eTable 1.
Deviations From Protocol

Aspect	Difference, With Justification
Outcome	We added "need for surgery" to the outcomes upon noticing that it was used in a number of potentially relevant studies and thus obviously viewed as an outcome of interest to other researchers in this field.
Presentation of prognostic model	Upon finding that incomplete reporting was a major issue, we added as a requirement for inclusion that either the final prognostic model (or the most complete model including main effects for all prognostic factors) was fully reported or a full report was provided on request.
Author contact	We planned to contact study authors for unreported study details and data but later decided to limit author contact to the clarification of issues related to study eligibility (at the second screening step) because we considered it very unlikely that obtaining the missing data would make any important differences to the outcome and conclusions of our review.

eTable 2.
MEDLINE Search Strategy (EBSCO Format)

Search ID	Search Terms
S1	((MH "Shoulder" OR MH "Shoulder Pain" OR shoulder) AND (MH Tendinopathy OR ("soft tissue" OR tendon* OR tendin* OR imping* OR rotator OR cuff).ti,ab)) OR (supraspinatus OR infraspinatus OR "teres minor" OR subscapularis OR "rotator cuff" OR subacromial*).ti,ab OR MH "Shoulder Impingement Syndrome" OR MH "Rotator Cuff")
S2	MH "Physical Therapy Modalities+" OR MH "Rehabilitation+" OR ("physical therap*" or physiotherap* OR exercis* OR "manual therap*" OR "manipulative therap*" OR mobilis* or rehab* OR conservative* OR non-operat* OR nonoperat* OR non-surg* OR nonsurg*).ti,ab
S3[a]	validat* OR TI predict*.ti OR rule* OR ((predict* AND (outcome* OR risk* OR model*)) OR ((history OR variable* OR criteria OR scor* OR characteristic* OR finding* OR factor*) AND (predict* OR model* OR decision* OR identif* OR prognos*)) OR (decision* AND (model* OR clinical* OR MH "Logistic Models")) OR (prognostic AND (history OR variable* OR criteria OR scor* OR characteristic* OR finding* OR factor* OR model*))
S4[a]	stratification OR MH "ROC Curve" OR discrimination OR discriminate OR c-statistic OR "c statistic" OR area under the curve OR AUC OR calibration OR indices OR algorithm OR multivariable
S5[b]	prognos*.ti,ab
S6	S1 AND S2 AND (S3 OR S4 OR S5)

[a] Prognosis research filter as proposed by Geersing et al[34] (clinical prediction model studies, Ingui filter OR update [S3 OR S4]).
[b] Amendment to the search filter proposed by Geersing et al[34] (S3 OR S4 OR S5).

eTable 3.
Excluded Studies (Alphabetically Ordered by First Author)[a]

