reliability and validity. *J Med Assoc Thai*. 2015;98 Suppl 5:S97-105.
70. de Vries GE, Jorritsma W, Dijkstra PU, Geertzen JH, Reneman MF. The construct validity of the Short Form-36 Health Survey for patients with nonspecific chronic neck pain. *Int J Rehabil Res*. 2015;38(2):137-143. doi: 10.1097/MRR.0000000000000102.
71. Hayes V, Morris J, Wolfe C, Morgan M. The SF-36 health survey questionnaire: is it suitable for use with older adults? *Age Ageing*. 1995;24(2):120-125.
72. Vernon H. The Neck Disability Index: state-of-the-art, 1991-2008. *J Manipulative Physiol Ther*. 2008;31(7):491-502. doi: 10.1016/j.jmpt.2008.08.006.
73. MacDermid JC, Walton DM, Avery S, et al. Measurement properties of the neck disability index: a systematic review. *J Orthop Sports Phys Ther*. 2009;39(5):400-417. doi: 10.2519/jospt.2009.2930.
74. Pietrobon R, Coeytaux RR, Carey TS, Richardson WJ, DeVellis RF. Standard scales for measurement of functional outcome for cervical pain or dysfunction: a systematic review. *Spine (Phila Pa 1976)*. 2002;27(5):515-522.
75. Cleland JA, Childs JD, Whitman JM. Psychometric properties of the Neck Disability Index and Numeric Pain Rating Scale in patients with mechanical neck pain. *Arch Phys Med Rehabil*. 2008;89(1):69-74. doi: 10.1016/j.apmr.2007.08.126.
76. Wlodyka-Demaille S, Poiraudieu S, Catanzariti JF, Rannou F, Fermanian J, Revel M. The ability to change of three questionnaires for neck pain. *Joint Bone Spine*. 2004;71(4):317-326.
77. Young IA, Cleland JA, Michener LA, Brown C. Reliability, construct validity, and responsiveness of the neck disability index, patient-specific functional scale, and numeric pain rating scale in patients with cervical radiculopathy. *Am J Phys Med Rehabil*. 2010;89(10):831-839. doi: 10.1097/PHM.0b013e3181ec98e6.
78. Hains F, Waalen J, Mior S. Psychometric properties of the Neck Disability Index. *J Manipulative Physiol Ther*. 1998;21(2):75-80.
79. Nieto R, Miro J, Huguet A. Disability in subacute whiplash patients: usefulness of the neck disability index. *Spine (Phila Pa 1976)*. 2008;33(18):E630-635. doi: 10.1097/BRS.0b013e31817eb836.
80. Wlodyka-Demaille S, Poiraudieu S, Catanzariti JF, Rannou F, Fermanian J, Revel M. French translation and validation of 3 functional disability scales for neck pain. *Arch Phys Med Rehabil*. 2002;83(3):376-382.
81. van der Velde G, Beaton D, Hogg-Johnston S, Hurwitz E, Tennant A. Rasch analysis provides new insights into the measurement properties of the neck disability index. *Arthritis Rheum*. 2009;61(4):544-551. doi: 10.1002/art.24399.
82. Walton DM, MacDermid JC. A brief 5-item version of the Neck Disability Index shows good psychometric properties. *Health Qual Life Outcomes*. 2013;11:108. doi: 10.1186/1477-7525-11-108.
83. Abbott JH, Schmitt J. Minimum important differences for the patient-specific functional scale, 4 region-specific outcome measures, and the numeric pain rating scale. *J Orthop Sports Phys Ther*. 2014;44(8):560-564. doi: 10.2519/jospt.2014.5248. Epub 2014 May 14.
84. Schuller W, Ostelo RW, Janssen R, de Vet HC. The influence of study population and definition of improvement on the smallest detectable change and the minimal important change of the neck disability index. *Health Qual Life Outcomes*. 2014;12:53. doi: 10.1186/1477-7525-12-53.
85. Kose G, Hepguler S, Atamaz F, Oder G. A comparison of four disability scales for Turkish patients with neck pain. *J Rehabil Med*. 2007;39(5):358-362.
86. Kovacs FM, Bago J, Royuela A, et al. Psychometric characteristics of the Spanish version of instruments to measure neck pain disability. *BMC Musculoskelet Disord*. 2008;9:42.
87. McCarthy MJ, Grevitt MP, Silcock P, Hobbs G. The reliability of the Vernon and Mior neck

- disability index, and its validity compared with the short form-36 health survey questionnaire. *Eur Spine J.* 2007;16(12):2111-2117. Epub 2007 Oct 6.
88. Heijmans WPG, Schipholt HJA, Elvers JWH, Oostendorp RAB. Neck disability index Dutch version (NDI-DV): investigation of reliability in patients with chronic whiplash. *Nederlands Tijdschrift Voor Fysiotherapie.* 2002;112(94-99).
  89. Andrade Ortega JA, Delgado Martinez AD, Almecija Ruiz R. Validation of a Spanish version of the Neck Disability Index. *Med Clin (Barc).* 2008;130(3):85-89.
  90. Shaheen AA, Omar MT, Vernon H. Cross-cultural adaptation, reliability, and validity of the Arabic version of neck disability index in patients with neck pain. *Spine (Phila Pa 1976).* 2013;38(10):E609-615. doi: 10.1097/BRS.0b013e31828b2d09.
  91. Chien A, Lai DM, Cheng CH, Wang SF, Hsu WL, Wang JL. Responsiveness of the Chinese versions of the Japanese Orthopaedic Association Cervical Myelopathy Evaluation Questionnaire and Neck Disability Index in postoperative patients with cervical spondylotic myelopathy. *Spine (Phila Pa 1976).* 2015;40(17):1315-1321. doi: 10.1097/BRS.0000000000001005.
  92. Wu S, Ma C, Mai M, Li G. Translation and validation study of Chinese versions of the neck disability index and the neck pain and disability scale. *Spine (Phila Pa 1976).* 2010;35(16):1575-1579. doi: 10.1097/BRS.0b013e3181c6ea1b.
  93. Ailliet L, Rubinstein SM, de Vet HC, van Tulder MW, Terwee CB. Reliability, responsiveness and interpretability of the neck disability index-Dutch version in primary care. *Eur Spine J.* 2015;24(1):88-93. doi: 10.1007/s00586-014-3359-y. Epub 2014 May 17.
  94. Vos CJ, Verhagen AP, Koes BW. Reliability and responsiveness of the Dutch version of the Neck Disability Index in patients with acute neck pain in general practice. *Eur Spine J.* 2006;15(11):1729-1736.
