Poster #5

A Method for Establishing Best Values for MCID, SCB, and PASS Thresholds after Rotator Cuff Repair

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We have no conflicts of interest to disclose

Background

Minimum clinically important difference (MCID), substantial clinical benefit (SCB), and patient acceptable symptom state (PASS) thresholds **ascribe significance** to PROMs after a given intervention

Significant **variability undermines** the **usefulness** of these concepts

› Am J Sports Med. 2024 Feb 6:3635465231202019. doi: 10.1177/03635465231202019. Online ahead of print.

Variability of MCID, SCB, and PASS Thresholds in Studies Assessing Patient-Reported Outcomes After Rotator Cuff Repair: A Systematic Review

Alexander C Lee [1], Radhika Gupta [1], John D Kelly 4th [2], Xinning Li [3], Robert L Parisien [4]

Thresholds are specific to **PROM + Intervention**

MCID for ASES score following rotator cuff repair

Not MCID for rotator cuff repair

Reviewed Studies

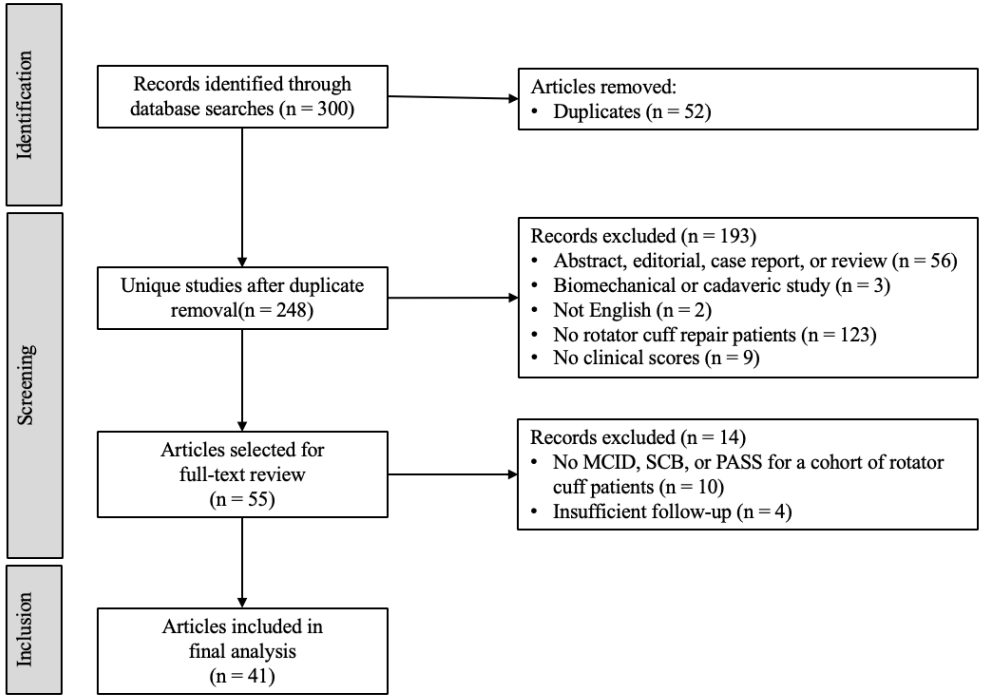
Systematic Review

Rotator Cuff Repair + MCID, SCB, or PASS

Jan 1st 2000 to May 31st 2022

Minimum 12-month follow-up

41 included studies (6331 shoulders)



Reported Thresholds

Minimal Clinically Important Difference (MCID)

The change in outcome score that represents the **smallest** significant clinical improvement after surgery

37 Studies

Substantial Clinical Benefit (SCB)