No.	Study	Main Reasons for Exclusion–Criterion Categories[b] (in Parentheses) and Explanations
1	Audenaert A, de Mey E, Reniers G. Patient variables determining treatment protocol and related economical impact in occupational rotator cuff tears. *WSEAS Trans Biol Biomed*. 2012;9:24–33.	(Po) Traumatic population (all participants had experienced a "posttraumatic rotator cuff tear in an industrial accident").
2	Bartolozzi A, Andreychik D, Ahmad S. Determinants of outcome in the treatment of rotator cuff disease. *Clin Orthop Relat Res*. 1994:90–97.	(I) It was not made explicit that *all* participants received physical therapy, and as "the 3 treatment options (physical therapy, injection, and NSAIDs) were also assessed" as predictive factors, it seems unlikely. (S/A) Retrospective study.
3	Bokor DJ, Hawkins RJ, Huckell GH, et al. Results of nonoperative management of full-thickness tears of the rotator cuff. *Clin Orthop Relat Res*. 1993:103–110.	(Po) Only 24% of the sample were atraumatic. (S/A) No multivariable prognostic modeling, retrospective.
4	Bonde JP, Mikkelsen S, Andersen JH, et al. Prognosis of shoulder tendonitis in repetitive work: a follow-up study in a cohort of Danish industrial and service workers. *Occup Environ Med*. 2003;60:E8.	(I) No mention of physical therapy (not following a defined course of conservative treatment with physical therapy).
5	Boorman RS, More KD, Hollinshead RM, et al. The rotator cuff quality-of-life index predicts the outcome of nonoperative treatment of patients with a chronic rotator cuff tear. *J Bone Joint Surg Am*. 2014;96:1883–1888.	(Po) In 49% of the sample, the onset was traumatic.
6	Chard MD, Sattelle LM, Hazleman BL. The long-term outcome of rotator cuff tendinitis: a review study. *Br J Rheumatol*. 1988;27:385–389.	(Po) Only 21% of the sample were atraumatic. (I) Only 16% of the sample underwent physical therapy, and there is no separate analysis for this subgroup. (S/A) No multivariable prognostic modeling.
7	Contreras F, Brown HC, Marx RG. Predictors of success of corticosteroid injection for the management of rotator cuff disease. *HSS J Musculoskelet J Hosp Spec Surg*. 2013;9:2–5. doi:10.1007/s11420-012-9316-6.	(S/A) No multivariable prognostic modeling.
8	Cummins CA, Sasso LM, Nicholson D. Impingement syndrome: temporal outcomes of nonoperative treatment. *J Shoulder Elbow Surg*. 2009;18:172–177. doi:10.1016/j.jse.2008.09.005.	(S/A) No multivariable prognostic modeling. Despite the allusion to logistic regression analysis (p. 173), no multivariable analysis was reported in the results. Author contact failed to resolve this issue.
9	Curry EJ, Matzkin EE, Dong Y, et al. Structural characteristics are not associated with pain and function in rotator cuff tears: the ROW Cohort Study. *Orthop J Sport Med*. 2015;3(5): 2325967115584596. doi:10.1177/2325967115584596.	(S/A) Cross-sectional study, no multivariable prognostic modeling.
10	Deutscher D, Horn SD, Dickstein R, et al. Associations between treatment processes, patient characteristics, and outcomes in outpatient physical therapy practice. *Arch Phys Med Rehabil*. 2009;90:1349–1363. doi:10.1016/j.apmr.2009.02.005.	(Po) Population not condition-specific (shoulder pain as 1 out of 4 musculoskeletal impairment group categories).
11	Ekeberg OM, Bautz-Holter E, Juel NG, et al. Clinical, socio-demographic and radiological predictors of short-term outcome in rotator cuff disease. *BMC Musculoskelet Disord*. 2010;11:239. doi:10.1186/1471-2474-11-239.	(I) No defined physical therapy treatment; was allowed if started, but was not followed. Only some patients had physical therapy (see primary RCT report).
12	Engebretsen K, Grotle M, Bautz-Holter E, et al. Predictors of Shoulder Pain and Disability Index (SPADI) and work status after 1 year in patients with subacromial shoulder pain. *BMC Musculoskelet Disord*. 2010;11:218. doi:10.1186/1471-2474-11-218.	(S/A) Secondary, retrospective analysis (no mention of planned prognostic analysis in trial registry entry [NCT00653081]).
13	Ertan S, Ayhan E, Güven MF, et al. Medium-term natural history of subacromial impingement syndrome. *J Shoulder Elbow Surg*. 2015;24:1512–1518. doi:10.1016/j.jse.2015.06.007.	(S/A) Retrospective study, no multivariable prognostic modeling. (I) Not investigating a course of conservative treatment with physical therapy (reference was made to initial treatment consisting of medication, cold compression, and modification of activities).

(Continued)