  95. Salo P, Ylinen J, Kautiainen H, Arkela-Kautiainen M, Hakkinen A. Reliability and validity of the finnish version of the neck disability index and the modified neck pain and disability scale. *Spine (Phila Pa 1976).* 2010;35(5):552-556. doi: 10.1097/BRS.0b013e3181b327ff.
  96. Cramer H, Lauche R, Langhorst J, Dobos GJ, Michalsen A. Validation of the German version of the Neck Disability Index (NDI). *BMC Musculoskelet Disord.* 2014;15:91. doi: 10.1186/1471-2474-15-91.
  97. Swanenburg J, Humphreys K, Langenfeld A, Brunner F, Wirth B. Validity and reliability of a German version of the Neck Disability Index (NDI-G). *Man Ther.* 2014;19(1):52-58. doi: 10.1016/j.math.2013.07.004. Epub 2013 Aug 3.
  98. Monticone M, Baiardi P, Vanti C, et al. Responsiveness of the Oswestry Disability Index and the Roland Morris Disability Questionnaire in Italian subjects with sub-acute and chronic low back pain. *Eur Spine J.* 2012;21(1):122-129. doi: 10.1007/s00586-011-1959-3. Epub 2011 Aug 8.
  99. Nakamaru K, Vernon H, Aizawa J, Koyama T, Nitta O. Crosscultural adaptation, reliability, and validity of the Japanese version of the neck disability index. *Spine (Phila Pa 1976).* 2012;37(21):E1343-1347. doi: 10.1097/BRS.0b013e318267f7f5.
  100. Takesita K, Hosono N, Kawaguchi Y, et al. Validity, reliability and responsiveness of the Japanese version of the Neck Disability Index. *J Orthop Sci.* 2013;18(1):14-21. doi: 10.1007/s00776-012-0304-y. Epub 2012 Sep 4.
  101. Song KJ, Choi BW, Choi BR, Seo GB. Cross-cultural adaptation and validation of the Korean version of the neck disability index. *Spine (Phila Pa 1976).* 2010;35(20):E1045-1049. doi: 10.1097/BRS.0b013e3181df78e9.
  102. Joseph SD, Bellare B, Vernon H. Cultural adaptation, reliability, and validity of neck disability index in Indian rural population: a Marathi version study. *Spine (Phila Pa 1976).* 2015;40(2):E68-76. doi: 10.1097/BRS.0000000000000681.
  103. Guzy G, Vernon H, Polczyk R, Szpitalak M. Psychometric validation of the authorized Polish version of the Neck Disability Index. *Disabil Rehabil.* 2013;35(25):2132-2137. doi: 10.3109/09638288.2013.771706. Epub 2013 Apr 29.
  104. Misterska E, Jankowski R, Glowacki M. Cross-cultural adaptation of the Neck Disability Index and Copenhagen Neck Functional Disability Scale for patients with neck pain due to degenerative and discopathic disorders. Psychometric properties of the Polish versions. *BMC Musculoskelet Disord.* 2011;12:84. doi: 10.1186/1471-2474-14-84.
  105. Cook C, Richardson JK, Braga L, et al. Cross-cultural adaptation and validation of the Brazilian Portuguese version of the Neck Disability Index and Neck Pain and Disability Scale. *Spine (Phila Pa 1976).* 2006;31(14):1621-1627.
  106. Cruz EB, Fernandes R, Carnide F, Domingues L, Pereira M, Duarte S. Cross-cultural adaptation and validation of the neck disability index to European Portuguese language. *Spine (Phila Pa 1976).* 2015;40(2):E77-82. doi: 10.1097/BRS.0000000000000692.
  107. Bakhtadze MA, Vernon H, Zakharova OB, Kuzminov KO, Bolotov DA. The Neck Disability Index-Russian language version (NDI-RU): a study of validity and reliability. *Spine (Phila Pa 1976).* 2015;40(14):1115-1121. doi: 10.1097/BRS.0000000000000880.

108. Murphy DR, Lopez M. Neck and back pain specific outcome assessment questionnaires in the Spanish language: a systematic literature review. *Spine J.* 2013;13(11):1667-1674. doi: 10.1016/j.spinee.2013.08.046. Epub 2013 Oct 3.
109. Andrade Ortega JA, Delgado Martinez AD, Almecija Ruiz R. Validation of the Spanish version of the Neck Disability Index. *Spine (Phila Pa 1976).* 2010;35(4):E114-118.
110. Luksanapruksa P, Wathana-apisit T, Wanassinop S, Sanpakit S, Chavasiri C. Reliability and validity study of a Thai version of the Neck Disability Index in patients with neck pain. *J Med Assoc Thai.* 2012;95(5):681-688.
111. Uthaikhup S, Paungmali A, Pirunsan U. Validation of Thai versions of the Neck Disability Index and Neck Pain and Disability Scale in patients with neck pain. *Spine (Phila Pa 1976).* 2011;36(21):E1415-1421. doi: 10.1097/BRS.0b013e31820e68ac.
112. Aslan E, Karaduman A, Yakut Y, Aras B, Simsek IE, Yagly N. The cultural adaptation, reliability and validity of neck disability index in patients with neck pain: a Turkish version study. *Spine (Phila Pa 1976).* 2008;33(11):E362-365.
113. Kesiktas N, Ozcan E, Vernon H. Clinimetric properties of the Turkish translation of a modified neck disability index. *BMC Musculoskelet Disord.* 2012;13:25. doi: 10.1186/1471-2474-13-25.
114. Telci EA, Karaduman A, Yakut Y, Aras B, Simsek IE, Yagli N. The cultural adaptation, reliability, and validity of neck disability index in patients with neck pain: a Turkish version study. *Spine (Phila Pa 1976).* 2009;34(16):1732-1735. doi: 10.1097/BRS.0b013e3181ac9055.
115. Goolkasian P, Wheeler AH, Gretz SS. The neck pain and disability scale: test-retest reliability and construct validity. *Clin J Pain.* 2002;18(4):245-250.
116. Wheeler AH, Goolkasian P, Baird AC, Darden BV, 2nd. Development of the Neck Pain and Disability Scale. Item analysis, face, and criterion-related validity. *Spine (Phila Pa 1976).* 1999;24(13):1290-1294.
117. En MC, Clair DA, Edmondston SJ. Validity of the Neck Disability Index and Neck Pain and Disability Scale for measuring disability associated with chronic, non-traumatic neck pain. *Man Ther.* 2009;14(4):433-438.
