General

Characteristics and Trends of the Most Cited Clinical Orthopaedics and Related Research Articles

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Background

Clinical Orthopaedics and Related Research is one of the most influential and reputable scientific journals in the field of orthopaedics. Some of the most reputable publications related to orthopaedic research can be attributed to this journal and it continues to have a significant impact on modern research.

Objective

The purpose of this study is to identify the most influential articles, in terms of number of citations, published by Clinical Orthopaedics and Related Research. The goal of analyzing the most cited articles in is to create a baseline for future researchers to build upon and to uncover any trends in orthopaedic research.

Methods

Preferred Reporting Items for Systematic Reviews guidelines were used to structure the data collection and analysis of this study. The Scopus database was used to compile the publication data. Data was then exported to an excel sheet to be further analyzed via a multi-author review process.

Results

The most cited article was "A Clinical Method of Functional Assessment of the Shoulder" by Constant et al.. The 50 articles analyzed in this study were cited a total of 32,404 times, averaging 719 citations per year, per publication. The oldest article was published in 1971, and the newest in 2008. The United States was the country with the most attributable publications and The University of Florida was the most contributory institution.

Conclusions

Our study recognizes Clinical Orthopaedics and Related research as having a strong predilection for older articles and a continued strength for modern publications.

INTRODUCTION

Orthopaedic research spans a vast variety of topics ranging from surgical techniques and disease progression to clinical outcomes and diagnosis. As the field of orthopedics continues to grow and become more effective at treating musculoskeletal ailments, so does the abundance of research literature that covers all things orthopedics. Such progress lends itself to the development of journals, such as Clinical Orthopaedics and Related Research (CORR), which catalogue publications in the field of orthopaedics. Such databases are advantageous because it allows for articles to be

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categorized, aiding clinicians and researchers in searching for relevant information.

In 1969 the New England Journal of Medicine (NEJM), and its editor Franz J. Ingelfinger implemented a policy that is now often referred to as the Ingelfinger Rule. The policy stated that the NEJM would not publish any materials that had been published in another journal or to the media.[1] This rule sought to preserve the originality of the journal and prevent research from being diluted and inflated by redundancy of publication. The policy has also been implemented in other orthopaedic journals including *Clinical Orthopaedics and Related Research* (CORR), *The Bone & Joint Journal* (BJJ), *The Journal of Bone and Joint Surgery* (JBJS), and *The Journal of Orthopedic Research* (JOR).[2] The exclusivity that has stemmed from the Ingelfinger rule highlights the importance of completing a bibliometric review centered around a particular journal. This study is focused on analyzing the characteristics and trends of the most cited CORR articles.

The *Journal of Citation Reports (JCR)* uses a metric termed, "impact factor" (IF) to quantify and rank the quality of scientific journals. Using data gathered in 2016, JCR published the top 15 orthopaedic journals in terms of IF. CORR was the fifth highest ranked journal in this ranking with an IF of 3.897.[3] Other journals of similar caliber, such as *International Orthopedics, Injury*, *Journal of Orthopedic Trauma*, and *Spine* have had similar analyses conducted.[4] Given its reputation and high level of quality, CORR is an ideal candidate for review.

This study involved citation analysis, often termed a bibliometric review, using the Scopus database to elucidate the most impactful and influential papers found in CORR. The metric used to quantify the data of the study was the frequency and number of citations each publication has accumulated. The goal of analyzing the most cited articles in CORR is to create a baseline for future researchers to build upon and to uncover any trends in orthopaedic research. We hypothesized that most studies would come out of the United States, be level II of evidence and comprise of biomechanical properties studies.

METHODS

Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines were used as to carry out the research conducted in this study. We began by developing a rationale for conducting this study and then developed specific questions to support said rationale. We then used a database with the capacity to address our objectives (Scopus), filtered out articles that were not pertinent to our study, further screened out data via a multi-author review, and analyzed the final data set. Though guidelines for a systematic review was used to structure the study, this analysis does not technically qualify as a systematic review. The intention of this study is to analyze the metrics of the most cited publications from *CORR,* rather than the content of publications to address a clinical question.

The first step was to define this study as a bibliometric review of CORR. With the objective of the review being to compile and rank the most frequently cited articles in the journal. The Scopus database was used to for the search query, conducted in September 2021, for "Clinical Orthopaedics and Related Research". The original search yielded 24,248 publications. Further search criteria were applied to the search results to narrow the data to match our objectives. Our results were limited to the publication document type of "articles" and "reviews," final publication stage, and English language. The addition of these filters reduced the search total to 16,657 publications. The results were then sorted in terms of total number of citations, from highest to lowest. The top 50 results were then carried forward for further analysis (*Figure 1*).

Features of the Scopus database were used to export the data and gather the following content: contributing institution, country of origin, number of publications by year, and author frequency. Additionally, data was exported to an Excel spreadsheet and level of evidence (LOE) and article classification added manually by two investigators (JL and JW). The LOE was assigned according to Oxford LOE guidelines. The article classifications used to categorize the publications were as follows: clinical outcomes, surgical techniques, biomechanics, implants, technical note, classification, clinical guidelines, biological process, etiology, and epidemiology. Of note, certain publications had article classification that overlapped more than one category. In such instances, the publication was marked with multiple classifications.

Given that the longer a publication has been in circulation, the more likely it is to be more frequently cited, a secondary analysis was performed on the most heavily cited publications since 1990. There were eight such publications in the top 50 rankings of this study. Those eight publications were then analyzed similarly to the entire cohort. The LOE, classification, and citations per year were then compared to the total cohort to establish any trend that might be apparent in more recent publications.