eTable 3.
Continued

No.	Study	Main Reasons for Exclusion–Criterion Categories[b] (in Parentheses) and Explanations
14	Gagnier JJ, Robbins C, Carpenter JE, et al. A prospective cohort study of patients treated surgically or non-surgically for full-thickness rotator cuff tears. *Orthop J Sport Med*. 2014;2(2 suppl). doi:10.1177/2325967114S00059.	(TP) Extended abstract, no published full study report available (may be linked with Kweon et al, 2015).
15	Gialanella B, Bertolinelli M. Corticosteroids injection in rotator cuff tears in elderly patient: pain outcome prediction. *Geriatr Gerontol Int*. 2013;13:993–1001. doi:10.1111/ggi.12046.	(Po) All patients had some degree of shoulder osteoarthritis.
16	Goldberg BA, Nowinski RJ, Matsen FA. Outcome of nonoperative management of full-thickness rotator cuff tears. *Clin Orthop Relat Res*. 2001;382:99–107.	(I) No mention of supervised physical therapy or of any involvement of physical therapists (treatment consisted of a home exercise program only). (S/A) There is a paragraph relating to prediction, but it is unclear how these results were derived. There was no reporting of multivariable modeling and no mention of such in the Methods section.
17	Hardy DC, Vogler JB, White RH. The shoulder impingement syndrome: prevalence of radiographic findings and correlation with response to therapy. *Am J Roentg*. 1986;147; 3:557–561. doi:10.1016/0002-9343(86)90696-0.	(I) No involvement of physical therapy. (S/A) No multivariable prognostic modeling.
18	Hawkins RH, Dunlop R. Nonoperative treatment of rotator cuff tears. *Clin Orthop Relat Res*. 1995;321:178–188.	(Po) 64% of cases were traumatic. (O) The outcome variable was patient satisfaction, which is not an outcome of interest in this review.
19	Itoi E, Tabata S. Conservative treatment of rotator cuff tears. *Clin Orthop Relat Res*. 1992;275:165–173.	(S/A) No multivariable prognostic modeling, possibly retrospective.
20	Kaergaard A, Andersen JH. Musculoskeletal disorders of the neck and shoulders in female sewing machine operators: prevalence, incidence, and prognosis. *Occup Environ Med*. 2000;57:528–534. doi:10.1136/oem.57.8.528.	(I) Not following a course of conservative treatment with physical therapy.
21	Kennedy CA, Haines T, Beaton DE. Eight predictive factors associated with response patterns during physiotherapy for soft tissue shoulder disorders were identified. *J Clin Epidemiol*. 2006;59:485–496. doi:10.1016/j.jclinepi.2005.09.003.	(Po) Generic shoulder soft tissue disorder population with no distinct impingement spectrum subgroup.
22	Kennedy CA, Manno M, Hogg-Johnson S, et al. Prognosis in soft tissue disorders of the shoulder: predicting both change in disability and level of disability after treatment. *Phys Ther*. 2006;86:1013–1032.	Duplicate publication of Kennedy et al, 2006 (see above).
23	Ketola S, Lehtinen J, Rousi T, et al. Which patients do not recover from shoulder impingement syndrome, either with operative treatment or with nonoperative treatment? *Acta Orthop*. 2015;86:1–6. doi:10.3109/17453674.2015.1033309.	(S/A) Secondary, retrospective analysis (no mention of planned prognostic analysis in trial registry entry [NCT00349648]).
24	Kijima H, Minagawa H, Nishi T, et al. Long-term follow-up of cases of rotator cuff tear treated conservatively. *J Shoulder Elbow Surg*. 2012;21:491–494. doi:10.1016/j.jse.2011.10.012.	(S/A) No multivariable prognostic modeling.
25	Kulenkampff H-A, Reichelt A. Clinical course of ruptures of the rotator cuff after conservative therapy. *Orthopadische Prax*. 1990;26:493–496.	(L) Full text in German. (S/A) Not a prognostic model study.
26	Kweon C, Gagnier JJ, Robbins CB, et al. Surgical versus nonsurgical management of rotator cuff tears: predictors of treatment allocation. *Am J Sports Med*. 2015;43:2368–2372. doi:10.1177/0363546515593954.	(S/A) Not designed to follow a course of conservative treatment with physical therapy over a defined period of time (allocation to surgery could have happened any time); although part of a prospective cohort study, the prognostic assessment seems like a case control comparison.
27	Laslett M, Steele M, Hing W, et al. Shoulder pain in primary care, part 2: predictors of clinical outcome to 12 months. *J Rehabil Med*. 2015;47:66–71. doi:10.2340/16501977-1885.	(Po) Mixed shoulder pain population, no subgroup analyses for rotator cuff disorders. (I) No follow-up of a course of physical therapy (physical therapy treatment was not documented).