118. Goolkasian P. Neck Pain and Disability Scale: a critical evaluation. *Expert Rev Pharmacoecon Outcomes Res.* 2003;3(4):379-382.
119. Jorritsma W, de Vries GE, Dijkstra PU, Geertzen JH, Reneman MF. Neck Pain and Disability Scale and Neck Disability Index: validity of Dutch language versions. *Eur Spine J.* 2012;21(1):93-100. doi: 10.1007/s00586-011-1920-5. Epub 2011 Aug 4.
120. Scherer M, Blozik E, Himmel W, Laptinskaya D, Kochen MM, Herrmann-Lingen C. Psychometric properties of a German version of the neck pain and disability scale. *Eur Spine J.* 2008;17(7):922-929.
121. Bremerich FH, Grob D, Dvorak J, Mannion AF. The Neck Pain and Disability Scale: cross-cultural adaptation into German and evaluation of its psychometric properties in chronic neck pain and C1-2 fusion patients. *Spine (Phila Pa 1976).* 2008;33(9):1018-1027. doi: 10.1097/BRS.0b013e31816c9107.
122. Agarwal S, Allison GT, Agarwal A, Singer KP. Reliability and validity of the Hindi version of the Neck Pain and Disability Scale in cervical radiculopathy patients. *Disabil Rehabil.* 2006;28(22):1405-1411.
123. Monticone M, Baiardi P, Nido N, Righini C, Tomba A, Giovanazzi E. Development of the Italian version of the Neck Pain and Disability Scale, NPDS-I: cross-cultural adaptation, reliability, and validity. *Spine (Phila Pa 1976).* 2008;33(13):E429-434. doi: 10.1097/BRS.0b013e318175c2b0.
124. Ono R, Otani K, Takegami M, et al. Reliability, validity, and responsiveness of the Japanese version of the Neck Pain and Disability Scale. *J Orthop Sci.* 2011;16(4):339-346. doi: 10.1007/s00776-011-0053-3. Epub 2011 Jun 21.
125. Mousavi SJ, Parnianpour M, Montazeri A, et al. Translation and validation study of the Iranian versions of the Neck Disability Index and the Neck Pain and Disability Scale. *Spine (Phila Pa 1976).* 2007;32(26):E825-831.
126. Bicer A, Yazici A, Camdeviren H, Erdogan C. Assessment of pain and disability in patients with chronic neck pain: reliability and construct validity of the Turkish version of the neck pain and disability scale. *Disabil Rehabil.* 2004;26(16):959-962.
127. Leak AM, Cooper J, Dyer S, Williams KA, Turner-Stokes L, Frank AO. The Northwick Park Neck Pain Questionnaire, devised to measure neck pain and disability. *Br J Rheumatol.* 1994;33(5):469-474.
128. Hoving JL, O'Leary EF, Niere KR, Green S, Buchbinder R. Validity of the neck disability index, Northwick Park neck pain questionnaire, and problem elicitation technique for measuring disability associated with whiplash-associated disorders. *Pain.* 2003;102(3):273-281.
129. Arana E, Marti-Bonmati L, Montijano R, Bautista D, Molla E, Costa S. Relationship between Northwick Park neck pain questionnaire and cervical spine MR imaging findings. *Eur Spine J.* 2006;15(8):1183-1188.
130. Terwee CB, Schellingerhout JM, Verhagen AP, Koes BW, de Vet HC. Methodological quality of studies on the measurement properties of neck pain and disability questionnaires: a systematic review. *J Manipulative Physiol Ther.* 2011;34(4):261-272. doi: 10.1016/j.jmpt.2011.04.003. Epub 2011 May 4.

131. Sim J, Jordan K, Lewis M, Hill J, Hay EM, Dziedzic K. Sensitivity to change and internal consistency of the Northwick Park Neck Pain Questionnaire and derivation of a minimal clinically important difference. *Clin J Pain*. 2006;22(9):820-826.
132. Schellingerhout JM, Heymans MW, Verhagen AP, de Vet HC, Koes BW, Terwee CB. Measurement properties of translated versions of neck-specific questionnaires: a systematic review. *BMC Med Res Methodol*. 2011;11:87. doi: 10.1186/1471-2288-11-87.
133. Yeung PL, Chiu TT, Leung AS. Use of modified Northwick Park Neck Pain Questionnaire in patients with postirradiation neck disability: validation study. *Head Neck*. 2004;26(12):1031-1037.
134. Westaway MD, Stratford PW, Binkley JM. The Patient-specific Functional Scale: validation of its use in persons with neck dysfunction. *J Orthop Sports Phys Ther*. 1998;27(5):331-338.
135. Stratford P, Gill C, Westaway M, Binkley J. Assessing disability and change on individual patients: a report of a patient specific measure. *Physiother Can*. 1995;47:258-263.
136. Cleland JA, Fritz JM, Whitman JM, Palmer JA. The reliability and construct validity of the Neck Disability Index and patient specific functional scale in patients with cervical radiculopathy. *Spine (Phila Pa 1976)*. 2006;31(5):598-602.
137. Pinfold M, Niere KR, O'Leary EF, Hoving JL, Green S, Buchbinder R. Validity and internal consistency of a whiplash-specific disability measure. *Spine (Phila Pa 1976)*. 2004;29(3):263-268.
138. Willis C, Niere KR, Hoving JL, Green S, O'Leary EF, Buchbinder R. Reproducibility and responsiveness of the Whiplash Disability Questionnaire. *Pain*. 2004;110(3):681-688.
139. Stupar M, Cote P, Beaton DE, Boyle E, Cassidy JD. Structural and construct validity of the Whiplash Disability Questionnaire in adults with acute whiplash-associated disorders. *Spine J*. 2015;15(11):2369-2377. doi: 10.1016/j.spinee.2015.07.006. Epub 2015 Jul 10.
140. Stupar M, Cote P, Beaton DE, Boyle E, Cassidy JD. A Test-retest reliability study of the Whiplash Disability Questionnaire in patients with acute whiplash-associated disorders. *J Manipulative Physiol Ther*. 2015;38(9):629-636. doi: 10.1016/j.jmpt.2015.10.003. Epub 2015 Nov 11.
141. Ferrari R, Russell A, Kelly AJ. Assessing whiplash recovery--the Whiplash Disability Questionnaire. *Aust Fam Physician*. 2006;35(8):653-654.
142. Schuster C, McCaskey M, Ettlin T. German translation, cross-cultural adaptation and validation of the whiplash disability questionnaire. *Health Qual Life Outcomes*. 2013;11:45. doi: 10.1186/1477-7525-11-45.
