eAppendix 1.
Glossary of Clinimetric Terms

Clinimetric Properties:

Definition: quantitative measurement of clinical and personal phenomena of patient care through collection and analysis of comparative clinical data that involves rating scales, indexes, and other quantitative instruments (eg, psychometric, practical, and general characteristics).

Psychometric Characteristics:

Definition: elements that contribute to the statistical adequacy of the instrument in terms of reliability, validity, measurement error, and internal consistency.

Cronbach alpha coefficient: test for a model's or survey's internal consistency.

Concurrent validity: method of determining validity as the correlation of the test with scores from known valid measures. A Pearson correlation coefficient (*r* value) is most commonly used.

Construct validity: degree to which an instrument accurately measures the underlying theoretical or hypothetical constructs of concern, including the normality of baseline distribution patterns, the presence of floor and ceiling effects, and how well the tool performs in comparison with instruments of a similar (convergent validity) and/or dissimilar (divergent validity) purpose and dimension.

Content validity: method of establishing validity based on expert judgment that the content of the measure is consistent with what is to be measured.

Convergent validity: type of validity that is determined by hypothesizing and examining the overlap between 2 or more tests that presumably measure the same construct.

Criterion validity: degree to which a measure or test correlates with other measures or tests of the same construct assessed concurrently or in the future; test's ability to predict a criterion.

Discriminant validity: degree to which an operation is not similar to or diverges from other operations to which it theoretically should not be similar.

Divergent validity: hypothesizing and examining differential relationships between a test and measures of similar or different constructs; the ability of a scale to discriminate between patients with maximal and minimal functional deficits.

Effect size: mean change scores divided by the standard deviation of the baseline scores.

Face/logical validity: overall appearance of the test; it is the extent to which a test appeals to test takers.

Factor structure: mathematical procedure to reduce large amounts of data into a structure that can be more easily studied.

Internal consistency: extent to which items within a questionnaire assess the same characteristics as a form of reliability that is determined by a single administration.

Kaiser-Meyer Olkin value: measure of "sampling adequacy," which should exceed the recommended minimum value such as 0.6 or 0.8, depending on the sample size and requirements.

Kolmogorov-Smirnov (K-S) test for normality: statistical nonparametric method for comparing the empirical distribution functions of 2 samples (ie, to quantify distances between the sample and the reference distribution).

Maximum likelihood extraction: method of extracting common variables to make multivariate data simpler and easier to understand through correlations between factors, but requires the assumption of multivariate normality.

(Continued)

eAppendix 1.
Continued

Minimal detectable change (MDC): minimal change that falls outside the measurement error in the score of an instrument.

Minimal clinically important difference (MCID): smallest improvement considered worthwhile by a patient.

Pearson coefficient: represents the relationship between 2 variables that are measured on the same interval or ratio scale.

Reliability: estimate of the precision or consistency of a measure determined by the variance of repeated measurements; the degree to which a test is free of random error. Test-retest reliability relies on 2 separate measures of the test and assumes there is no underlying change that has occurred between test periods.

Responsiveness: ability of a scale to measure clinical change.

Standard error of the measurement (SEM): estimate of error to use in interpreting an individual's test score.

Standard response mean (SRM): mean change scores divided by the standard deviation of the change scores.

Practical Characteristics:

Flesch-Kincaid scales: "Reading Ease" and "Grade Level" use word length and sentence length to indicate the comprehension difficulty when reading text; the scales are inversely related.

Missing responses: item questions not answered by the respondent; usually there is a limit of 10% of the total number of item questions.

Time to complete and score: time required for the respondent to complete or the administrator to score the tool, including accounting for missing responses.

General Characteristics:

Ceiling effects: items are not challenging enough for a respondent to show continued improvement, but the test cannot capture further improvement.

Constructs: should represent both function and quality of life.

Data distribution: should be normalized through inspection of the baseline histogram and analyzed with the one-sample Kolmogorov-Smirnov test cutoff at significance level of $P>.05$.

Floor effects: items cannot take on a value below the lowest possible score for a respondent to show continued decline, but the test cannot capture further decline.

Independent research: should consider the clinimetric properties in an independent sample.

Independent statistical analysis: should be made of all results on independent samples.

eAppendix 2.

List of Outcome Measures (N=130) Used in Stage 1 (Item Generation) of Development of the Lower Limb Functional Index[a]