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eTable 3.
Continued

No.	Study	Main Reasons for Exclusion–Criterion Categories[b] (in Parentheses) and Explanations
28	Maman E, Harris C, White L, et al. Outcome of nonoperative treatment of symptomatic rotator cuff tears monitored by magnetic resonance imaging. *J Bone Joint Surg Am*. 2009;91:1898–1906. doi:10.2106/JBJS.G.01335.	(Pr), (S/A): No multivariable prognostic modeling related to the variables of interest for this review. The relationship between baseline variables and changes in tear size was evaluated by simple percentage comparisons. Logistic regression was used only to assess the relationship between progression in tear size and elapsed time between a participant's first and final MRI scan; retrospective study.
29	McCreesh K. Evidence based prognosis setting in the case of a conservatively managed rotator cuff tear. *Physiother Irel*. 2007;28:31–35.	(S/A) Case study.
30	Mintken PE, Cleland JA, Carpenter KJ, et al. Some factors predict successful short-term outcomes in individuals with shoulder pain receiving cervicothoracic manipulation: a single-arm trial. *Phys Ther*. 2010;90:26–42. doi:10.2522/ptj.20090095.	(Po) Generic shoulder pain population, 30% due to trauma.
31	Morag Y, Jamadar DA, Miller B, et al. Morphology of large rotator cuff tears and of the rotator cable and long-term shoulder disability in conservatively treated elderly patients. *J Comput Assist Tomogr*. 2013;37:631–638.	(I) 80% of the sample received physical therapy, but separate data for those receiving physical therapy were not reported. (S/A) No multivariable prognostic modeling.
32	Nakamura Y, Yokoya S, Mochizuki Y, et al. Monitoring of progression of nonsurgically treated rotator cuff tears by magnetic resonance imaging. *J Orthop Sci*. 2015;20:314–320. doi:10.1007/s00776-014-0680-6.	(S/A) No multivariable prognostic modeling.
33	Notarnicola A, Maccagnano G, Tafuri S, et al. Prognostic factors of extracorporeal shock wave therapy for tendinopathies. *Musculoskelet Surg*. 2015 May 16 [Epub ahead of print]. doi:10.1007/s12306-015-0375-y.	(Po) Mixed population of various musculoskeletal tendon complaints, including rotator cuff tendinitis; combined analysis (no difference in response to treatment was found related to the different tendons). (I) Following a course of extracorporeal shock-wave therapy; physical therapy treatment was documented but was not standard element of treatment.
34	Ottaviani M, Mele G. Epidemiological, clinical and diagnostic study of rotator cuff rupture. *Riabilitazione*. 1998;31:17–24.	(L) Full text in Italian. (S/A) Presumably not a multivariable prognostic modeling study.
35	Rahme H, Solem-Bertoft E, Westerberg CE, et al. The subacromial impingement syndrome: study of results of treatment with special emphasis on predictive factors and pain-generating mechanisms. *Scand J Rehabil Med*. 1998;30:253–262.	(Po) 24% of overall sample were posttrauma (subgroup data not reported). (O) The outcome is the success of surgery (ie, only surgically treated patients were evaluated by multivariable regression analysis).
36	Rowe CR. Ruptures of the rotator cuff: selection of cases for conservative treatment. *Surg Clin North Am*. 1963;43:1531–1534.	(S/A) Not a prognostic modeling study.
37	Ryall C, Coggon D, Peveler R, et al. A prospective cohort study of arm pain in primary care and physiotherapy: prognostic determinants. *Rheumatology (Oxford)*. 2007;46:508–515. doi:10.1093/rheumatology/kel320.	(P) Nonspecific population ("arm pain"), no subclassification of shoulder pain.
38	Safran O, Schroeder J, Bloom R, et al. Natural history of nonoperatively treated symptomatic rotator cuff tears in patients 60 years old or younger. *Am J Sports Med*. 2011;39:710–714. doi:10.1177/0363546510393944.	(Po) 53% were posttraumatic. (I) No mention of physical therapy, not following a defined course of conservative treatment with physical therapy ("natural progression"). (S/A) There appears to be no prognostic modeling.
39	Samilson RL, Binder WF. Symptomatic full thickness tears of rotator cuff: an analysis of 292 shoulders in 276 patients. *Orthop Clin North Am*. 1975;6:449–466.	(Po) 82% were posttraumatic. (I) An unspecified proportion received physical therapy, and there was no discrete physical therapy subgroup. (S/A) Not a prognostic modeling study.

(Continued)

eTable 3.
Continued

No.	Study	Main Reasons for Exclusion–Criterion Categories[b] (in Parentheses) and Explanations
40	Silverstein BA, Viikari-Juntura E, Fan ZJ, et al. Natural course of nontraumatic rotator cuff tendinitis and shoulder symptoms in a working population. *Scand J Work Environ Health*. 2006; 32:99–108. doi:10.5271/sjweh.985.	(I) The proportion receiving physical therapy was not specified, not following a defined course of conservative treatment with physical therapy ("natural course"). (S/A) No multivariable prognostic modeling.
41	Sindhu BS, Lehman LA, Tarima S, et al. Influence of fear-avoidance beliefs on functional status outcomes for people with musculoskeletal conditions of the shoulder. *Phys Ther*. 2012;92:992–1005. doi:10.2522/ptj.20110309.	(P) ICD-9 classifications (disease categories) too imprecise for localization to the rotator cuff disorder spectrum as defined for this review. (S) Retrospective study.
42	Smith KL, Harryman DT, Antoniou J, et al. A prospective, multipractice study of shoulder function and health status in patients with documented rotator cuff tears. *J Shoulder Elbow Surg*. 2000;9:395–402. doi:10.1067/mse.2000.108962.	(S) Not a prognostic modeling study, effectively a time zero cross-sectional analysis correlating various clinical characteristics with Simple Shoulder Test (SST) functions.
43	Solomon DH, Bates DW, Schaffer JL, et al. Referrals for musculoskeletal disorders: patterns, predictors, and outcomes. *J Rheumatol*. 2001;28:2090–2095.	(I) Treatment unspecified (not all patients received physical therapy), not following a defined course of conservative treatment with physical therapy. (O) Outcome of interest ("referral" to a secondary care specialist) not of interest for this review.
44	Tanaka M, Itoi E, Sato K, et al. Factors related to successful outcome of conservative treatment for rotator cuff tears. *Ups J Med Sci*. 2010;115:193–200. doi:10.3109/03009734.2010.493246.	(S/A) No multivariable prognostic modeling.
45	van der Windt DA, Koes BW, Boeke AJ, et al. Shoulder disorders in general practice: prognostic indicators of outcome. *Br J Gen Pract*. 1996;46:519–523.	(I) Not following a defined course of conservative treatment with physical therapy, not all patients (in the rotator cuff tendinitis group) had physical therapy.
46	Viikari-Juntura E, Takala EP, Riihimäki H, et al. Predictive validity of symptoms and signs in the neck and shoulders. *J Clin Epidemiol*. 2000;53:800–808. doi:10.1016/S0895-4356(00)00197-9.	(Po) Nonspecific shoulder pain population. (I) Physical therapy not for all participants.
47	Virta L, Mortensen M, Eriksson R, Möller M. How many patients with subacromial impingement syndrome recover with physiotherapy? A follow-up study of a supervised exercise programme. *Adv Physiother*. 2009;11:166–173. doi:10.1080/14038190802460481.	(S/A) No multivariable prognostic modeling.
48	Wang JC, Horner G, Brown ED, Shapiro MS. The relationship between acromial morphology and conservative treatment of patients with impingement syndrome. *Orthopedics*. 2000;23: 557–559.	(S) No multivariable prognostic modeling.
49	Yamanaka K, Matsumoto T. The joint side tear of the rotator cuff: a follow-up study by arthrography. *Clin Orthop Relat Res*. 1994;304:68–73. doi:10.1097/00003086-199407000-00012.	(Po) 28% posttraumatic. (I) Conservative treatment is undefined. (S/A) No multivariable prognostic modeling.