143. McCaskey M, Ettlin T, Schuster C. German version of the whiplash disability questionnaire: reproducibility and responsiveness. *Health Qual Life Outcomes*. 2013;11:36. doi: 10.1186/1477-7525-11-36.
144. Tesio L, Granger CV, Fiedler RC. A unidimensional pain/disability measure for low-back pain syndromes. *Pain*. 1997;69(3):269-278.
145. Stratford PW, Binkley JM, Riddle DL. Development and initial validation of the back pain functional scale. *Spine (Phila Pa 1976)*. 2000;25(16):2095-2102.
146. Longo UG, Loppini M, Denaro L, Maffulli N, Denaro V. Rating scales for low back pain. *Br Med Bull*. 2010;94:81-144. doi: 10.1093/bmb/ldp052. Epub 2010 Jan 10.
147. Stratford PW, Binkley JM. A comparison study of the back pain functional scale and Roland Morris Questionnaire. North American Orthopaedic Rehabilitation Research Network. *J Rheumatol*. 2000;27(8):1928-1936.
148. Rytokoski U, Puukka P, Talo S. Biodisabilities in relation to other disease consequences in the functional assessment of patients with chronic low back pain. *Int J Rehabil Res*. 1997;20(3):225-244.
149. Nicol R, Robinson Nicol M, Hopfe M, Newell D. Linking the Bournemouth Questionnaire for low back pain to the International Classification of Functioning, Disability and Health. *Disabil Rehabil*. 2016;28(11):1089-1096. doi: 10.3109/09638288.2015.1090484. Epub 2015 Oct 12.
150. Jahn WT, Liebenson C, Yeomans SG. The Bournemouth Questionnaire: can it be used to monitor and predict treatment outcome in chiropractic patients with persistent low back pain? *J Manipulative Physiol Ther*. 2006;29(2):17
151. Newell D, Bolton JE. Responsiveness of the Bournemouth questionnaire in determining minimal clinically important change in subgroups of low back pain patients. *Spine (Phila Pa 1976)*. 2010;35(19):1801-1806. doi: 10.1097/BRS.0b013e3181cc006b.
152. Hurst H, Bolton J. Assessing the clinical significance of change scores recorded on subjective outcome measures. *J Manipulative Physiol Ther*. 2004;27(1):26-35.
153. Hartvigsen J, Lauridsen H, Ekstrom S, et al. Translation and validation of the danish version of the Bournemouth questionnaire. *J Manipulative Physiol Ther*. 2005;28(6):402-407.
154. Ruta DA, Garratt AM, Wardlaw D, Russell IT. Developing a valid and reliable measure of health outcome for patients with low back pain. *Spine (Phila Pa 1976)*. 1994;19(17):1887-1896.
155. Leung AS, Lam TH, Hedley AJ, Twomey LT. Use of a subjective health measure on Chinese low back pain patients in Hong Kong. *Spine (Phila Pa 1976)*. 1999;24(10):961-966.
156. Lawlis GF, Cuencas R, Selby D, McCoy CE. The development of the Dallas Pain Questionnaire.

- An assessment of the impact of spinal pain on behavior. *Spine (Phila Pa 1976)*. May 1989;14(5):511-516.
157. Haas M, Jacobs GE, Raphael R, Petzing K. Low back pain outcome measurement assessment in chiropractic teaching clinics: responsiveness and applicability of two functional disability questionnaires. *J Manipulative Physiol Ther*. 1995;18(2):79-87.
158. Marty M, Blotman F, Avouac B, Rozenberg S, Valat JP. Validation of the French version of the Dallas Pain Questionnaire in chronic low back pain patients. *Rev Rhum Engl Ed*. 1998;65(2):126-134.
159. Feise RJ, Menke JM. Functional Rating Index: literature review. *Med Sci Monit*. 2010;16(2):RA25-36.
160. Chansirinukor W, Maher CG, Latimer J, Hush J. Comparison of the functional rating index and the 18-item Roland-Morris Disability Questionnaire: responsiveness and reliability. *Spine (Phila Pa 1976)*. 2005;30(1):141-145.
161. Childs JD, Piva SR. Psychometric properties of the functional rating index in patients with low back pain. *Eur Spine J*. 2005;14(10):1008-1012.
162. Hagg O, Fritzell P, Romberg K, Nordwall A. The General Function Score: a useful tool for measurement of physical disability. Validity and reliability. *Eur Spine J*. 2001;10(3):203-210.
163. Bendebba M, Dizerega GS, Long DM. The Lumbar Spine Outcomes Questionnaire: its development and psychometric properties. *Spine J*. 2007;7(1):118-132.
164. Manniche C, Asmussen K, Lauritsen B, Vinterberg H, Kreiner S, Jordan A. Low Back Pain Rating scale: validation of a tool for assessment of low back pain. *Pain*. 1994;57(3):317-326.
165. Greenough CG, Fraser RD. Assessment of outcome in patients with low-back pain. *Spine (Phila Pa 1976)*. 1992;17(1):36-41.
166. Davidson M, Keating JL, Eyres S. A low back-specific version of the SF-36 Physical Functioning scale. *Spine (Phila Pa 1976)*. 2004;29(5):586-594.
167. Walsh TL, Hanscom B, Lurie JD, Weinstein JN. Is a condition-specific instrument for patients with low back pain/leg symptoms really necessary? The responsiveness of the Oswestry Disability Index, MODEMS, and the SF-36. *Spine (Phila Pa 1976)*. 2003;28(6):607-615.
168. Davidson M, Keating JL. A comparison of five low back disability questionnaires: reliability and responsiveness. *Phys Ther*. 2002;82(1):8-24.
169. Taylor SJ, Taylor AE, Foy MA, Fogg AJ. Responsiveness of common outcome measures for patients with low back pain. *Spine (Phila Pa 1976)*. 1999;24(17):1805-1812.
170. Million R, Hall W, Nilsen KH, Baker RD, Jayson MI. Assessment of the progress of the back-pain patient 1981 Volvo Award in Clinical Science. *Spine (Phila Pa 1976)*. 1982;7(3):204-212.
171. Hagg O, Fritzell P, Oden A, Nordwall A, Swedish Lumbar Spine Study G. Simplifying outcome measurement: evaluation of instruments for measuring outcome after fusion surgery for chronic low back pain. *Spine (Phila Pa 1976)*. 2002;27(11):1213-1222.