Considerable improvement from preoperative health

11 Studies

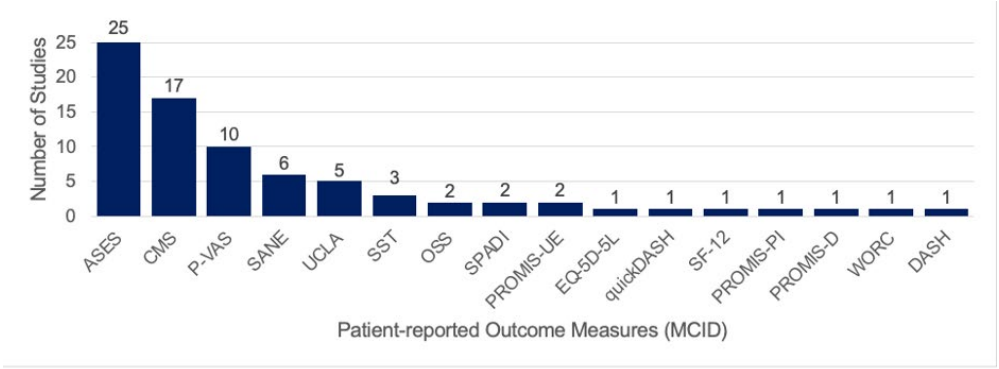
Patient Acceptable Symptom State (PASS)

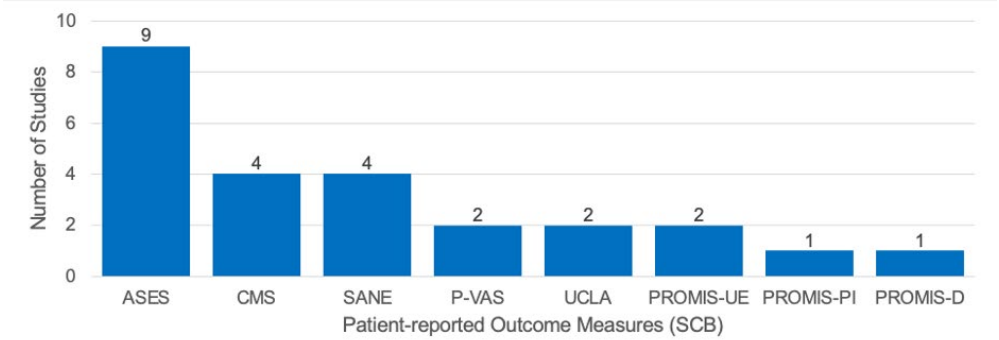
Minimum **postoperative** health outcome required to establish patient satisfaction

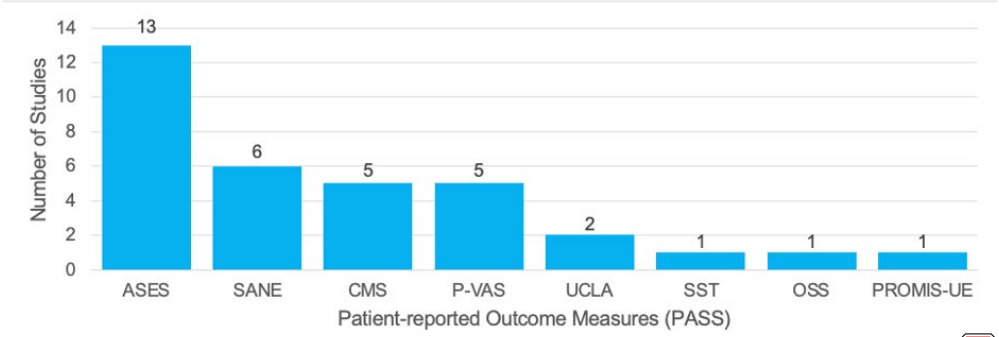
16 Studies

*Some studies reported multiple thresholds

Patient Reported Outcome Measures







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Calculation Methods

Anchor-based (12 studies)