[a] NSAIDs=nonsteroidal anti-inflammatory drugs, RCT=randomized controlled trial, MRI=magnetic resonance imaging, ICD-9=*International Classification of Diseases, Ninth Edition*.
[b] Criterion categories: Po=population, I=intervention(s), O=outcome(s), S/A=study design/analysis, Pr=prognostic factors, L=language, TP=type of publication.

eTable 4.
Ongoing Studies

Study	Source
ICTRP[a] (study ID and title), ordered by ID	
ACTRN12615000351516 Pain modulation characteristics in people with shoulder impingement and predictors of successful outcomes following physical therapy treatment	ICTRP. Available at: http://apps.who.int/trialsearch/Trial2.aspx?TrialID=ACTRN12615000351516 (last accessed October 22, 2015)
DRKS00004462 Predicting the outcome of conservative treatment with physical therapy for shoulder pain in the presence of atraumatic partial-thickness tears of the rotator cuff	ICTRP. Available at: http://apps.who.int/trialsearch/Trial2.aspx?TrialID=DRKS00004462 (last accessed October 22, 2015)
NCT00632996 Exercise and manual therapy for shoulder subacromial impingement syndrome	ICTRP. Available at: http://apps.who.int/trialsearch/Trial2.aspx?TrialID=NCT00632996 (last accessed October 22, 2015)
NCT00762580 Features to predict success with nonoperative treatment of patients with rotator cuff tears (MOON)	ICTRP. Available at: http://apps.who.int/trialsearch/Trial2.aspx?TrialID=NCT00762580 (last accessed October 22, 2015)
NCT01498198 Workers' Compensation Board: rotator cuff tear management	ICTRP. Available at: http://apps.who.int/trialsearch/Trial2.aspx?TrialID=NCT01498198 (last accessed October 22, 2015)
NCT02287090 Comparative effectiveness of operative versus nonoperative treatments for rotator cuff tears (ROW)	ICTRP. Available at: http://apps.who.int/trialsearch/Trial2.aspx?TrialID=NCT02287090 (last accessed October 22, 2015)
NCT02510352 Cohort of patients with a symptomatic rotator cuff tear treated without surgical repair	ICTRP. Available at: http://apps.who.int/trialsearch/Trial2.aspx?TrialID=NCT02510352 (last accessed October 22, 2015)
Published protocol (first author [year])	
Lambers Heerspink (2011) Clinical and radiological outcome of conservative vs surgical treatment of atraumatic degenerative rotator cuff rupture: design of a randomized controlled trial.	Lambers Heerspink FO, Hoogeslag Ag R, Diercks LR, et al. Clinical and radiological outcome of conservative vs surgical treatment of atraumatic degenerative rotator cuff rupture: design of a randomized controlled trial. *BMC Musculoskelet Disord*. 2011;12:25. doi: 10.1186/1471-2474-12-25.