172. Anagnostis C, Mayer TG, Gatchel RJ, Proctor TJ. The million visual analog scale: its utility for predicting tertiary rehabilitation outcomes. *Spine (Phila Pa 1976)*. 2003;28(10):1051-1060.
173. Daltroy LH, Cats-Baril WL, Katz JN, Fossel AH, Liang MH. The North American Spine Society lumbar spine outcome assessment Instrument: reliability and validity tests. *Spine (Phila Pa 1976)*. 1996;21(6):741-749.
174. Morlock RJ, Nerenz DR, Consortium S. The NASS lumbar spine outcome assessment instrument: large sample assessment and sub-scale identification. *J Back Musculoskelet Rehabil*. 2002;16(2):63-69.
175. Pose B, Sangha O, Peters A, Wildner M. Validation of the North American Spine Society Instrument for assessment of health status in patients with chronic backache. *Z Orthop Ihre Grenzgeb*. 1999;137(5):437-441.
176. Schochat T, Rehberg W, von Kempis J, Stucki G, Jackel WH. The North American Spine Society Lumbar Spine Outcome Assessment Instrument: translation and psychometric analysis of the German version in rehabilitation patients with chronic back pain. *Z Rheumatol*. 2000;59(5):303-313.
177. McCaffery M, Beebe A, et al. *Pain: Clinical Manual for Nursing Practice*. St. Louis, MO: Mosby; 1989.
178. Chapman JR, Norvell DC, Hermsmeyer JT, et al. Evaluating common outcomes for measuring treatment success for chronic low back pain. *Spine (Phila Pa 1976)*. 2011;36(21 Suppl):S54-68.
179. Khorsan R, Coulter ID, Hawk C, Choate CG. Measures in chiropractic research: choosing patient-based outcome assessments. *J Manipulative Physiol Ther*. 2008;31(5):355-375. doi: 10.1016/j.jmpt.2008.04.007.
180. Vela LI, Haladay DE, Denegar C. Clinical assessment of low-back-pain treatment outcomes in athletes. *J Sport Rehabil*. 2011;20(1):74-88.
181. Kool JP, Oesch PR, de Bie RA. Predictive tests for non-return to work in patients with chronic low back pain. *Eur Spine J*. 2002;11(3):258-266.
182. Cleland JA, Whitman JM, Houser JL, Wainner RS, Childs JD. Psychometric properties of selected tests in patients with lumbar spinal stenosis. *Spine J*. 2012;12(10):921-931.
183. Childs JD, Piva SR, Fritz JM. Responsiveness of the numeric pain rating scale in patients with low back pain. *Spine (Phila Pa 1976)*. 2005;30(11):1331-1334.

184. Fairbank JC, Couper J, Davies JB, O'Brien JP. The Oswestry Low Back Pain Disability questionnaire. *Physiotherapy*. 1980;66(8):271-273.
185. Bossons CR, Levy J, Sutterlin CE, 3rd. Reconstructive spinal surgery: assessment of outcome. *South Med J*. 1996;89(11):1045-1052.
186. Thomas AM, Fairbank JC, Pynsent PB, Baker DJ. A computer-based interview system for patients with back pain. A validation study. *Spine (Phila Pa 1976)*. 1989;14(8):844-846.
187. Pynsent PB, Fairbank JC. Computer interview system for patients with back pain. *J Biomed Eng*. 1989;11(1):25-29.
188. Fritz JM, Irrgang JJ. A comparison of a modified Oswestry Low Back Pain Disability Questionnaire and the Quebec Back Pain Disability Scale. *Phys Ther*. 2001;81(2):776-788.
189. Fairbank J. Use of Oswestry Disability Index (ODI). *Spine (Phila Pa 1976)*. 1995;20(13):1535-1537.
190. Fairbank JC, Pynsent PB. The Oswestry Disability Index. *Spine (Phila Pa 1976)*. 2000;25(22):2940-2952.
191. Roland M, Fairbank J. The Roland-Morris Disability Questionnaire and the Oswestry Disability Questionnaire. *Spine (Phila Pa 1976)*. 2000;25(24):3115-3124.
192. Davidson M, Keating J. Oswestry Disability Questionnaire (ODQ). *Aust J Physiother*. 2005;51(4):270.
193. Kopec JA, Esdaille JM, Abrahamowicz M, et al. The Quebec Back Pain Disability Scale. Measurement properties. *Spine (Phila Pa 1976)*. 1995;20(3):341-352.
194. Kopec JA, Esdaille JM, Abrahamowicz M, et al. The Quebec Back Pain Disability Scale: conceptualization and development. *J Clin Epidemiol*. 1996;49(2):151-161.
195. Carreon LY, Glassman SD, McDonough CM, Rampersaud R, Berven S, Shainline M. Predicting SF-6D utility scores from the Oswestry disability index and numeric rating scales for back and leg pain. *Spine (Phila Pa 1976)*. 2009;34(19):2085-2089.
196. Vianin M. Psychometric properties and clinical usefulness of the Oswestry Disability Index. *J Chiropr Med*. 2008;7(4):161-163.
197. Dawson AP, Steele EJ, Hodges PW, Stewart S. Utility of the Oswestry Disability Index for studies of back pain related disability in nurses: evaluation of psychometric and measurement properties. *Int J Nurs Stud*. 2010;47(5):604-607. doi: 10.1016/j.ijnurstu.2009.10.013. Epub 2009 Dec 16.
198. Irmak R, Baltaci G, Ergun N. Long term test-retest reliability of Oswestry Disability Index in male office workers. *Work*. 2016;53(3):639-642. doi: 10.3233/WOR-152234.
199. Newman AN, Stratford PW, Letts L, Spadoni G. A systematic review of head-to-head comparison studies of the Roland-Morris and Oswestry measures' abilities to assess change. *Physiother Can*. 2013;65(2):160-166. doi: 10.3138/ptc.2012-12.
200. Algarni AS, Ghorbel S, Jones JG, Guermazi M. Validation of an Arabic version of the Oswestry Index in Saudi Arabia. *Ann Phys Rehabil Med*. 2014;57(9-10):653-663. doi: 10.1016/j.rehab.2014.06.006. Epub 2014 Aug 4.
201. Coelho RA, Siqueira FB, Ferreira PH, Ferreira ML. Responsiveness of the Brazilian-Portuguese version of the Oswestry Disability Index in subjects with low back pain. *Eur Spine J*. 2008;17(8):1101-1106. doi: 10.1007/s00586-008-0690-1. Epub 2008 May 30.