Thresholds from correlation of PROM scores with an **anchor question**

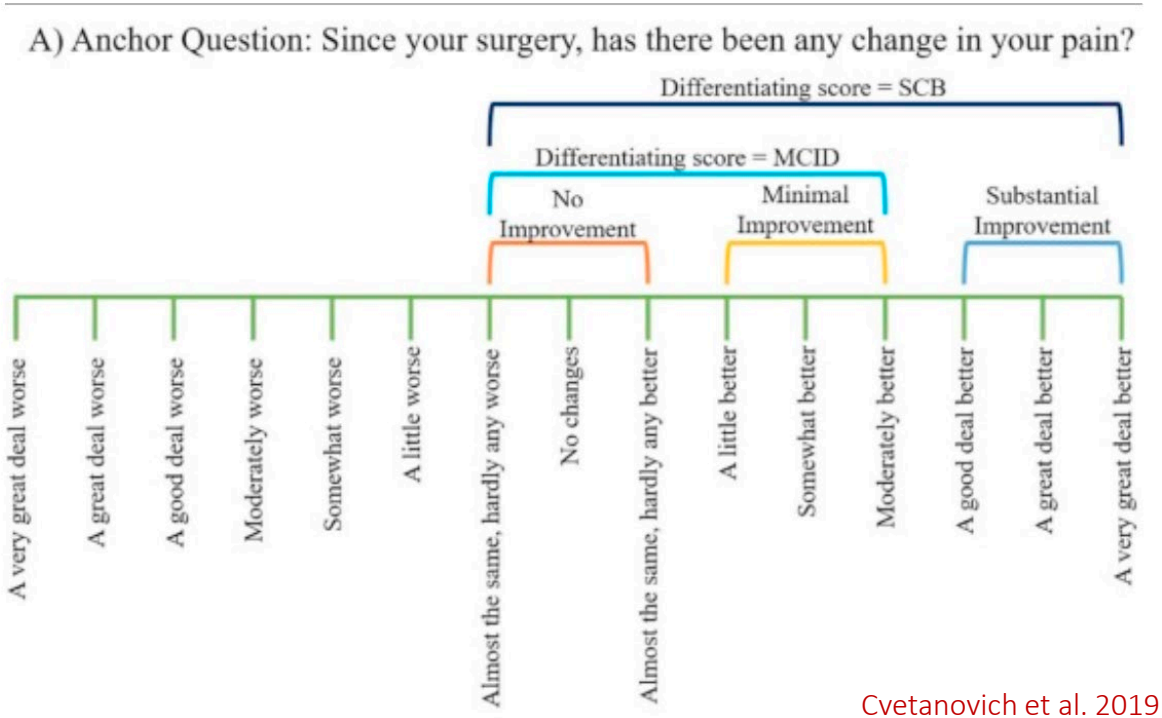
Distribution-based (6 studies)

Thresholds from patient PROM scores without an anchor question

Referenced existing studies (29 studies)

Thresholds taken from the existing literature

Anchor Questions



Cvetanovich et al. 2019

Negative Anchor for MCID And SCB

Positive Anchor for MCID

Positive Anchor for SCB

Calculation Methods (Anchor-based)

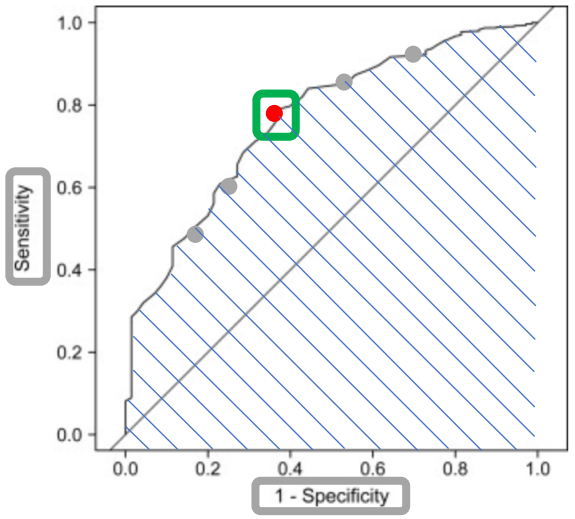
Receiver operator characteristic (ROC) analysis

Threshold = 10

Anchor Response		Above	Below
	+	80	20
	-	40	60

	Sens	Spec
4	.95	.38
7	.85	.45
10	.80	.60
15	.60	.65
25	.44	.79

ROC Curve



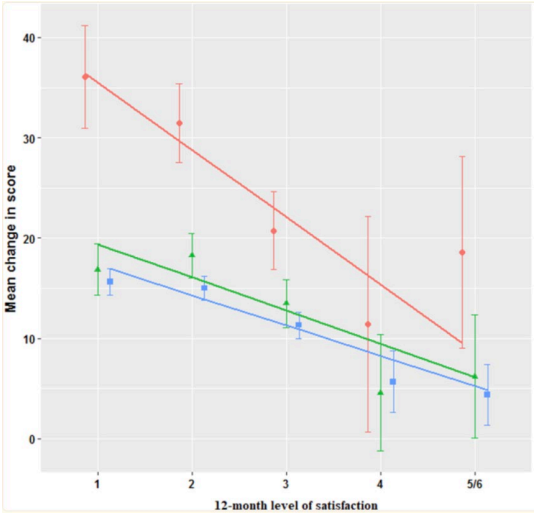
MCID/SCB/PASS = max {sensitivity + specificity}

