Evaluation of Spin in Systematic Reviews and Meta-Analyses of Rotator Cuff Repair with Platelet-Rich Plasma

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INTRODUCTION: Platelet-rich plasma (PRP) use in orthopaedics continues to increase. One of the most common uses of PRP is as an adjunct in rotator cuff repair surgery. Multiple systematic reviews and meta-analyses have summarized the data on PRP use in rotator cuff repair surgery. Systematic reviews and meta-analyses are subject to spin bias, where authors interpretation of results influences readers interpretations. The purpose of this study was to evaluate the presence of spin in the abstracts of systematic reviews and meta-analyses of PRP augmented rotator cuff repair surgery. The secondary aim of the study was to evaluate study characteristics that were associated with spin. Our hypothesis was that spin would be present in 30% of abstracts and that studies published in lower impact journals would more likely have spin.

METHODS: A Pubmed and Embase search was conducted using the terms “Rotator Cuff Repair” and “PRP” and “Systematic Review” or “Meta-analysis.” After reviewing the 70 initial studies, 25 studies met the inclusion criteria (Figure 1). Study characteristics were documented (Table 1) and each study was evaluated for the 15 most common forms of spin and with the AMSTAR 2 rating system.

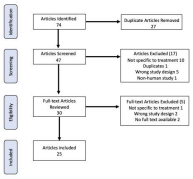
RESULTS:

At least one form of spin was found in 56% (14/25) of the included studies. In regard to the three different categories of spin, a form of misleading interpretation was found in 56% (14/25) of the studies (Table 2). A form of misleading reporting was found in 48% (12/25) of the studies. A form of inappropriate extrapolation was found in 16% (4/25) of the studies. A statistically significant association was identified between misleading interpretation and publication year (OR 1.41 per year increase in publication, 95% CI 1.04-1.92, p=0.029) as well as misleading reporting and publication year (OR 1.41 per year increase in publication, 95% CI 1.02-1.95, p=0.037). There was also a significant association between inappropriate extrapolation and journal impact factor (OR 0.21 per unit increase in impact factor, 95% CI 0.044 to 0.99, p = 0.048).

DISCUSSION AND CONCLUSION:

The most important finding of this study was 56% of systematic reviews and meta-analyses on augmenting rotator cuff repair with PRP had at least one form of spin present in the abstract. We also found that articles published in journals with a higher impact factor had smaller odds of having spin. This may be due to higher expectation of objective writing in journals with higher impact factors. We also found that there was a higher odds of at least one form of misleading interpretation as well as misleading reporting with increasing publication year.

There is a high presence of spin in abstracts of systematic reviews and meta-analyses of rotator cuff repair with PRP augmentation. With the increasing use of biologics in orthopaedics, spin found in these reviews can influence readers, especially those who mainly read abstracts. In order to minimize spin in reviews, journals should require reviewers to assess spin. Readers will also gain more understanding, as more studies assessing spin in orthopaedics are published.



First Author	Year	Journal	IF	LOE	Funding	PRP
Chahal J[24]	2012	Arthroscopy	5.715	3	NM	RCR +/- PRP
Malfull- N[12]	2012	Stem Cells Int.	5.131	2	NM	RCR +/- PRP
Vavken P[44]	2015	AJSM	8.076	2	NM	RCR +/- PRP
Zhao J[27]	2015	Arthroscopy	5.715	2	NM	RCR +/- PRP
Warth R[17]	2015	Arthroscopy	5.715	2	Pr	RCR +/- PRP
Cai YZ[6]	2015	JSES	3.833	1	Pub	RCR +/- PRP
Saltzman BM[45]	2016	Arthroscopy	5.715	3	NF	RCR +/- PRP
Mao XH[22]	2018	J Ortho Surg Res	2.982	2	NM	RCR +/- PRF
Han C[14]	2019	J Ortho Surg Res	2.982	2	NF	RCR +/- PRP
Wang C[16]	2019	PLoS One	3.272	2	NF	RCR +/- PRP
Hurley ET[18]	2019	AJSM	8.076	2	NM	RCR +/- PRP/PRF
Yang FA[46]	2020	Scientific Reports	5.156	1	NF	RCR +/- PRP
Cavendish PA[5]	2020	JSES	3.833	2	NM	RCR +/- PRP
Villarreal-Villarreal GA[19]	2021	Arthroscopy	5.715	1	NF	RCR +/- PRP
Xu W[10]	2021	OJSM	3.975	2	NF	RCR +/- PRF
Hurley ET[13]	2021	AJSM	8.076	1	NM	RCR +/- PRP (LP, LR)
Ryan J[23]	2021	Arthroscopy	5.715	2	Pub	RCR +/- PRP (PRP, PRF; LP, LR)
Zhao D[48]	2021	JSES	3.833	2	Pub	RCR +/- PRP
Lavoie-Gagne O[3]	2022	Arthroscopy	5.715	1	NF	RCR +/- PRP
Li Y[11]	2022	Arthroscopy	5.715	2	NF	RCR +/- PRP (PRP, PRF)
Ahmad Z[1]	2022	Arthrosc Sports Med Rehabil	1.587	3	Pr	RCR +/- PRP
Bono O[2]	2023	OJSM	3.426	3	NM	RCR +/- PRP (PRP, PRF; LP, LR)
Trantos IA[9]	2023	J Clin Med	5.098	3	NF	RCR
Fehrl F[21]	2023	KSSTA	4.407	1	NF	RCR +/- PRP
Lv M[15]	2023	Arthroscopy	5.715	1	NM	SR vs DR vs SB +/- PRP

Table 1 Study characteristics . IF-5 year impact factor, LOE-level of evidence, PRP-platelet rich plasma, PRF-platelet rich fibrin, LP-leukocyte poor, LR-leukocyte rich, SR-single row repair, DR-double row repair, SB-transosseous equivalent/suture bridge

Misleading interpretation		14
1	Conclusion contains recommendations for clinical practice not supported by the findings	7
2	Title claims or suggests a beneficial effect of the experimental intervention not supported by the findings	6
4	Conclusion claims safety based on nonstatistically significant results with a wide confidence interval	0
9	Conclusion claims the beneficial effect of the experimental treatment despite reporting bias	4
12	Conclusion claims equivalence or comparable effectiveness for nonstatistically significant results with a wide confidence interval	0
Misleading reporting		12
3	Selective reporting of or overemphasis on efficacy outcomes or analysis favoring the beneficial effect of the experimental intervention	2
5	Conclusion claims the beneficial effect of the experimental treatment despite high risk of bias in primary studies	5
6	Selective reporting of or overemphasis on harm outcomes or analysis favoring the safety of the experimental intervention	1
10	Authors hide or do not present any conflict of interest	1
11	Conclusion focuses selectively on statistically significant efficacy outcome	4
13	Failure to specify the direction of the effect when it favors the control intervention	0
14	Failure to report a wide confidence interval of estimates	0
Inappropriate extrapolation		4
7	Conclusion extrapolates the review's findings to a different intervention (i.e., claiming efficacy of one specific intervention although the review covers a class of several interventions)	1
8	Conclusion extrapolates the review's findings from a surrogate marker or a specific outcome to the global improvement of the disease	2
15	Conclusion extrapolates the review's findings to a different population or setting	2

Table 2 Assessment of types of spin in the reviewed studies. Total number of studies for each category is on the right. The type of spin described by Yavchitz is categorized and numbered on the left.