202. Costa LO, Maher CG, Latimer J, et al. Clinimetric testing of three self-report outcome measures for low back pain patients in Brazil: which one is the best? *Spine (Phila Pa 1976)*. 2008;33(22):2459-2463. doi: 10.1097/BRS.0b013e3181849dbe.
203. Liu H, Tao H, Luo Z. Validation of the simplified Chinese version of the Oswestry Disability Index. *Spine (Phila Pa 1976)*. 2009;34(11):1211-1216; discussion 1217. doi: 10.1097/BRS.0b013e31819e2b34.
204. Ma C, Wu S, Xiao L, Xue Y. Responsiveness of the Chinese version of the Oswestry disability index in patients with chronic low back pain. *Eur Spine J*. 2011;20(3):475-481. doi: 10.1007/s00586-010-1624-2. Epub 2010 Nov 26.
205. Lauridsen HH, Hartvigsen J, Manniche C, Korsholm L, Grunnet-Nilsson N. Danish version of the Oswestry Disability Index for patients with low back pain. Part 1: Cross-cultural adaptation, reliability and validity in two different populations. *Eur Spine J*. 2006;15(11):1705-1716.
206. Denis I, Fortin L. Development of a French-Canadian version of the Oswestry Disability Index: cross-cultural adaptation and validation. *Spine (Phila Pa 1976)*. 2012;37(7):E439-444. doi: 10.1097/BRS.0b013e318233eaf9.
207. Osthus H, Cziske R, Jacobi E. Cross-cultural adaptation of a German version of the Oswestry Disability Index and evaluation of its measurement properties. *Spine (Phila Pa 1976)*. 2006;31(14):E448-453.
208. Mannion AF, Junge A, Fairbank JC, Dvorak J, Grob D. Development of a German version of the Oswestry Disability Index. Part 1: cross-cultural adaptation, reliability, and validity. *Eur Spine J*. 2006;15(1):55-65.
209. Mannion AF, Junge A, Grob D, Dvorak J, Fairbank JC. Development of a German version of the Oswestry Disability Index. Part 2: sensitivity to change after spinal surgery. *Eur Spine J*. 2006;15(1):66-73.

210. Boscainos PJ, Sapkas G, Stilianessi E, Prouskas K, Papadakis SA. Greek versions of the Oswestry and Roland-Morris Disability Questionnaires. *Clin Orthop Relat Res.* 2003; (411):40-53.
211. Nishant, Chhabra HS, Kapoor KS. New modified english and hindi oswestry disability index in low back pain patients treated conservatively in Indian population. *Asian Spine J.* 2014;8(5):632-638. doi: 10.4184/asj.2014.8.5.632. Epub 2014 Oct 18.
212. Valasek T, Varga PP, Szoverfi Z, Kumin M, Fairbank J, Lazary A. Reliability and validity study on the Hungarian versions of the oswestry disability index and the Quebec back pain disability scale. *Eur Spine J.* 2013;22(5):1010-1018. doi: 10.1007/s00586-012-2645-9. Epub 2013 Jan 16.
213. Mohan V, Prashanth GS, Meravanig G, Rajagopalan N, Yerramshetty J. Adaptation of the Oswestry Disability Index to Kannada language and evaluation of its validity and reliability. *Spine (Phila Pa 1976).* Dec 10 2015. [Epub ahead of print]
214. Jeon CH, Kim DJ, Kim SK, Kim DJ, Lee HM, Park HJ. Validation in the cross-cultural adaptation of the Korean version of the Oswestry Disability Index. *J Korean Med Sci.* 2006;21(6):1092-1097.
215. Miekisiak G, Kollataj M, Dobrogowski J, et al. Validation and cross-cultural adaptation of the Polish version of the Oswestry Disability Index. *Spine (Phila Pa 1976).* 2013;38(4):E237-243. doi: 10.1097/BRS.0b013e31827e948b.
216. Payares K, Lugo LH, Morales V, Londono A. Validation in Colombia of the Oswestry disability questionnaire in patients with low back pain. *Spine (Phila Pa 1976).* 2011;36(26):E1730-1735. doi: 10.1097/BRS.0b013e318219d184.
217. Vincent JI, Macdermid JC, Grewal R, Sekar VP, Balachandran D. Translation of Oswestry Disability Index into Tamil with cross cultural adaptation and evaluation of reliability and validity. *Open Orthop J.* 2014;8:11-19. doi: 10.2174/1874325001408010011. eCollection 2014.
218. Yakut E, Duger T, Oksuz C, et al. Validation of the Turkish version of the Oswestry Disability Index for patients with low back pain. *Spine (Phila Pa 1976).* 2004;29(5):581-585; discussion 585.
219. Chatman AB, Hyams SP, Neel JM, et al. The Patient-Specific Functional Scale: measurement properties in patients with knee dysfunction. *Phys Ther.* 1997;77(8):820-829.
220. Hancock MJ, Maher CG, Latimer J, et al. Assessment of diclofenac or spinal manipulative therapy, or both, in addition to recommended first-line treatment for acute low back pain: a randomised controlled trial. *Lancet.* 2007;370(9599):1638-1643.
221. Macedo LG, Latimer J, Maher CG, et al. Effect of motor control exercises versus graded activity in patients with chronic nonspecific low back pain: a randomized controlled trial. *Phys Ther.* 2012;92(3):363-377. doi: 10.2522/ptj.20110290. Epub 2011 Dec 1.
222. Pengel LH, Refshauge KM, Maher CG, Nicholas MK, Herbert RD, McNair P. Physiotherapist-directed exercise, advice, or both for subacute low back pain: a randomized trial. *Ann Intern Med.* 2007;146(11):787-796.
223. Stratford P, Gill C, Westaway MD, Binkley JM. Assessing disability and change on individual patients: a report of a patient specific measure. *Physiother Can.* 1995;47:258-262.
224. Maughan EF, Lewis JS. Outcome measures in chronic low back pain. *Eur Spine J.* 2010;19(9):1484-1494. doi: 10.1007/s00586-010-1353-6. Epub 2010 Apr 17.
225. Roland M, Morris R. A study of the natural history of back pain. Part I: development of a reliable and sensitive measure of disability in low-back pain. *Spine (Phila Pa 1976).* 1983;8(2):141-144.
226. Stratford PW, Binkley JM. Measurement properties of the RM-18. A modified version of the Roland-Morris Disability Scale. *Spine (Phila Pa 1976).* 1997;22(20):2416-2421.
227. Underwood MR, Barnett AG, Vickers MR. Evaluation of two time-specific back pain outcome measures. *Spine (Phila Pa 1976).* 1999;24(11):1104-1112.