Reference	Name	Abbreviation	Subtype
Generic or Whole Body (n=12)			
1	Balance Scale	Objective scale	Balance
2	Checklist for employers' commitment level to occupational health and safety and injury management **#1**	ECL OH&S and IM	Global, employer risk screening
2	Checklist for risk of injured worker non–return to work	RIW (NRTW)	Global, patient risk screening
3	General Screening Tool–Dichotomous Scale	GST-D	Global, patient risk screening
4	Health Assessment Questionnaire for rheumatic diseases	HAQ	Disease specific, RA
5	Injured Worker Survey (Hand)	IWS	Region specific, screening
6	New Zealand Low Back Pain Screening Questionnaire	NZ LBP SQ	Region specific, screening
7	Örebro Musculoskeletal Pain Questionnaire	ÖMPQ	Global, patient risk screening
8	Örebro Musculoskeletal Screening Questionnaire **#2**	ÖMSQ	Global, patient risk screening
9	36-Item Short-Form Health Survey **#3**	SF-36	Generic
10	Sickness Impact Profile **#4**	SIP	Generic
11	Timed "Up & Go" Test	Objective scale	Functional mobility
Condition or Disease Specific (n=9)			
12	Arthritis Impact Measurement Scales for rheumatic diseases	AIMS2	Disease specific, RA
13	Arthritis Impact Measurement Scales for rheumatic diseases	AIMS	Disease specific, RA
14	Functional Independence Measure	FIM	Function
15	McGill Pain Questionnaire	McGill	Pain
16	Multi-scale Pain Measurement Chart	Strauss	Pain
17	Numeric Rating Scales	NRS	Pain/function
18	Patient-Specific Functional Scale	PSFS	Disability
19	Patient-specific index	PSI	Disability
20	Visual analog scale	VAS	Pain/function
Lower Limb: Region Specific (n=4)			
21	American Academy of Orthopaedic Surgeons–Lower Limb Outcome Scale **#5**	AAOS-LL	Region specific, lower limb
22	Functional Assessment System	FAS	Region specific, lower limb
23	Lower Extremity Activity Profile	LEAP	Region specific, lower limb
24	Lower Extremity Functional Scale **#6**	LEFS	Region specific, lower limb
The AAOS-LL is one patient-reported outcome measure, with #5 presented in each subsection of hip, knee, and ankle.			
Lower Limb: Joint Specific, Hip (n=9)			
21	American Academy of Orthopaedic Surgeons: Hip **#5**	AAOS–Hip	Region specific, lower limb
25	Harris Hip Score **#7**	HHS	Joint specific, hip
26	Hip Disability and Osteoarthritis Outcome Score **#8**	HOOS	Joint specific, hip
27	Index of Severity for Hip Osteoarthritis	ISH	Joint specific, hip
28	Oxford Hip Score **#9**	Oxford–Hip	Joint specific, hip
29	Outcomes Measures in Rheumatology Clinical Trials–Osteoarthritis Research Society	OARSI/OMERACT	Joint specific, hip
30	Western Ontario and McMasters Universities Osteoarthritis Index hip measure **#10**	WOMAC–Hip	Joint specific, hip

(Continued)

eAppendix 2.
Continued

Reference	Name	Abbreviation	Subtype
31	Wrightington Hospital Charnley "Green Card" System	Charnley	Joint specific, hip
32	Larson or Iowa Hip Score	Larson/Iowa	Joint specific, hip
The Oxford and WOMAC scales (#9 and #10) are present in each subsection of hip and knee.			
Lower Limb: Joint Specific, Knee (n=26)			
33	Activity Rating Scale	ARS	Joint specific, knee
34	American Academy of Orthopaedic Surgeons: Knee **#5**	AAOS–K	Joint specific, knee
35	ACL Functional Scoring Scale	ACL–FSS	Joint specific, ACL knee
36	Anterior Knee Pain Scale	AKPS	Joint specific, knee
37	Brunner Scale	Brunner	Joint specific, knee
38	Cincinnati Knee Rating Scale **#11**	CKRS	Joint specific, ACL knee
39	Edinburgh Knee Function Scale	EKFS	Joint specific, knee
40	Eng and Pierrynowski Patellofemoral Pain Syndrome Questionnaire	Eng and Pierrynowski	Joint specific, PFJ syndrome
41	Flandry Patellofemoral Pain Syndrome Questionnaire	Flandry PFPSQ	Joint specific, PFJ syndrome
42	Functional Index Questionnaire	FIQ	Joint specific, PFJ syndrome
43	Index of Severity for Knee Osteoarthritis	ISK	Joint specific, knee
44	International Knee Documentation Committee **#12**	IKDC	Joint specific, ACL knee
45	Knee Osteoarthritis Outcome Score **#13**	KOOS	Joint specific, knee
46	Knee Pain Scale	KPS	Joint specific, knee
47	Knee Severity Index	KSI	Joint specific, knee
41	Knee VAS	Knee VAS	Joint specific, knee
36	Kujala Patellofemoral Pain Syndrome Questionnaire	Kujala	Joint specific, PFJ syndrome
48	Knee Society Knee Scale	KSKS	Joint specific, knee
49	Marshall Hospital for Special Surgery Scale	Marshall–Knee	Joint specific, knee
50	Oxford Knee Score **#9**	Oxford–Knee	Joint specific, knee
51	Outcomes Measures in Rheumatology Clinical Trials–Osteoarthritis Research Society	OARSI/OMERACT	Joint specific, knee
52	Quality of Life Outcome Measure for ACL Deficiency	QoL–ACL	Joint specific, ACL knee
53	Sports Knee–Rating Scale	SKRS	Joint specific, knee
54	Weber Score	Weber	Joint specific, knee
55	Western Ontario and McMasters Universities Osteoarthritis Index knee measure **#10**	WOMAC–Knee	Joint specific, knee
56	Western Ontario and McMasters Universities Osteoarthritis Index ACL measure	WOMAC–ACL	Joint specific, ACL knee
Lower Limb: Joint Specific, Foot and Ankle (n=25)			
57	American Academy of Orthopaedic Surgeons: Ankle **#5**	AAOS–A	Region specific, ankle
58	Ankle Joint Functional Assessment Tool **#14**	AJFAT	Joint specific, ankle
59	Ankle Osteoarthritis Scale	AOS	Joint specific, ankle
60	Debie Scale	Debie	Joint specific, ankle
61	Foot and Ankle Measure **#15**	FAAM	Joint specific, ankle
62	Foot and Ankle Disability Index **#16**	FADI	Joint specific, ankle

