4-14-2022

Comparing Orthopedic Randomized Control Trials Published in High-Impact Medical and Orthopedic Journals

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Financial Disclosures: None

PURPOSE

To compare study characteristics, methodologic quality and outcome direction among operative randomized orthopedic trials published in high-impact medical and orthopedic journals and to identify study attributes associated with greater exposure and impact

MATERIALS AND METHODS

- RCTs published between January 2010-December 2020 in 6 high-impact medical journals and 10 high-impact orthopedic journals were analyzed
- RCTs reporting outcomes after an orthopedic surgical intervention compared with nonsurgical interventions or a less-invasive/extensive surgical procedure were included
- Study characteristics, methodology, outcomes, and Altmetric data including citation rate and Altmetric attention scores (AAS), were collected
- Primary study outcomes were categorized as positive (favoring operative/more extensive surgery), negative (favoring nonoperative/less extensive surgery), or neutral
- Methodological quality of each study was graded by the Jadad scale
- Linear regressions were utilized to assess for study features associated with AAS and citation rates

RESULTS

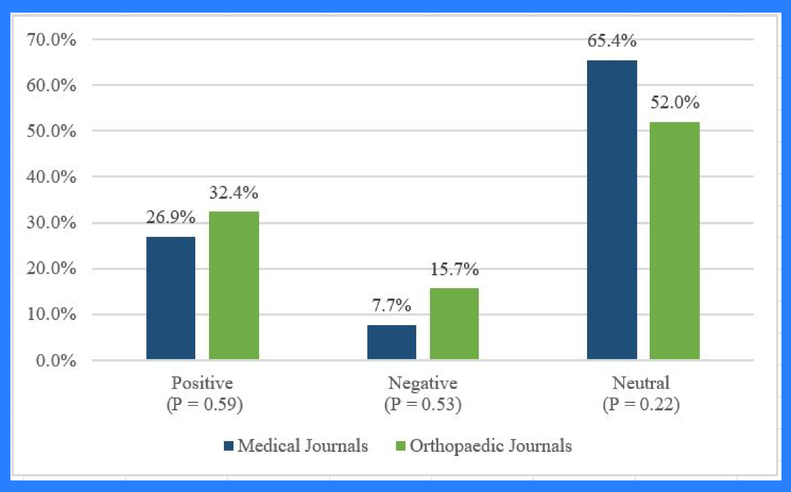

Table 1. Distribution of published orthopedic RCT's in Orthopaedic and medical journals by journal name, orthopaedic subspecialty and year of publication

Journal name	Number of Articles
Arthroplasty	4 (3.1%)
JBJS	34 (26.6%)
The spine journal	5 (3.9%)
CORR	5 (3.9%)
KSSTA	11 (8.6%)
Osteoarthritis and Cartilage	1 (.8%)
Bone & Joint Journal	12 (9.4%)
Arthroscopy	10 (7.8%)
AJSM	14 (10.9%)
Acta Orthopedica	6 (4.7%)
BMJ	6 (4.7%)
JAMA	5 (3.9%)
Lancet	7 (5.5%)
Annals of Internal medicine	2 (1.6%)
NEJM	6 (4.7%)
Subspecialties	
Trauma	32 (25.0%)
Arthoplasty	14 (10.9%)
Hand	6 (4.7%)
Sports	32 (25.0%)
Spine	19 (14.8%)
Shoulder/elbow	22 (17.2%)
Pediatrics	1 (.8%)
Foot and Ankle	2 (1.6%)
Dates of publication	
2010	7 (5.5%)
2011	10 (7.8%)
2012	10 (7.8%)
2013	12 (9.4%)
2014	10 (7.8%)
2015	15 (11.7%)
2016	15 (11.7%)
2017	13 (10.2%)
2018	15 (11.7%)
2019	13 (10.2%)
2020	8 (6.3%)

RCT; randomized control trial, JBJS; Journal of Bone and Joint Surgery, CORR; Clinical Orthopaedics and Related Research, KSSTA; Knee Surgery, Sports, Traumatology, Arthroscopy, AJSM; American Journal of Sports Medicine, JAMA; Journal of the American Medical Association, NEJM; New England Journal of Medicine

Table 2. Comparison of study characteristics between orthopaedic RCTs published in medical and orthopaedic journals [a]