228. Morris T, Hee SW, Stallard N, Underwood M, Patel S. Can we convert between outcome measures of disability for chronic low back pain? *Spine (Phila Pa 1976).* 2015;40(10):734-739. doi: 10.1097/BRS.0000000000000866.
229. Kent P, Lauridsen HH. Managing missing scores on the Roland Morris Disability Questionnaire. *Spine (Phila Pa 1976).* 2011;36(22):1878-1884. doi: 10.1097/BRS.0b013e3181ffe53f.
230. Turner JA, Fulton-Kehoe D, Franklin G, Wickizer TM, Wu R. Comparison of the Roland-Morris Disability Questionnaire and generic health status measures: a population-based study of workers' compensation back injury claimants. *Spine (Phila Pa 1976).* 2003;28(10):1061-1067; discussion 1067.
231. Stratford PW, Binkley JM. Applying the results of self-report measures to individual patients: an example using the Roland-Morris Questionnaire. *J Orthop Sports Phys Ther.* 1999;29(4):232-239.
232. Jordan K, Dunn KM, Lewis M, Croft P. A minimal clinically important difference was derived for the Roland-Morris Disability Questionnaire for low back pain. *J Clin Epidemiol.* 2006;59(1):45-52.
233. Stratford PW, Binkley J, Solomon P, Finch E, Gill C, Moreland J. Defining the minimum level of detectable change for the Roland-Morris questionnaire. *Phys Ther.* 1996;76(4):359-365; discussion 366-358.

234. Adams J, Chapman J, Bradley S, Ryan SJ. Literacy levels required to complete routinely used patient-reported outcome measures in rheumatology. *Rheumatology (Oxford)*. 2013;52(3):460-464. doi: 10.1093/rheumatology/kes296. Epub 2012 Oct 31.
235. Maki D, Rajab E, Watson PJ, Critchley DJ. Cross-cultural translation, adaptation, and psychometric testing of the Roland-Morris disability questionnaire into modern standard Arabic. *Spine (Phila Pa 1976)*. 2014;39(25):E1537-1544. doi: 10.1097/BRS.0000000000000632.
236. Costa LO, Maher CG, Latimer J, Ferreira PH, Pozzi GC, Ribeiro RN. Psychometric characteristics of the Brazilian-Portuguese versions of the Functional Rating Index and the Roland Morris Disability Questionnaire. *Spine (Phila Pa 1976)*. 2007;32(17):1902-1907.
237. Fan S, Hu Z, Hong H, Zhao F. Cross-cultural adaptation and validation of simplified Chinese version of the Roland-Morris Disability Questionnaire. *Spine (Phila Pa 1976)*. 2012;37(10):875-880. doi: 10.1097/BRS.0b013e31823b0460.
238. Yi H, Ji X, Wei X, et al. Reliability and validity of simplified Chinese version of Roland-Morris questionnaire in evaluating rural and urban patients with low back pain. *PLoS One*. 2012;7(1):e30807. doi: 10.1371/journal.pone.0030807. Epub 2012 Jan 27.
239. Zerkak D, Metivier JC, Fouquet B, Beaudreuil J. Validation of a French version of Roland-Morris questionnaire in chronic low back pain patients. *Ann Phys Rehabil Med*. 2013;56(9-10):613-620. doi: 10.1016/j.rehab.2013.08.006. Epub 2013 Sep 24.
240. Wiesinger GF, Nuhr M, Quittan M, Ebenbichler G, Wolf G, Fialka-Moser V. Cross-cultural adaptation of the Roland-Morris questionnaire for German-speaking patients with low back pain. *Spine (Phila Pa 1976)*. 1999;24(11):1099-1103.
241. Nambi SG. Reliability, validity, sensitivity and specificity of Gujarati version of the Roland-Morris Disability Questionnaire. *J Back Musculoskelet Rehabil*. 2013;26(2):149-153. doi: 10.3233/BMR-2012-00359.
242. Valasek T, Varga PP, Szoverfi Z, et al. Validation of the Hungarian version of the Roland-Morris disability questionnaire. *Disabil Rehabil*. 2015;37(1):86-90. doi: 10.3109/09638288.2014.909536. Epub 2014 Apr 21.
243. Suzukamo Y, Fukuhara S, Kikuchi S, et al. Validation of the Japanese version of the Roland-Morris Disability Questionnaire. *J Orthop Sci*. 2003;8(4):543-548.
244. Nakamura M, Miyamoto K, Shimizu K. Validation of the Japanese version of the Roland-Morris Disability Questionnaire for Japanese patients with lumbar spinal diseases. *Spine (Phila Pa 1976)*. 2003;28(20):2414-2418.
245. Lee JS, Lee DH, Suh KT, Kim JI, Lim JM, Goh TS. Validation of the Korean version of the Roland-Morris Disability Questionnaire. *Eur Spine J*. Dec 2011;20(12):2115-2119. doi: 10.1007/s00586-011-1788-4. Epub 2011 Apr 10.
246. Kim KE, Lim JY. Cross-cultural adaptation and validation of the Korean version of the Roland-Morris Disability Questionnaire for use in low back pain. *J Back Musculoskelet Rehabil*. 2011;24(2):83-88. doi: 10.3233/BMR20110278.
247. Moon J, Kim YC, Park SY, et al. Psychometric characteristics of the Korean version of the Roland-Morris Disability Questionnaire. *J Korean Med Sci*. 2011;26(10):1364-1370. doi: 10.3346/jkms.2011.26.10.1364. Epub 2011 Oct 1.
248. Maaroufi H, Benbouazza K, Faik A, et al. Translation, adaptation, and validation of the Moroccan version of the Roland Morris Disability Questionnaire. *Spine (Phila Pa 1976)*. 2007;32(13):1461-1465.
249. Asghari A. Psychometric properties of a modified version of the Roland-Morris disability questionnaire (M-RMDQ). *Arch Iran Med*. 2011;14(5):327-331. doi: 007.
250. Mousavi SJ, Parnianpour M, Mehdian H, Montazeri A, Mobini B. The Oswestry Disability Index, the Roland-Morris Disability Questionnaire, and the Quebec Back Pain Disability Scale: translation and validation studies of the Iranian versions. *Spine (Phila Pa 1976)*. 2006;31(14):E454-459.
251. Opara J, Szary S, Kucharz E. Polish cultural adaptation of the Roland-Morris Questionnaire for evaluation of quality of life in patients with low back pain. *Spine (Phila Pa 1976)*. 2006;31(23):2744-2746.