(Continued)

eAppendix 2.
Continued

Reference	Name	Abbreviation	Subtype
63	Foot and Ankle Outcome Score **#17**	FAOS	Joint specific, ankle
64	Foot Function Index #18	FFI	Joint specific, ankle
65	Foot Health Status Questionnaire	FHSQ	Joint specific, foot
66	Good Rating Scale	Good Scale	Joint specific, ankle
67	Juvenile Arthritis Foot Disability Index	JAFI	Joint specific, foot
68	Kaikkonen Knee Scale	Kaikkonen	Joint specific, ankle
69	Karlsson Ankle Function Score	KAFS	Joint specific, ankle
70	Keller Ankle Score	Keller	Joint specific, ankle
71	Lysholm Injury Rating Scale **#19**	Lysholm	Joint specific, ankle
72	Maryland Foot Score	MFS	Joint specific, foot
73	Olerud Scoring Scale	OSS	Joint specific, ankle
74	Sports Ankle Rating System Quality of Life Measure	QOL	Joint specific, ankle
75	Rowan Foot Pain Assessment Questionnaire	ROFPAQ	Joint specific, foot
76	Sefton Ankle Questionnaire	Sefton	Joint specific, ankle
77	Subjective Grading Scale	SRS	Joint specific, ankle
78	Subjective Functional Rating Scale	SFRS	Joint specific, ankle
79	Tegner Knee Injury Rating Scale **#19**	Tegner	Joint specific, ankle
80	Victorian Institute of Sport Achilles Scale	VISA–A	Condition specific, Achilles tendon
81	Zwipp Score	Zwipp (German)	Joint specific, ankle
The Lysholm and Tegner scales are one patient-reported outcome measure; thus, #19 appears twice.			
Upper Limb: Region Specific (n=11)			
82	American Academy of Orthopaedic Surgeons: Arm **#20**	AAOS–UL	Region specific, upper limb
83	Disabilities of Arm, Shoulder and Hand **#21**	DASH	Region specific, upper limb
84	Musculoskeletal Function Assessment for Musculoskeletal Disease	MFA	Region specific, upper limb
85	Neck and Upper Limb Index (a) **#22**	NULIa	Region specific, upper limb
86	Neck and Upper Limb Index (b)	NULIb	Region specific, upper limb
87	St. Michael's Upper Extremity Reconstructive Service Patient Self-Evaluation Form	M–ASES	Region specific, upper limb
88	Toronto Extremity Salvage Score	TESS	Region specific, upper limb
89	Upper Body Musculoskeletal Assessment	UBMA	Region specific, upper limb
90	Upper Extremity Functional Index **#23**	UEFI	Region specific, upper limb
91	Upper Extremity Functional Scale	UEFS	Region specific, upper limb
19	Upper Limb Functional Index **#24**	ULFI	Region specific, upper limb
Upper Limb: Joint Specific, Shoulder (n=12)			
92	American Shoulder and Elbow Surgeons Standardized Shoulder Assessment	ASES	Joint specific, shoulder
93	Constant-Murley Shoulder Score	CMSS	Joint specific, shoulder
94	Croft Shoulder Disability Index **#25**	Croft or SDI	Joint specific, shoulder
95	Penn Shoulder Score	Penn	Joint specific, shoulder
96	Shoulder Disability Questionnaire	SDQ–van der Windt	Joint specific, shoulder

(Continued)

eAppendix 2.

