

High Prevalence of Spin in Systematic Reviews and Meta-Analyses Reporting on Stem Cell Injections for the Treatment of Knee Osteoarthritis

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INTRODUCTION: The monetary gains from stem cell injections used for the treatment of knee osteoarthritis (OA) may create financial incentives that bias the reporting of the results of this intervention. Therefore, studies evaluating the therapeutic benefit of this intervention may overstate or misrepresent certain findings (“spin”). This study assessed the presence of spin in systematic reviews and meta-analyses evaluating the effectiveness of stem cell injections used to treat symptomatic knee OA.

METHODS: A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline-compliant search of the PubMed, Embase, and Cochrane databases was used to identify systematic reviews and meta-analyses investigating stem cell injections for knee OA. Study abstracts were analyzed for the presence of 21 unique types of spin described by Yavchitz et al. Publication year, journal, study design, level of evidence, funding source, PRISMA guideline adherence, and SCOPUS CiteScore were recorded. Descriptive statistics summarizing spin prevalence were calculated. *Chi*-square analyses were used to identify associations between study attributes and the five most common spin types.

RESULTS: 38 of 39 (97.4%) abstracts contained at least one spin type, with a mean spin count of 4.77 ± 2.23 per abstract. 36 of 39 (92.3%) abstracts had a SCOPUS CiteScore, with a mean score of 2.91 ± 2.10. “Conclusion claiming the beneficial effect of the experimental treatment despite high risk of bias in primary studies” was the most common spin type, identified in 32 abstracts (82.1%). No statistically significant associations existed between publication year and the most common spin types. Publications with lower levels of evidence (i.e., Levels III-V) had a disproportionately higher prevalence of the spin type “ignoring that the review included different study design” (*P*=0.002). Publications with lower SCOPUS CiteScores had higher prevalence of the spin types “failure to report a wide confidence interval of estimates” (*P*=0.018), “inadequate focus on P-value instead of magnitude of the effect estimates for harm or efficacy outcome” (*P*=0.036), and “selective reporting of or overemphasis on efficacy outcomes or analysis favoring the beneficial effect of the experimental intervention” (*P*=0.012).

DISCUSSION: Systematic reviews and meta-analyses assessing the efficacy of intra-articular stem cell injections for knee OA have a high prevalence of spin. Additional investigations with higher-level evidence and transparent communication of study limitations are necessary to evaluate the efficacy of this intervention.

SIGNIFICANCE/CLINICAL RELEVANCE: Given the frequent utilization of abstracts of systematic reviews and meta-analyses for guiding treatment decisions, these findings underscore the need for clinicians to perform a meticulous and critical assessment of the literature when evaluating whether stem cell injections are a viable therapeutic option. The results of additional high-quality randomized controlled trials adhering to rigorous reporting standards will be essential for physicians to accurately assess the potential benefits conferred by stem cell injections to knee OA patients.

Table 1. Association between Five Most Common Spin Types and Study Characteristics

Spin Type	Spin Prevalence		Association with Publication Year	Association with Level of Evidence	Association with Scopus CiteScore
	n	%	P-Value	P-Value	P-Value
	Conclusion claiming the beneficial effect of the experimental treatment despite a high risk of bias in primary studies	32	82.1	0.704	0.085
Failure to report a wide confidence interval of estimates	27	69.2	0.592	0.213	0.018
Inadequate focus on P-value instead of magnitude of the effect estimates for harm or efficacy outcome	22	56.4	0.577	0.105	0.036
Ignoring that the review included different study design (e.g., controlled trial or observational studies)	16	41.0	0.428	0.002	0.311
Conclusion formulating recommendations for clinical practice not supported by the findings	15	38.5	0.139	0.274	0.159

Table 2. Association between Five Most Severe Spin Types and Study Characteristics

Spin Type	Spin Prevalence		Association with Publication Year	Association with Level of Evidence	Association with Scopus CiteScore
	n	%	P-Value	P-Value	P-Value
	Conclusion formulating recommendations for clinical practice not supported by the findings	15	38.5	0.139	0.274
Title claims or suggests a beneficial effect of the experimental intervention not supported by the findings	2	5.1	0.969	0.626	0.064
Selective reporting of or overemphasis on efficacy outcomes or analysis favoring the beneficial effect of the experimental intervention	10	25.6	0.381	0.926	0.012
Conclusion claiming safety based on nonstatistically significant results with a wide confidence interval	5	12.8	0.640	0.814	0.657
Conclusion claiming the beneficial effect of the experimental treatment despite a high risk of bias in primary studies	32	82.1	0.704	0.085	0.221