	Medical Journal (n=26)	Orthopaedic Journal (n=102)	P-Value
# of authors	14 ± 9	6.3 ± 2.8	<0.001*
# of patients	227 ± 285	103 ± 82	<0.001*
# of surgeons	67.8 ± 130	5.1 ± 9.6	<0.001*
# of hospitals	14 ± 18	3.5 ± 5.8	<0.001*
Funding source			
Government	12 (46.2%)	11 (10.8%)	<0.001*
Industry	4 (15.4%)	7 (6.9%)	0.23
Institutional	3 (11.5%)	16 (15.7%)	0.76
Multiple	7 (26.9%)	11 (10.8%)	0.03*
Other	0	2 (2%)	1
None	0	55 (53.9%)	<0.001*

RCT; randomized control trial

* Denotes statistical significance at P < 0.05

[a] Continuous data presented as means ± standard deviations. Categorical data presented as numbers with percentages

Table 3. Methodological characteristics of orthopaedic RCTs published in medical and orthopaedic journals

	Medical Journal (n=26)	Orthopaedic Journal (n=102)
Control Group		
Primary PT	11 (42.3%)	20 (19.6%)
Sham Surgery	5 (19.2%)	4 (3.9%)
Nonsurgical immobilization	4 (15.4%)	21 (20.6%)
Immobilization and PT	0	6 (5.9%)
Other	1 (3.8%)	4 (3.9%)
Less Surgery	5 (19.2%)	47 (46.1%)
Double Blinding	4 (15.4%)	10 (9.8%)
Data analysis		
Intention-to-treat	25 (96.2%)	40 (39.2%)
As-treated	1 (3.8%)	1 (1%)
Intention-to-treat and as-treated	0	4 (3.9%)
Per Protocol	0	3 (2.9%)
Not Reported	0	54 (52.9%)

RCT; randomized control trial, PT; physical therapy

Table 4. Comparison of impact and outcome direction between orthopaedic RCTs published in medical and orthopaedic journals[a]

	Medical Journals (n=26)	Orthopaedic Journals (n=102)	P-Value
Altmetric data			
Altmetric Attention Score	342.3 ± 361.2	33.2 ± 61.8	<0.001*
News Articles	13 ± 13.6	2.45 ± 2.5	0.003
Blog Posts	2.9 ± 2.6	1.4 ± .52	0.12
Twitter Mentions	353.9 ± 405.1	38.8 ± 85.3	<0.001*
Facebook Mentions	121.5 ± 303.5	5.1 ± 9.2	0.011
Citations	148.4 ± 147.6	59.8 ± 67.7	<0.001*
Annual Citation Rate	30.3 ± 17	9.35 ± 7.55	<0.001*
Jadad Scores	3.2 ± .9	2.9 ± .9	0.15
Outcomes			
Positive[b]	7 (26.9%)	33 (32.4%)	0.59
Negative[b]	2 (7.7%)	16 (15.7%)	0.53
Neutral[b]	17 (65.4%)	53 (52%)	0.22

RCT; randomized control trial

* Denotes statistical significance at P < 0.05

[a] Continuous data presented as means ± standard deviations. Categorical data presented as numbers with percentages

[b] Positive; results favoring operative/more extensive surgery, Negative; results favoring non-operative or less extensive surgery, Neutral; no difference in results between treatment groups

RESULTS

- 128 RCTs were included, 26 from medical and 102 from orthopedic journals
- Studies published in medical journals included more authors (14.0 ± 9.0 vs. 6.3 ± 2.8, P<.001), larger sample sizes (277 ± 285 vs. 103 ± 82, P<0.001), more participating institutions (14 ± 18 vs. 3.5 ± 5.8, p<.001), and more often received funding (100% vs. 46%, P<0.001)
- Average methodologic quality score did not differ between medical and orthopedic journals (Jadad Score: 3.2 vs. 2.9, P=0.12)
- After adjustment with multivariable linear regressions, publication in a medical journal was the only factor significantly associated with annual citation rate (β=1.48, CI [0.98 – 1.98], P<0.001), and AAS (β=287.3, CI [162.5 – 412.1], P<0.001)
- The direction of the primary study outcome did not differ between studies in medical and orthopedic journals (Positive: 26.9% vs. 32.4%, P=0.59; Negative: 7.7% vs. 15.7%, P=0.53; Neutral: 65.4% vs. 52%, P=0.22)

DISCUSSION

- Previous results support and complement our finding that the direction of study results do not differ between medical and orthopedic journals, by demonstrating that the direction of study results do not influence the likelihood of acceptance for publication in either type of journal
- Our results suggest that screening studies by AAS may disproportionally promote RCTs published in medical journals, despite comparable quality to those published in orthopedic journals.
- With a larger sample size that previous studies, our study may more accurately depict the digital impact of orthopedic RCTs published in medical journals

CONCLUSION

- High-impact medical and orthopedic journals publish orthopedic RCTs with negative or neutral findings at a similar rate and have comparable methodologic quality but research published in medical journals receives more attention

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