Continued

Reference	Name	Abbreviation	Subtype
97	Shoulder Pain and Disability Index	SPADI	Joint specific, shoulder
98	Shoulder Severity Index	SSI	Joint specific, shoulder
99	Simple Shoulder Test	SST	Joint specific, shoulder
100	Subjective Shoulder Rating Scale	SSRS	Joint specific, shoulder
101	Symptoms and Function of the Shoulder	SFS	Joint specific, shoulder
102	University of California–Los Angeles Shoulder Rating Scale **#26**	UCLA-SRS	Joint specific, shoulder
103	Western Ontario Shoulder Instability Index	WOSI	Joint specific, shoulder
Upper Limb: Joint Specific, Elbow (n=2)			
104	American Shoulder and Elbow Surgeons Elbow Form	ASES–e	Joint specific, wrist
105	Patient-Rated Elbow Evaluation	PREE	Joint specific, wrist
Upper Limb: Joint Specific, Wrist and Hand (n=4)			
106	Brigham and Women's Carpal Tunnel Questionnaire	Brigham-Levine	Condition specific, wrist
107	Gartland and Werley Score	Gartland and Werley	Condition specific, wrist
108	Michigan Hand Outcomes Questionnaire	MHQ	Region specific, hand
109	Patient-Rated Wrist Evaluation	PRWE	Joint specific, wrist
Spine: Region Specific (n=9)			
110	Aberdeen Extended Spine Pain Scale **#27**	Aberdeen	Region specific, spine
111	American Academy Orthopaedic Surgeons: Cervical **#28**	AAOS–Neck	Region specific, spine
	American Academy Orthopaedic Surgeons: Lumbar **#28**	AAOS–Back	Region specific, spine
112	Bournemouth Back Questionnaire	Bournemouth–Back	Region specific, spine–back
113	Bournemouth Neck Questionnaire	Bournemouth–Neck	Region specific, spine–neck
114,115	Core Outcome Measure Index–Back **#29**	COMI-Back	Region specific, spine–back
	Core Outcome Measure Index–Neck **#29**	COMI-Neck	Region specific, spine–neck
116	Functional Rating Index	FRI	Region specific, spine
117	Spinal Functional Index	SFI	Region specific, spine
AAOS, Bournemouth, and COMI scales count as one patient-reported outcome measure each, so #28 and #29 appear twice.			
Spine: Level Specific, Neck (n=5)			
118	Headache Assessment Questionnaire **#30**	HAQ	Condition specific, cervical
119	Neck Disability Index **#31**	NDI	Region specific, cervical spine
120	Neck Pain Disability Questionnaire–Wheeler	NPDQ	Region specific, cervical spine
121	Northwick Park Neck Pain Questionnaire	NPNPQ	Region specific, cervical spine
122	Whiplash Disability Questionnaire	WDQ	Region specific, cervical spine
Spine: Level Specific, Upper and Lower Back (n=6) (Oswestry as one patient-reported outcome measure)			
123	Back Pain Functional Scale	BPFS	Region specific, lumbar spine
124	Modified Oswestry Disability Questionnaire	Mod–ODQ	Region specific, lumbar spine
125	Oswestry Disability Questionnaire **#32**	ODQ	Region specific, lumbar spine
126	Quebec Back Pain Disability Scale **#33**		Region specific, lumbar spine
127	Roland-Morris Disability Questionnaire **#34**	RMDQ	Region specific, lumbar spine
128	SF-36 Low Back Pain Version	SF-36–18	Region specific, lumbar spine

[a] The highlighted measures (#1–#34) were those selected for item generation. RA=rheumatoid arthritis, ACL=anterior cruciate ligament, PFJ=patellofemoral joint.

References

1 Berg KO, Wood-Dauphinée SL, Williams JI, Maki B. Measuring balance in the elderly: validation of an instrument. *Can J Public Health*. 1992;83(suppl 2):S7–S11.

2 Kenny D. Building on the rock: foundations of effective rehabilitation practice. Keynote presentation at: 2nd Annual Conference of Vocational Rehabilitation Providers. Hobart, Tasmania; July 23–26, 2003.

3 Gabel CP. *General Screening Tool–Dichotomous Scale: A Global Screening Tool for Risk Determination* [master's thesis]. Northern Territory, Australia: Northern Territory University; 2001.

4 Fries JF, Spitz PW, Young DY. The dimensions of health outcomes: the health assessment questionnaire, disability and pain scales. *J Rheumatol*. 1982;9:789–793.

5 Hennigar C, Saunders D, Efendov A. The injured workers survey: development and clinical use of a psychosocial screening tool for patients with hand injuries. *J Hand Ther*. 2001;14:122–127.

6 Kendall N, Linton SJ, Main C. *Guide to Assessing Psychosocial Yellow Flags in Acute Low Back Pain: Risk Factors for Long-Term Disability and Work Loss*. Seattle, WA: IASP Press; 1997:527–536.

7 Linton SJ, Boersma K. Early identification of patients at risk of developing a persistent back problem: the predictive validity of the Örebro Musculoskeletal Pain Questionnaire. *Clin J Pain*. 2003;19:80–86.

8 Gabel CP, Melloh M, Yelland M, et al. Predictive ability of a modified Örebro musculoskeletal pain questionnaire in an acute low back pain working population. *Eur Spine J*. 2011;20:449–457.

9 Ware JE Jr, Sherbourne CD. The MOS 36-Item Short-Form Health Survey (SF-36); I: conceptual framework and item selection. *Med Care*. 1992;30:473–483.

10 Bergner M, Bobbitt RA, Carter WB, Gilson BS. The Sickness Impact Profile: development and final revision of a health status measure. *Med Care*. 1981;19:787–805.

11 Podsiadlo D, Richardson S. The timed "Up & Go": a test of basic functional mobility for frail elderly persons. *J Am Geriatr Soc*. 1991;39:142–148.

12 Meenan RF, Mason JH, Anderson JJ, et al. AIMS2: the content and properties of a revised and expanded arthritis impact measurement scale health status questionnaire. *Arthritis Rheum*. 1992;35:1–10.

13 Meenan RF, Gertman PM, Mason JH. Measuring health status in arthritis: the Arthritis Impact Measurement Scale. *Arthritis Rheum*. 1980;23:146–152.

14 Turner-Stokes L, Nyein K, Turner-Stokes T, Gatehouse C. The UK FIM+FAM: development and evaluation, functional assessment measure. *Clin Rehabil*. 1999;13:277–287.

15 Melzack R. The McGill Pain Questionnaire: major properties and scoring methods. *Pain*. 1975;1:277–299.

16 Strauss, S. Multi-Scale Pain Measurement Chart. Medical Pain Management Course, Continuing Medical Acupuncture Education; October 23–26, 1997; Surfers Paradise, Gold Coast, Queensland, Australia.

17 Ostelo RW, Deyo RA, Stratford PW, 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;33:90–94.

18 Stratford PW, Gill C, Westaway M, Binkley JM. Assessing disability and change on individual patients: a report of a patient specific measure. *Physiother Can*. 1995;47:258–263.