252. Kovacs FM, Llobera J, Gil Del Real MT, et al. Validation of the Spanish version of the Roland-Morris questionnaire. *Spine (Phila Pa 1976)*. 2002;27(5):538-542.
253. Scharovsky A, Pueyrredon M, Craig D, et al. Cross-cultural adaptation and validation of the Argentinean version of the Roland-Morris Disability Questionnaire. *Spine (Phila Pa 1976)*. 2008;33(12):1391-1395. doi: 10.1097/BRS.0b013e318173dc8f.
254. Payares K, Lugo LH, Restrepo A. Validation of the Roland Morris Questionnaire in Colombia to Evaluate Disability in Low Back Pain. *Spine (Phila Pa 1976)*. 2015;40(14):1108-1114. doi: 10.1097/BRS.0000000000000963.
255. Johansson E, Lindberg P. Subacute and chronic low back pain. Reliability and validity of a Swedish version of the Roland and Morris Disability Questionnaire. *Scand J Rehabil Med*. 1998;30(3):139-143.

256. Jirarattanaphochai K, Jung S, Sumananont C, Saengnianpanthkul S. Reliability of the Roland-Morris Disability Questionnaire (Thai version) for the evaluation of low back pain patients. *J Med Assoc Thai*. 2005;88(3):407-411.
257. Kucukdeveci AA, Tennant A, Elhan AH, Niyazoglu H. Validation of the Turkish version of the Roland-Morris Disability Questionnaire for use in low back pain. *Spine (Phila Pa 1976)*. 2001;26(24):2738-2743.
258. Stratford PW, Binkley J. The Quebec Back Pain Disability Scale: measurement properties. *Spine (Phila Pa 1976)*. 1995;20(19):2169-2170.
259. Mens JM, Vleeming A, Snijders CJ, Ronchetti I, Ginai AZ, Stam HJ. Responsiveness of outcome measurements in rehabilitation of patients with posterior pelvic pain since pregnancy. *Spine (Phila Pa 1976)*. 2002;27(10):1110-1115.
260. Kim GM, Yi CH, Cynn HS. Factors influencing disability due to low back pain using the Oswestry Disability Questionnaire and the Quebec Back Pain Disability Scale. *Physiother Res Int*. 2015;20(1):16-21. doi: 10.1002/pri.1591. Epub 2014 May 1.
261. Demoulin C, Ostelo R, Knottnerus JA, Smeets RJ. Quebec Back Pain Disability Scale was responsive and showed reasonable interpretability after a multidisciplinary treatment. *J Clin Epidemiol*. 2010;63(11):1249-1255. doi: 10.1016/j.jclinepi.2009.08.029. Epub 2010 Apr 18.
262. Ostelo RW, Deyo RA, Stratford P, et al. Interpreting change scores for pain and functional status in low back pain: towards international consensus regarding minimal important change. *Spine (Phila Pa 1976)*. 2008;33(1):90-94. doi: 10.1097/BRS.0b013e31815e3a10.
263. Alnahhal A, May S. Validation of the Arabic version of the Quebec Back Pain Disability Scale. *Spine (Phila Pa 1976)*. 2012;37(26):E1645-1650. doi: 10.1097/BRS.0b013e3182765a3f.
264. Schoppink LE, van Tulder MW, Koes BW, Beurskens SA, de Bie RA. Reliability and validity of the Dutch adaptation of the Quebec Back Pain Disability Scale. *Phys Ther*. 1996;76(3):268-275.
265. Riecke J, Holzapfel S, Rief W, Lachnit H, Glombiewski JA. Cross-cultural adaption of the German Quebec Back Pain Disability Scale: an exposure-specific measurement for back pain patients. *J Pain Res*. 2016;9:9-15. doi: 10.2147/JPR.S92615. eCollection 2016.
266. Yvanes-Thomas M, Calmels P, Bethoux F, et al. Validity of the French-language version of the Quebec back pain disability scale in low back pain patients in France. *Joint Bone Spine*. 2002;69(4):397-405.
267. Christakou A, Andriopoulou M, Asimakopoulos P. Validity and reliability of the Greek version of the Quebec Back Pain Disability Scale. *J Back Musculoskelet Rehabil*. 2011;24(3):145-154. doi: 10.3233/BMR-2011-0288.
268. Suh KT, Kim JI, Lim JM, Goh TS, Lee JS. Validation of the Korean version of the Quebec Back Pain Disability Scale. *J Spinal Disord Tech*. 2012;25(8):447-450. doi: 10.1097/ BSD.0b013e3182337792.
269. Bendeddouche I, Rostom S, Bahiri R, et al. Translation, adaptation and validation of the Moroccan version of the Quebec Back Pain Disability Scale. *Clin Rheumatol*. 2012;31(6):943-949. doi: 10.1007/s10067-012-1961-0. Epub 2012 Feb 18.
270. Misterska E, Jankowski R, Glowacki M. Quebec Back Pain Disability Scale, Low Back Outcome Score and revised Oswestry low back pain disability scale for patients with low back pain due to degenerative disc disease: evaluation of Polish versions. *Spine (Phila Pa 1976)*. 2011;36(26):E1722-1729. doi: 10.1097/BRS.0b013e318216ad48.
271. Rodrigues MF, Michel-Crosato E, Cardoso JR, Traebert J. Psychometric properties and cross-cultural adaptation of the Brazilian Quebec back pain disability scale questionnaire. *Spine (Phila Pa 1976)*. 2009;34(13):E459-464. doi: 10.1097/BRS.0b013e3181a5605a.
272. Vieira AC, Moniz S, Fernandes R, Carnide F, Cruz EB. Responsiveness and interpretability of the Portuguese version of the Quebec Back Pain Disability Scale in patients with chronic low back pain. *Spine (Phila Pa 1976)*. 2014;39(5):E346-352. doi: 10.1097/BRS.0000000000000159.
273. Cruz EB, Fernandes R, Carnide F, Vieira A, Moniz S, Nunes F. Cross-cultural adaptation and validation of the Quebec Back Pain Disability Scale to European Portuguese language. *Spine (Phila Pa 1976)*. 2013;38(23):E1491-1497. doi: 10.1097/BRS.0b013e3182a439cc.
274. Melikoglu MA, Kocabas H, Sezer I, Bilgilisoy M, Tuncer T. Validation of the Turkish version of the Quebec back pain disability scale for patients with low back pain. *Spine (Phila Pa 1976)*. 2009;34(6):E219-224. doi: 10.1097/BRS.0b013e3181971e2d.