[a] ICTRP=World Health Organization International Clinical Trials Registry Platform.

eTable 5.
Characteristics and Results of Included Studies: Detailed Version

Study	Characteristics		
Hallgren et al,[40] 2014			
Objective	To examine "whether the baseline Constant-Murley (CM) score, rotator cuff status, and radiological findings influenced the decision about surgery."		
Design	Cohort study derived from 2-group RCT, consecutive recruitment Phase of research: development		
Setting	Sweden, orthopedic (presumably outpatient) department in a university hospital Study dates: recruitment took place from January 2008 to February 2010		
Start point	Not precisely defined, recruitment was from the waiting list for arthroscopic subacromial decompression (duration of symptoms ≥6 mo)		
Participants	N=102 (data on 95 participants)* Type of disorder: subacromial pain, mixed population: nontear (69%), partial tear (22%), full tear (9%) Mean age: 52 y Sex: 63% male		
Intervention	Both groups included exercise-based physical therapy (specific vs control exercises) after an initial steroid injection Duration: 12 wk		
Prognostic factors considered	N=8: Constant score (quartiles), proximal humeral migration (yes or no), radiological determination of osteoarthritis (in the shoulder complex) (yes or no), cuff status (intact, partial tear, or full tear), subacromial calcification (yes or no), subacromial degeneration (yes or no), sex,† treatment group (control versus specific)†		
Outcome	Choice of surgery (yes or no, based on record of treatment)		
Endpoint	After 1 y (after inclusion or after surgery)		
Selection of factors	For multivariable modeling: unclear (lack of information); there is no suggestion of prognostic factor selection based on univariable analysis. Within multivariable modeling: unclear (lack of information). No rationale was provided for the combinations of prognostic factors, and no "final" model was specified, but apparently no stepwise regression was used.		
Statistical analysis	Logistic regression. Four models were presented.‡		
Most complete model, including main effects for all prognostic models	Number of outcome events=41 Pseudo R^2=.28		
	Predictor/statistics§	OR	95% CI
	Intact cuff	1.00	
	PTT	0.92	(0.24, 3.46)
	FTT	2.88	(0.32, 25.59)
	Control vs specific	8.68	(2.75, 27.37)
	CM 1 quartile	1.00	
	CM 2 quartile	0.42	(0.10, 1.82)
	CM 3 quartile	0.11	(0.03, 0.47)
	CM 4 quartile	0.12	(0.03, 0.58)
	Calcification	2.59	(0.68, 9.85)
	Degeneration	2.05	(0.43, 9.71)
	Women	0.32	(0.09, 1.12)
	Regression constant	0.01	(0.00, 0.46)
	Further evaluation of model performance (including internal and external validation): none presented		
Prognostic index/statement	None presented		

(Continued)

eTable 5.
Continued

Study	Characteristics	
Study authors' conclusions	"The severity of shoulder disability at baseline and the presence of a full-thickness tear seem to influence outcome and the need for surgery."	
Notes	*Unpublished analysis data specify up to 97 observations. †Adjustment variables. ‡Based on unpublished analysis data. §Model based on 93 observations; values rounded to 2 decimal places	
Hung et al,[41] 2010		
Objective	"To identify the shoulder kinematic and impairment of the patients who are more likely to respond to physical therapy."	
Design	Cohort (single-group), presumably consecutive recruitment (no information provided) Phase of research: development	
Setting	Taiwan, orthopedic (presumably outpatient) clinic in a national university hospital Study dates: unspecified	
Start point	Recruitment by an orthopedics clinic or by "general announcements in the local Internet media"; no further information provided	
Participants	N=33 (of interest for the present review was a subgroup of 23 participants who showed "improvement") Type of disorder: subacromial impingement syndrome, presumably mixed population (rotator cuff tears were not excluded, but no further information was provided) Mean age: 23.3 y Sex: 100% male	
Intervention	Standardized physical therapy program Duration: 6 wk	
Prognostic factors considered	N unclear; up to 60 participants may have been assessed covering the following predictors or categories‖: scapular kinematics, shoulder PROM, isometric strength, thoracic spine posture, posterior shoulder tightness, functional disability, symptom duration, adherence to treatment,¶ age,¶ height,¶ weight¶	
Outcome	"Improvement" on 15-point GRCS from –7 ("a very great deal worse") to +7 ("a very great deal better"), with dichotomization into "improved" (≥+4) or "not improved" (≤+3)	
Endpoint	After 6 wk (conclusion of physical therapy treatment)	
Selection of factors	For multivariable modeling: "Variables from the shoulder kinematics and clinical impairments were tested for their relationship with the reference outcome using independent sample *t* tests. Variables with a significant level of $P<.10$ may be retained as potential predictor variables." Within multivariable modeling: stepwise regression	
Statistical analysis	Logistic regression. Apparently, 2 models were calculated.	
Final model	Number of outcome events: 23 Nagelkerke R^2: .73	
	FLEX-SF score	Cutoff <41#
	Scapular internal rotation at 30° of shoulder elevation (descending phase, unloaded)	Cutoff <0.7#
	Serratus anterior muscle force as percentage of body weight	Cutoff <27%#
	Further evaluation of model performance (including internal and external validation): probability of improvement (%) was evaluated for 1, 2, or all of the factors in the final model: 1+=69, 2+=88, 3+=100	
Prognostic index/statement	"A subject with SAIS [subacromial impingement syndrome] who meets 3 criteria (FLEX-SF score <41, muscle force of serratus anterior <27.4% body weight, degree of scapular internal rotation at 30°, shoulder elevation <0.7 degree) at baseline has a probability of 100% of demonstrating improvement at 6-week follow-up."	
Study authors' conclusions	See above	