19 Gabel CP, Michener L, Burkett B, Neller A. The upper limb functional index (ULFI): development and determination of reliability, validity and responsiveness. *J Hand Ther*. 2006;19:328–349.

20 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;33:90–94.

21 Johanson NA, Liang MH, Daltroy L, et al. American Academy of Orthopaedic Surgeons lower limb outcomes assessment instruments: reliability, validity, and sensitivity to change. *J Bone Joint Surg Am*. 2004;86:902–909.

22 Öberg U, Öberg B, Öberg T. Validity and reliability of a new assessment of lower-extremity dysfunction. *Phys Ther*. 1994;74:861–871.

23 Finch E, Walsh M, Thomas SG, Woodhouse LJ. Functional ability perceived by individuals following total knee arthroplasty compared to age-matched individuals without knee disability. *J Orthop Sports Phys Ther*. 1998;27:255–263.

24 Binkley JM, Stratford PW, Lott SA, Riddle DL. The Lower Extremity Functional Scale: scale development, measurement properties, and clinical application. *Phys Ther*. 1999;79:371–383.

25 Harris WH. Traumatic arthritis of the hip after dislocation and acetabular fractures; treatment by mold arthroplasty: an end-result study using a new method of result evaluation. *J Bone Joint Surg Am*. 1969;51:737–755.

26 Klassbo M, Larsson E, Mannevik E. Hip disability and osteoarthritis outcome score: an extension of the Western Ontario and McMaster Universities osteoarthritis index. *Scand J Rheumatol*. 2003;32:46–51.

27 Lequesne M, Méry C. European guidelines for clinical trials of new antirheumatic drugs. *Eular Bull*. 1980;9:171.

28 Dawson J, Fitzpatrick R, Carr A, Murray D. Questionnaire on the perceptions of patients about total hip replacement. *J Bone Joint Surg Br*. 1996;78:185–190.

29 Hawker GA, Davis AM, French MR, et al. Development and preliminary psychometric testing of a new OA pain measure: an OARSI/OMERACT initiative. *Osteoarthritis Cartilage*. 2008;16:409–414.

30 Bellamy N. WOMAC Osteoarthritis Index; 2003. Available at: http://www.womac.org. Accessed December 2, 2010.

31 Chanley J. *"Green Card" System for Assessment of Pain and Gait for Patients Undergoing Total Hip Replacement Surgery*. Lancashire, United Kingdom: Wrightington Hospital; 1980.

32 Larson CB. Rating scale for hip disabilities. *Clin Orthop Relat Res*. 1963;31:85–93.

33 Marx RG, Stump TJ, Jones EC, et al. Development and evaluation of an activity rating scale for disorders of the knee. *Am J Sports Med*. 2001;29:213–218.

34 Irrgang JJ, Snyder-Mackler L, Wainner RS, et al. Development of a patient-reported measure of function of the knee. *J Bone Joint Surg Am*. 1998;80:1132–1145.

35 Lysholm J, Gillquist J. Evaluation of knee ligament surgery results with special emphasis on use of a scoring scale. *Am J Sports Med*. 1982;10:150–154.

36 Kujala UM, Jaakkola LH, Koskinen SK, et al. Scoring of patellofemoral disorders. *Arthroscopy*. 1993;9:159–163.

37 Brunner R, Gaechter A. Repair of fibular ligaments: comparison of reconstructive techniques using plantaris and peroneal tendons. *Foot Ankle*. 1991;11:359–367.

38 Noyes FR, Barber SD, Mooar LA, et al. A rationale for assessing sports activity levels and limitations in knee disorders. *Clin Orthop Relat Res*. 1989;246:238–249.

39 Leigh Brown AP, Kennedy AD, Grant AM, et al. The development and validation of the Edinburgh Knee Function Scale: a simple tool for outcome measurement in non-surgical patients. *Knee*. 1999;6:115–23.

40 Eng JJ, Pierrynowski MR. Evaluation of soft foot orthotics in the treatment of patellofemoral pain syndrome [erratum in: *Phys Ther*. 1993;73:330]. *Phys Ther*. 1993;73:62–68.

41 Flandry F, Hunt JP, Terry GC, Hughston JC. Analysis of subjective knee complaints using visual analog scales. *Am J Sports Med*. 1991;19:112–118.

42 Stratford PW, Heuff J. The validation of outcome measures in patients fulfilling the clinical diagnostic criteria of chondromalacia patella. Presented at: Annual Congress of the Canadian Physiotherapy Association; June 1982; Halifax, Nova Scotia, Canada.

43 Lequesne MG, Méry C, Samson M, Gerard P. Indices of severity for osteoarthritis of the hip and knee: validation, value in comparison with other assessment tests. *Scand J Rheumatol*. 1987;65(suppl):85–89.

44 Hefti F, Muller W, Jakob RP, Staubli HU. Evaluation of knee ligament injuries with the IKDC form. *Knee Surg Sports Traumatol Arthrosc*. 1993;1:226–234.

45 Roos EM, Roos HP, Lohmander LS, et al. Knee Injury and Osteoarthritis Outcome Score (KOOS): development of a self-administered outcome measure. *J Orthop Sports Phys Ther*. 1998;28:88–96.

46 Rejeski WJ, Ettinger WH Jr, Shumaker S, et al. The evaluation of pain in patients with knee osteoarthritis: the Knee Pain Scale. *J Rheumatol*. 1995;22:1124–1129.