= Area Under the Curve

Calculation Methods

Linear Regression (Anchor)

Has the surgery met your expectation so far?
1 = Yes, totally… 3 = Yes, quite a bit…
5 = No, not quite… 7 = No, not at all



Xu et al. 2020

Slope of line = MCID

Mean Improvement (Anchor)

Average improvement among patients with a **positive anchor** response

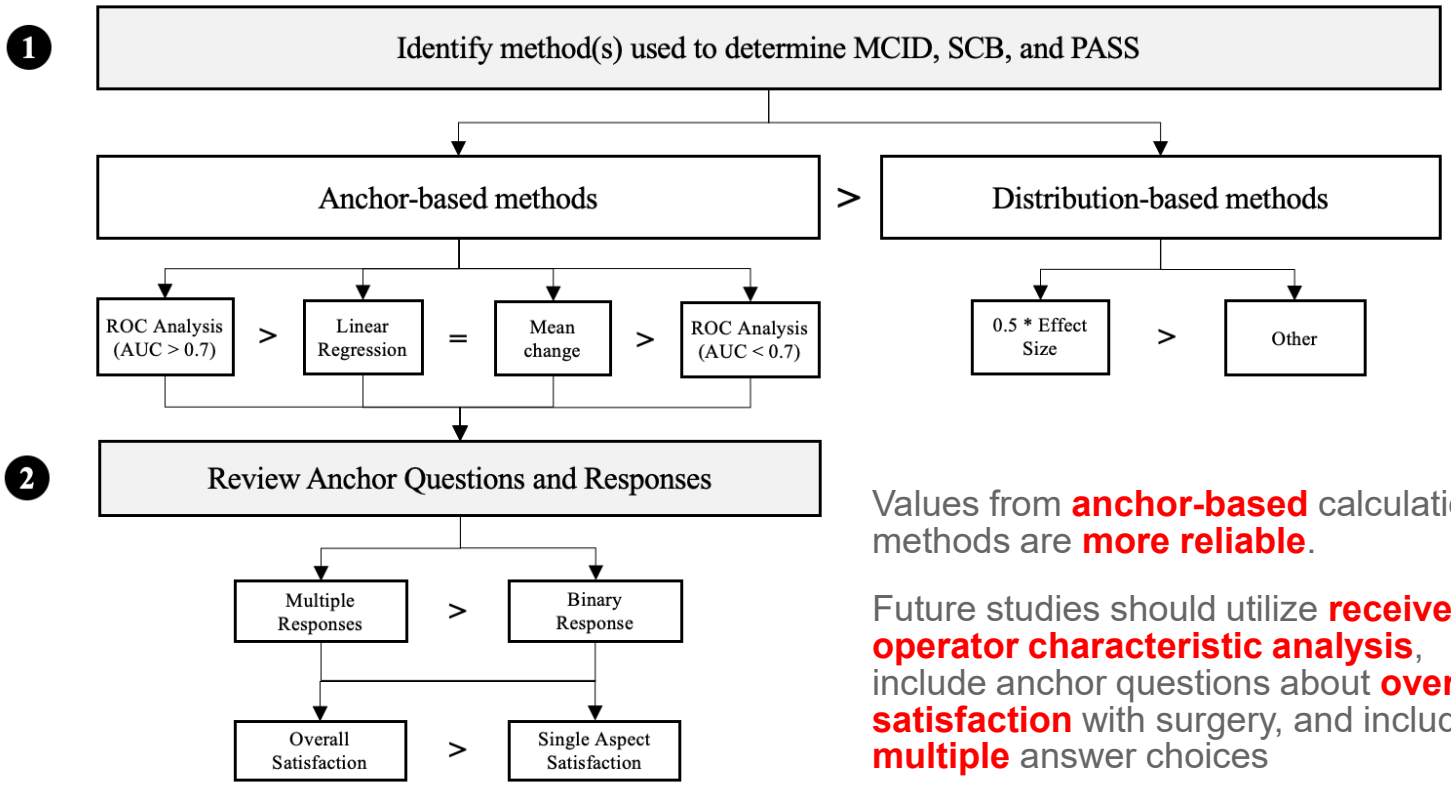
Effect size (Distribution)