(Continued)

eTable 5.
Continued

Study	Characteristics		
Notes	‖All potential prognostic factors were dichotomized using cutoff points derived from ROC analyses. ¶Apparently an adjustment variable. #Resulting values from sensitivity and specificity ROC analyses.		
Kromer et al,[39] 2014			
Objective	To analyze "to what degree fear-avoidance beliefs and catastrophizing contribute to the variance of disability at baseline and at 3-month follow-up in patients with SPS (subacromial pain syndrome)."		
Design	Cohort study derived from 2-group RCT, consecutive recruitment Phase of research: development		
Setting	Germany, outpatient physical therapy practices Study dates: recruitment took place over an 18-mo period; dates are unspecified		
Start point	Presentation to a physical therapist following referral by general practitioner or orthopedic surgeon (duration of symptoms ≥4 wk)		
Participants	N=90 (data for 88 participants), subacromial shoulder pain, presumably tendinopathies and partial tears Mean age: 51.8 y Sex: 50% male		
Intervention	Both treatment groups included supervised exercises; the intervention group received additional treatment with manual mobilizations, individualized education, instruction on ADL Duration: overall, 12 wk (physical therapy for 5 wk + continuation of home exercises for 7 wk)		
Prognostic factors considered	N≥7**: age,†† 11-point VNRS,†† FABQ-PA, PCS, sex,†† SPADI-F, symptom duration††		
Outcome	SPADI-F change score		
Endpoint	After 12 wk (conclusion of intervention)		
Selection of factors	For multivariable modeling: It is unclear what predictors were initially considered. Multicollinearity was assessed among the predictors that are specified in the report (cutoff $r \geq .5$); in case of a correlation, the "most easily obtainable variable in clinical practice" was chosen for further analysis; selection was done regardless of the statistical significance of univariable correlations of predictors with the outcome. Within multivariable modeling: backward regression		
Statistical analysis	Hierarchical linear regression. The 7 predictors were categorized into: demographic, clinical, and psychological factors.		
Final model	Number of outcome events=88 R^2=.48, R^2 adjusted=.44		
	Predictor/statistics	Beta*	95% CI‡‡
	Age	0.000	–0.32, 0.32
	Sex	0.081	*–3.94, 9.86*
	Duration of complaints	–0.324	*–0.06, –0.02*
	SPADI-F baseline score	0.600	0.40, 0.78
	FABQ-PA score	–0.102	*–1.14, –0.36*
	PCS score	0.083	–0.23, 0.59
	Further evaluation of model performance (including internal and external validation): none presented		
Prognostic index/statement	None presented		
Study authors' conclusions	"In patients with SPS, fear-avoidance beliefs measured at baseline" appear to be significantly associated with baseline disability but not with disability change scores after 3 months . . . . The regression model for the disability change score after 3 months clearly identified duration of complaints and baseline disability as the only significant variables."		

(Continued)

eTable 5.
Continued

Study	Characteristics
Notes	**The narrative implies that there were other, unspecified predictors. ††Apparently an adjustment variable. ‡‡CIs contain inaccuracies (see italicized values).
Merolla et al,[42] 2011§§	
Objective	"To validate a prognostic score to predict which patients could have a good and stable outcomes with nonoperative treatment."
Design	Cohort (single-group), consecutive recruitment Phase of research: validation
Setting	Italy, outpatient clinic of hospital department of shoulder and elbow surgery Study dates: unspecified
Start point	Diagnosis of a symptomatic rotator cuff tear by a shoulder surgeon
Participants	N=60 (of interest for the present review was a subgroup of 33 participants who were treated conservatively) Type of disorder: symptomatic rotator cuff tears (presumably both partial- and full-thickness) Mean age: 52.6 y Sex: 60% male
Intervention	Treatment was structured into different phases and included pain control, passive mobilization, supervised exercises, and laser therapy Duration: overall duration unclear
Prognostic factors considered	N≥17. There was no regression. Acromiohumeral interval (<7 mm/>7mm); AROM (<90°/>90°, although the movements to which this applied were unspecified); age (<60 y/>60 y); bilateral tear (yes or no); drop sign (yes or no); long head of biceps muscle status (normal, rupture, instability); overhead sport (yes or no); previous rehabilitation (yes or no); scapular dyskinesis (yes or no); shoulder trauma (<6 mo/>6 mo); subscapularis muscle tear (yes or no); type of tear (complete, partial); working activity (light, heavy); workers' compensation (yes or no); passive stiffness, measured goniometrically (none or mild, moderate, severe); rotator cuff fatty infiltration (grades 0–I, II, or III); and rotator cuff muscle atrophy (grades I, II, III, or IV).
Outcomes	Constant score, subjective satisfaction assessed with a 0–100 nominal scale and pain assessed with a VAS. It is unclear whether all were used for the validation of the model. Election of surgery and QoL also appear to have been assessed but were not prespecified outcomes in the Method section.
Endpoint	Unclear. Outcomes were measured at 6, 9, and 12 mo, but the prognosis aspect may have been assessed at 12 mo only.
Statistical analysis	"Student's *t*-test was used to highlight significant differences between pre-rehabilitation and post-rehabilitation program scores."
Validation statistics	Number of outcome events=33 for continuous outcomes (conservatively treated participants); unclear for categorized outcomes No validation statistics presented Mean prediction score (SD) at follow-up: • Conservative group: 11.3 (1.8) • Surgical group: 16.1 (1.7)
Consideration of changes to original model	NI
Study authors' conclusions	"The outcomes of our study support the assumption that a predictive prognostic score may guarantee a rational approach in the management of subjects with [cuff] tears, especially in elderly who continue to have the higher rate of recurrence and therefore could be well treated with standard conservative therapies." "Since the patients who benefit from conservative treatment had a score lower than 13 points, we identified this values as a 'cutoff' score to predict a good results by conservative management of [cuff] tear."
Notes	§§Unclear and incomplete reporting, seriously hindered data extraction.