47 Clark JA, Spiro A III, Fincke G, et al. Symptom severity of osteoarthritis of the knee: a patient-based measure developed in the Veterans Health Study. *J Gerontol A Biol Sci Med Sci*. 1998;53:M351–M360.

48 Insall JN, Dorr LD, Scott RD, Scott WN. Rationale of the Knee Society clinical rating system. *Clin Ortho Relat Res*. 1989; 248:13–14.

49 Marshall JL, Fetto JF, Botero PM. Knee ligament injuries: a standardized evaluation method. *Clin Orthop Relat Res*. 1977;123:115–129.

50 Dawson J, Fitzpatrick R, Murray D, Carr A. Questionnaire on the perceptions of patients about total knee replacement. *J Bone Joint Surg Br*. 1998;80:63–69.

51 Hawker GA, Davis AM, French MR, et al. Development and preliminary psychometric testing of a new OA pain measure: an OARSI/OMERACT initiative. *Osteoarthritis Cartilage*. 2008;16:409–414.

52 Mohtadi N. Development and validation of the Quality Of Life Outcome Measure (questionnaire) for chronic anterior cruciate ligament deficiency. *Am J Sports Med*. 1998;26:350–359.

53 *Scoring Algorithms for the Lower Limb: Outcomes Data Collection Instrument, Version 2.0*. Rosemont, IL: American Academy of Orthopaedic Surgeons; 1998.

54 Jerosch J, Schoppe R. Midterm effects of ankle joint supports on sensorimotor and sport-specific capabilities. *Knee Surg Sports Traumatol Arthrosc*. 2000;8:252–259.

55 Bellamy N, Buchanan WW, Goldsmith CH, et al. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. *J Rheumatol*. 1988;15:1833–1840.

56 Hawker G, Melfi C, Paul J, et al. Comparison of a generic (SF-36) and a disease-specific (WOMAC) (Western Ontario and McMaster Universities Osteoarthritis Index) instrument in the measurement of outcomes after knee replacement surgery. *J Rheumatol*. 1995;22:1193–1196.

57 Johanson NA, Liang MH, Daltroy L, et al. American Academy of Orthopaedic Surgeons lower limb outcomes assessment instruments: reliability, validity, and sensitivity to change. *J Bone Joint Surg Am*. 2004;86:902–909.

58 Rozzi SL, Lephart SM, Sterner R, Kuligowski L. Balance training for persons with functionally unstable ankles. *J Orthop Sports Phys Ther*. 1999;29:478–486.

59 Domsic RT, Saltzman CL. Ankle osteoarthritis scale. *Foot Ankle Int*. 1998;19: 466–471.

60 Munn J, Beard DJ, Refshauge KM, Lee RW. Do functional performance tests detect impairment in subjects with ankle instability? *J Sport Rehabil*. 2002;11:40–50.

61 Martin RL, Irrgang JJ, Burdett RG, et al. Evidence of validity for the Foot and Ankle Ability Measure (FAAM). *Foot Ankle Int*. 2005;26:968–983.

62 Martin RL, Burdett RG, Irrgang JJ. Development of the Foot and Ankle Disability Index (FADI) [abstract]. *J Orthop Sports Phys Ther*. 1999;29:A32–A33.

63 Roos EM, Brandsson S, Karlsson J. Validation of the foot and ankle outcome score for ankle ligament reconstruction. *Foot Ankle Int*. 2001;22:788–794.

64 Budiman-Mak E, Conrad KJ, Roach KE. The Foot Function Index: a measure of foot pain and disability. *J Clin Epidemiol*. 1991;44:561–570.

65 Bennett PJ, Patterson C, Wearing S, Baglioni T. Development and validation of a questionnaire designed to measure foot-health status. *J Am Podiatr Med Assoc*. 1998;88:419–428.

66 Good CJ, Jones MA, Lingstone BN. Reconstruction of the lateral ligament of the ankle. *Injury*. 1975;7:63–65.

67 Andre M, Hagelberg S, Stenstrom CH. The Juvenile Arthritis Foot Disability Index: development and evaluation of measurement properties. *J Rheumatol*. 2004;31:2488–2493.

68 Kaikkonen A, Lehtonen H, Kannus P, Jarvinen M. Long-term functional outcome after surgery of chronic ankle instability: a 5-year follow-up study of the modified Evans procedure. *Scand J Med Sci Sports*. 1999;9:239–244.

69 Karlsson J, Peterson L. Evaluation of the ankle joint function: the use of a scoring scale. *Foot*. 1991;1:15–19.

70 Keller M, Grossman J, Caron M, Mendicino RW. Lateral ankle instability and the Brostrom-Gould procedure. *J Foot Ankle Surg*. 1996;35:513–520.

71 Lysholm J, Tegner Y. Knee injury rating scales. *Acta Orthop*. 2007;78:445–453.

72 Heffernan G, Khan F, Awan N, et al. A comparison of outcome scores in os calcis fractures. *Ir J Med Sci*. 2000;169:127–128.

73 Olerud C, Molander H. A scoring scale for symptom evaluation after ankle fracture. *Arch Orthop Trauma Surg*. 1984;103: 190–194.