The **standard deviation** of **preoperative** values

Anchor and Distribution Studies

Study	Elig Patients	Follow-up (months)	Lost to Follow-up	Country	Evidence, Study Type	Metric	Score	Method(s)
Kukkonen (2013)	802	3, 12	3%	Finland	Basic Science - Validation of Outcomes Instrument	MCID	CMS	ROC Analysis, Mean Change (Positive Anchor), Effect Size
Gagnier (2018)	222	15	91%	United States	Basic Science - Validation of Outcomes Instrument	MCID	ASES, WORC	Mean Change (Positive Anchor)
Cvetanovich (2019)	355	12	19%	United States	Basic Science - Validation of Outcomes Instrument	MCID, SCB, PASS	ASES, CMS, SANE	ROC Analysis, Effect Size
Gowd (2019)	89	12	-	United States	Level III - Cohort Study	MCID, SCB, PASS	ASES, CMS	ROC Analysis
Xu (2019)	327	12 24	6% 32%	Singapore	Level III - Cohort Study	MCID	CMS, OSS, UCLA	Linear Regression
Haunschild (2020)	101 105	12	-	United States	Level III - Cohort Study	SCB, PASS MCID	PROMIS-UE	ROC Analysis Effect Size
Kim (2020)	92	12	11%	South Korea	Level III - Cohort Study	PASS MCID, SCB	ASES, P-VAS, SANE, UCLA	ROC Analysis ROC Analysis, Mean Change (Positive Anchor)
Tashjian (2020)	202	12	-	United States	Basic Science - Validation of Outcomes Instrument	MCID	ASES, P-VAS, SST	Mean Change (Positive Anchor)
Marks (2021)	153	12	3%	Switzerland	Level III - Cohort Study	MCID	EQ-5D-5L	ROC Analysis Mean Change (Positive Anchor) Effect Size
Pagan - Conesa (2021)	110	12	17%	Spain	Level III - Prospective Therapeutic Study	MCID	CMS, pain-VAS	Mean Change (All) minus 0.5 * SD Change (All)
Malavolta (2022)	329	12	12%	Brazil	Basic Science - Validation of Outcomes Instrument	MCID	ASES, UCLA	ROC Analysis, Effect Size
Kim (2022)	117	24	-	South Korea	Level III - Case Series	PASS	ASES, P-VAS, SANE	ROC Analysis
Tramer (2022)	198	18	15%	United States	Level III - Cohort Study	MCID, SCB	PROMIS - D, PROMIS - PI, PROMIS-UE	ROC Analysis

Methodology



Values from **anchor-based** calculation methods are **more reliable**.

Future studies should utilize **receiver operator characteristic analysis**, include anchor questions about **overall satisfaction** with surgery, and include **multiple** answer choices

Recommendations

MCID					
	Num Studies	Measurement Range	Range of MCID reported	Our Recommendation	
				Value	Study
ASES	26	0 - 100	6.1 - 39	21	Kim (2020)
CMS	17	0 - 100	2.0 - 44.5	5.5	Cvetanovich (2019)
P-VAS	9	0 - 10	1.4 - 6.5	1.5	Kim (2020)
SANE	6	0 - 100	12.0 - 29.4	12	Kim (2020)
UCLA	5	0 - 35	2.5 - 9.3	6	Kim (2020)

SCB					
	Num Studies	Measurement Range	Range of SCB reported	Our Recommendation	
				Value	Study
ASES	9	0 - 100	16.8 - 27.9	26	Kim (2020)
SANE	4	0 - 100	20.0 - 32.8	20	Kim (2020)

PASS					
	Num Studies	Measurement Range	Range of PASS reported	Our Recommendation	
				Value	Study
ASES	13	0 - 100	78.0 - 93.5	78	Kim (2020)
SANE	6	0 - 100	71.0 - 82.5	71	Kim (2020)
CMS	5	0 - 100	23.3 - 44.0	23.3	Cvetanovich (2019)
P-VAS	5	0 - 10	0.5 - 1.7	1.7	Kim (2020)

Significance

First proposed method for choosing best MCID, SCB, and PASS thresholds for an Orthopaedic Surgery

Recommend calculation provides reproducible way determine MCID, SCB, and PASS from patient cohort data

Recommended values provide standardization for studies reporting MCID, SCB, and PASS for rotator cuff repair using common PROMs

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