(Continued)

eTable 5.
Continued

Study	Characteristics	
Taheriazam et al,[43] 2005		
Objective	"To determine the prognostic factors associated with the response to conservative therapy of subacromial impingement syndrome."	
Design	Cohort (single-group), consecutive recruitment Phase of research: development	
Setting	Iran, outpatient orthopedic clinic Study dates: enrollment took place from March 2001 to February 2002	
Start point	New diagnosis of impingement syndrome	
Participants	N=102[||||] (data for 89 participants) Type of disorder: subacromial impingement syndrome (NI on whether rotator cuff tears were included) Mean age: 56.4 y Sex: 51% male	
Intervention	Treatment was based on a standardized protocol including oral NSAIDs, up to 2 local steroid injections, and a supervised physical therapy program Duration: overall, presumably 12 mo	
Prognostic factors considered	N=8; acromial morphology (type I, II, or III),[¶¶] acromial spur (present, absent), AROM into flexion and abduction (implicitly measured goniometrically, but converted into ordinal data for analysis as normal, mildly impaired, moderately impaired, or severely impaired),[¶¶] age, Constant score, dominant shoulder involvement (yes or no), sex, symptom duration	
Outcomes	Constant score	
Endpoint	After 12 mo (follow-up visit at clinic)	
Selection of factors	For multivariable modeling: All 8 predictors were included in the multivariable analysis regardless of the statistical significance of univariable correlations of predictors with the outcome. Within multivariable modeling: After the initial inclusion of all predictors, further modeling was based on the statistical significance of the regression coefficients. Among the 3 remaining predictors, 3 additional multivariable models were then calculated.	
Statistical analysis	Linear regression, presumably 4 multivariable models were calculated	
Final model	Number of outcome events=89 R^2 adjusted=.68	
	Acromial morphology	SEE=0.76
	Duration of symptoms	
	Baseline Constant score	
	Normal distribution of residuals was assessed (Kolmogorov-Smirnov test): P=.3	
	Further evaluation of model performance (including internal and external validation): none presented	
Prognostic index/statement	None presented	
Calibration, discrimination, validation	None presented	
Study authors' conclusions	"We found that the predictive value of the pretreatment Constant score could be empowered by taking into account the effects of acromion morphology and pretreatment symptom duration. This is quantitatively shown by better fitness of the 3-variable model than the univariate models."	
Notes	[||||] As reported by the authors, but there is a discrepancy. Of 128 eligible patients, 93 consented and 13 were excluded from the analysis, giving a sample of 80. [¶¶] Erroneously analyzed as continuous data in the regression.	

[a] ADL=activities of daily living, FABQ-PA=Fear-Avoidance Beliefs Questionnaire Physical Activity subscale, FLEX-SF=Flexilevel Scale of Shoulder Function, GRCS=Global Rating of Change Scale, NI=no information, NSAIDs=nonsteroidal anti-inflammatory drugs, QoL=quality of life, RCT=randomized controlled trial, ROC=receiver operating characteristic, PROM=passive range of motion, AROM=active range of motion, SEE=standard error of the estimate, SLAP=superior labral anterior to posterior, SPADI-F=Shoulder Pain and Disability Index Function subscale, VAS=visual analog scale, VNRS=Visual Numeric Rating Scale, OR=odds ratio, CI=confidence interval, PTT=partial-thickness tear, FTT=full-thickness tear, PCS=Pain Catastrophizing Scale.