74 Williams GN, Molloy JM, DeBerardino TM, et al. Evaluation of the sports ankle rating system in young, athletic individuals with acute lateral ankle sprains. *Foot Ankle Int*. 2003;24:274–282.

75 Rowan K. The development and validation of a multi-dimensional measure of chronic foot pain: the Rowan Foot Pain Assessment Questionnaire (ROFPAQ). *Foot Ankle Int*. 2001;22:795–809.

76 Sefton GK, George J, Fitton JM, McMullen H. Reconstruction of the anterior talofibular ligament for the treatment of the unstable ankle. *J Bone Joint Surg Br*. 1979;61-B:352–354.

77 Komenda AG, Ferkel RD. Arthroscopic findings associated with the unstable ankle. *Foot Ankle Int*. 1999;20:708–713.

78 Nussbaum ED, Hosea TM, Siesler SD, et al. Prospective evaluation of syndesmotic ankle sprains without diastasis. *Am J Sports Med*. 2001;29:31–35.

79 Tegner Y, Lysholm J. Rating systems in the evaluation of knee ligament injuries. *Clin Orthop Relat Res*. 1985;198:43–49.

80 Robinson JM, Cook JL, Purdam C, et al. The VISA-A questionnaire: a valid and reliable index of the clinical severity of Achilles tendinopathy. *Br J Sports Med*. 2001;35:335–341.

81 Knop C, Knop C, Thermann H, et al. Treatment of recurrence of fibular ligament rupture: results of a prospective randomized study [article in German]. *Unfallchirurg*. 1999;102:23–28.

82 American Academy of Orthopaedic Surgeons; Council of Musculoskeletal Specialty Societies. *Disabilities of the Arm Shoulder and Hand Module*. Toronto, Ontario, Canada: Institute for Work and Health; 1997.

83 Beaton DE, Katz JN, Fossel AH, et al. Measuring the whole or the parts: validity, reliability, and responsiveness of the Disabilities of the Arm, Shoulder and Hand outcome measure in different regions of the upper extremity. *J Hand Ther*. 2001; 14:128–146.

84 Martin DP, Engelberg R, Agel J, et al. Development of a musculoskeletal extremity health status instrument: the musculoskeletal function assessment instrument. *J Orthop Res*. 1996;14:173–181.

85 Stock SR, Loisel P, Streiner D, et al. The impact of neck and upper limb musculoskeletal disorders on the lives of affected workers: development of a new functional status index. *Qual Life Res*. 1995; 4:491.

86 Stock SR, Loisel P, Streiner D, et al. *The Neck and Upper Limb Index Questionnaire (NULI-20)*. Montreal, Quebec, Canada: McGill University; 2000.

87 Beaton DE, Richards RR. Measuring function of the shoulder: a cross-sectional comparison of five questionnaires. *J Bone Joint Surg Am*. 1996;78:882–890.

88 Davis AM, Wright JG, Williams JL. Development of a measure of physical function for patients with bone and soft tissue sarcoma. *Qual Life Res*. 1996;5:508–516.

89 Kramer JF, Potter P, Harburn KL, et al. An upper body musculoskeletal assessment instrument for patients with work-related musculoskeletal disorders: a pilot study. *J Hand Ther*. 2001;14:115–121.

90 Stratford PW, Binkley JM, Stratford D. Development and initial validation of the upper extremity functional index. *Physiother Can*. 2001;52:259–267, 281.

91 Pransky G, Feuerstein M, Himmelstin J, et al. Measuring functional outcomes in work-related upper extremity disorders: development and validation of the upper extremity function scale. *J Occup Environ Med*. 1997;39:1195–1202.

92 Richards R, An KN, Bigliani LU, et al. American shoulder and elbow surgeons: a standardized method for the assessment of shoulder function. *J Shoulder Elbow Surg*. 1994;3:347–352.

93 Constant CR, Murley AH. A clinical method of functional assessment of the shoulder. *Clin Orthop Relat Res*. 1987; 214:161–164.

94 Croft P, Pope D, Zonca M, et al. A. Measurement of shoulder related disability: results of a validation study. *Ann Rheum Dis*. 1994;53:525–528.

95 Leggin BG, Schaffer MA. Reliability, validity and responsiveness of a shoulder outcome scoring system. Presented at: Combined Sections Meeting of the American Physical Therapy Association; February 1987; Dallas, Texas.

96 van der Windt DA, van der Heijden GJ, de Winter AF, et al. The responsiveness of the Shoulder Disability Questionnaire. *Ann Rheum Dis*. 1998;57:82–87.

97 Williams JW Jr, Hollerman DR Jr, Simel DL. Measuring shoulder function with the Shoulder Pain and Disability Index. *J Rheumatol*. 1995;22:727–732.

98 Patte D. Directions for use of the index severity for painful and/or chronically disabled shoulders [abstract]. Paris, France: First Open Congress of the European Society of Surgery of the Shoulder and Elbow; 1997:36–41.

99 Lippitt S, Harryman D, Matsen F. A practical tool for evaluation of function: the simple shoulder test. In: Matsen FA III, Fu FH, Hawkins RJ, eds. *The Shoulder: A Balance of Mobility and Stability*. Rosemont, IL: American Academy of Orthopaedic Surgeons; 1993:501–518.

100 Kohn D, Geyer M, Wulker N. The Subjective Shoulder Rating Scale (SSRS): an examiner-independent scoring system. Paris, France: International Congress of Shoulder Surgery; 1992.

101 L'Insalata JC, Warren RF, Cohen SB, et al. A self-administered questionnaire for assessment of symptoms and function of the shoulder. *J Bone Joint Surg Am*. 1997;79:738–748.

102 Amstutz HC, Sew Hoy AL, Clarke IC. UCLA anatomic total shoulder arthroplasty. *Clin Orthop Relat Res*. 1981;155: 7–20.

103 Kirkely A, Griffin S, McLintock H, Ng L. The development and evaluation of a disease-specific quality of life measurement tool for shoulder instability: the Western Ontario Shoulder Instability Index (WOSI). *Am J Sports Med*. 1998; 26:764–772.

104 American Shoulder and Elbow Surgeons. Elbow form. Available at: http://www.ases-assn.org/web/index.html. Accessed December 2, 2010.

105 MacDermid JC. Outcome evaluation in patients with elbow pathology: issues in instrument development and evaluation. *J Hand Ther*. 2001;14:105–114.

106 Levine DW, Simmons BP, Koris MJ, et al. A self-administered questionnaire for the assessment of severity of symptoms and functional status in carpal tunnel syndrome. *J Bone Joint Surg Am*. 1993;75: 1585–1592.

107 Gartland JJ Jr, Werley CW. Evaluation of healed Colles' fractures. *J Bone Joint Surg Am*. 1951;33:895–907.

108 Chung KC, Pillsbury MS, Walters MR, Hayward AW. Reliability and validity testing of the Michigan Hand Outcomes Questionnaire. *J Hand Surg Am*. 1998; 23:575–587.

109 MacDermid JC, Turgeon T, Richards RS, et al. Patient rating of wrist pain and disability: a reliable and valid measurement tool. *J Orthop Trauma*. 1998;12:577–586.

110 Williams NH, Wilkinson C, Russell IT. (2001). Extending the Aberdeen Back Pain Scale to include the whole spine: a set of outcome measures for the neck, upper and lower back. *Pain*. 2001;94: 261–274.

111 American Association of Orthopaedic Surgeons. Outcomes Instruments and Information: Understanding Outcomes Scoring, Normative Study, and Reliability/Validity. Available at: http://www.aaos.org/research/outcomes/outcomes_documentation.asp#spref. Accessed December 2, 2010.

112 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;2: 503–510

113 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: 141–148.

114 Mannion AF, Porchet F, Kleinstuck FS, et al. The quality of spine surgery from the patient's perspective; part 1: the core outcome measures index in clinical practice. *Eur Spine J*. 2009;18(suppl 3):367–373.

115 Mannion AF, Porchet F, Kleinstuck FS, et al. The quality of spine surgery from the patient's perspective; part 2: minimal clinically important difference for improvement and deterioration as measured with the core outcome measures index. *Eur Spine J*. 2009;18(suppl 3):374–379.

116 Feise RJ, Michael Menke J. Functional rating index: a new valid and reliable instrument to measure the magnitude of clinical change in spinal conditions [erratum in: *Spine (Phila Pa 1976)*. 2001;26:596]. *Spine (Phila Pa 1976)*. 2001;26:78–86.

117 Gabel CP, Melloh M, Burkett B. Unpublished research.

118 Niere K, Jerak A. Measurement of headache frequency, intensity and duration: comparison of patient report by questionnaire and headache diary. *Physiother Res Int*. 2004;9:149–156.

119 Vernon H. The Neck Disability Index: patient assessment and outcome monitoring in whiplash. *J Musculoskelet Pain*. 1996;4:95–104.

120 Wheeler AH, Goolkasian P, Baird AC, Darden BV Jr. Development of the neck pain and disability scale: item analysis, face, and criterion-related validity. *Spine (Phila Pa 1976)*. 1999;24:1290–1294.

121 Leak AM, Cooper J, Dyer S, et al. The Northwick Park Neck Pain Questionnaire, devised to measure neck pain and disability. *Br J Rheumatol*. 1994;33: 469–474.

122 Pinfold M, Niere KR, O'Leary EF, et al. Validity and internal consistency of a whiplash-specific disability measure. *Spine (Phila Pa 1976)*. 2004;29:263–268.

123 Stratford PW, Binkley JM, Riddle DL. Development and initial validation of the Back Pain Functional Scale. *Spine (Phila Pa 1976)*. 2000;25:2095–2102.

124 Baker DJ, Pynsent PB, Fairbank JC. The Oswestry Disability Index revisited. In: Roland M, Jenner JR, eds. *Back Pain: New Approaches to Rehabilitation and Education*. Manchester, United Kingdom: Manchester University Press; 1989; 174–186.

125 Fairbank J, Couper CT, et al. The Oswestry Low Back Pain Disability Questionnaire. *Physiotherapy*. 1980;66: 271–273.

126 Kopec JA, Esdaile JM, Abrahamowicz M, et al. The Quebec Back Pain Disability Scale: measurement properties. *Spine (Phila Pa 1976)*. 1995;20:341–352.

127 Roland M, Morris R. A study of the natural history of back pain; part 1: development of a reliable and sensitive measure of disability in low-back pain. *Spine (Phila Pa 1976)*. 1983;8:141–144.

128 Davidson M, Keating JL, Eyres S. A low back-specific version of the SF-36 physical functioning scale. *Spine (Phila Pa 1976)*. 2004:29:586–594.