RESULTS

The decade that accounted for the most publications was 1980 to 1989 (n=34, 68%) (*Figure 2*). Seven of the top 10 most cited articles were published during this period. The most contributory country was the United States (n=29) which comprised 57% of all publications (*Figure 3, 4*). Biomechanics was the most common article classification, being attributed to 13 of the analyzed publications (*Figure 5*). There were eight authors who contributed to two publications in the top 50 (*Table 1*). As far as contributions by institutions, The University of Florida was the most contributory, accounting for four publications (*Table 2*).

The oldest article reviewed was published in 1971 and the most recently published article was published in 2008. In this time span, the 50 publications analyzed were cited a total of 32,404 times, averaging 719.16 citations per publication. The most heavily cited article has been cited 3692 times and the least cited article was cited 473 times (*Table 3*). In terms of the Level of Evidence (LOE) analysis, Level III was the most frequent level observed (n=20, 40%), followed

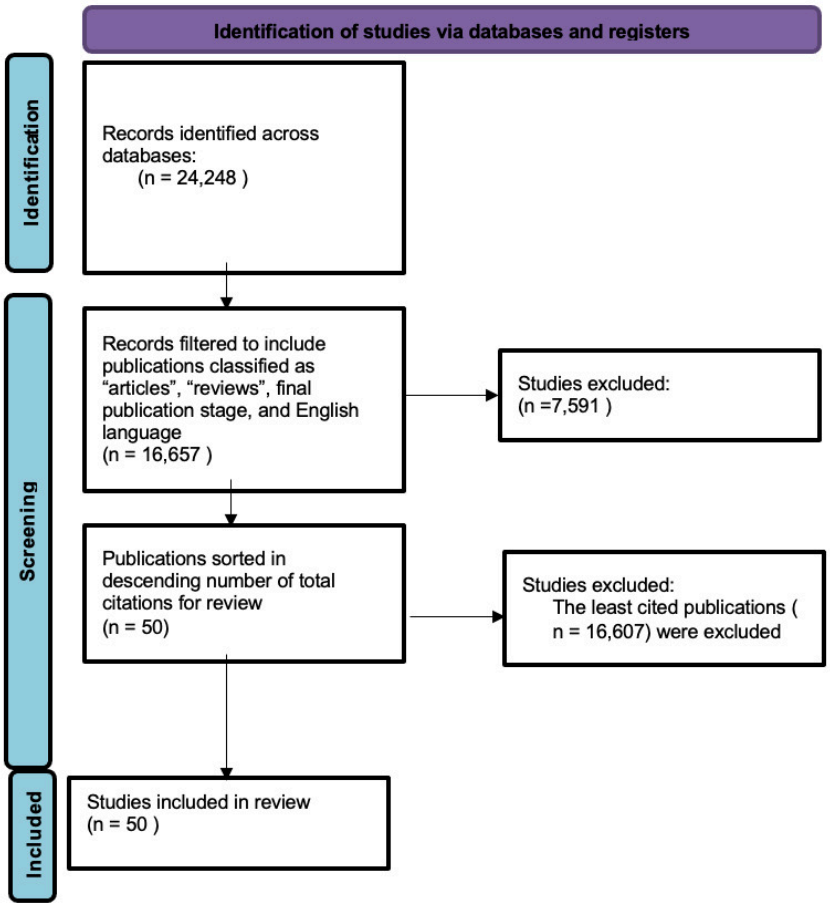

Figure 1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram.

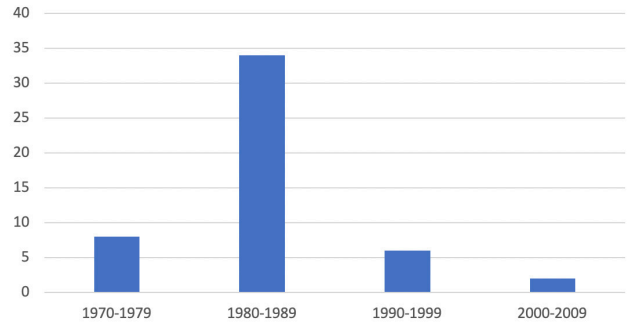

Figure 2. Number of Publications by Decade

by Level V (n=15, 30%), and Level II was the least frequent (n=3, 6%). None of the publications in our top 50 analysis were of Level I.

"A clinical method of functional assessment of the shoulder (1987)," by Constant et al., was the most cited publication (n=3692) in this study. The study describes a rating system for assessing shoulder functionality. The second most cited article (n=3129), " 'Modes of Failure' of cemented stem-type femoral components: a radiographic analysis of loosening (1979)," by Gruen et al., studied the incidence of hip prostheses loosening. Additionally, the study categorized the implant loosening to four distinct modes of failure. With 3,022 citations, "Rating systems in the evaluation of knee ligament injuries (1985)," was the third most cited article in this study. As the title of the study suggests, researchers sought to standardize a way to evaluate knee ligament injuries.

Given that most of the articles in the top 50 were published in the 1980s, there was a separate analysis conducted on the papers published from 1990 onward (*Table 4*). The top ranked publication in this category was a 2000 article by Peterson et al., in which researchers sought to identify the clinical outcomes of 101 patients who received autologous chondrocyte transplantation for full thickness chondral defects of the knee. The second publication on this analysis was Arrington et al.'s 1996 paper "Complications of iliac crest bone graft harvesting." The researchers were able to retrospectively quantify the incidence of minor and major complications of 414 consecutive cases of autologous bone grafts used for reconstructive orthopaedic surgery. The 1990 publication by Engh, et al., "Roentgenographic assessment of the biologic fixation of porous-surfaced femoral components." was the third ranked article in this table. The researchers of this study retrospectively examined 1005 cases with known clinical outcomes to establish the sensitivity and specificity of certain roentgenographic signs of femoral implants.

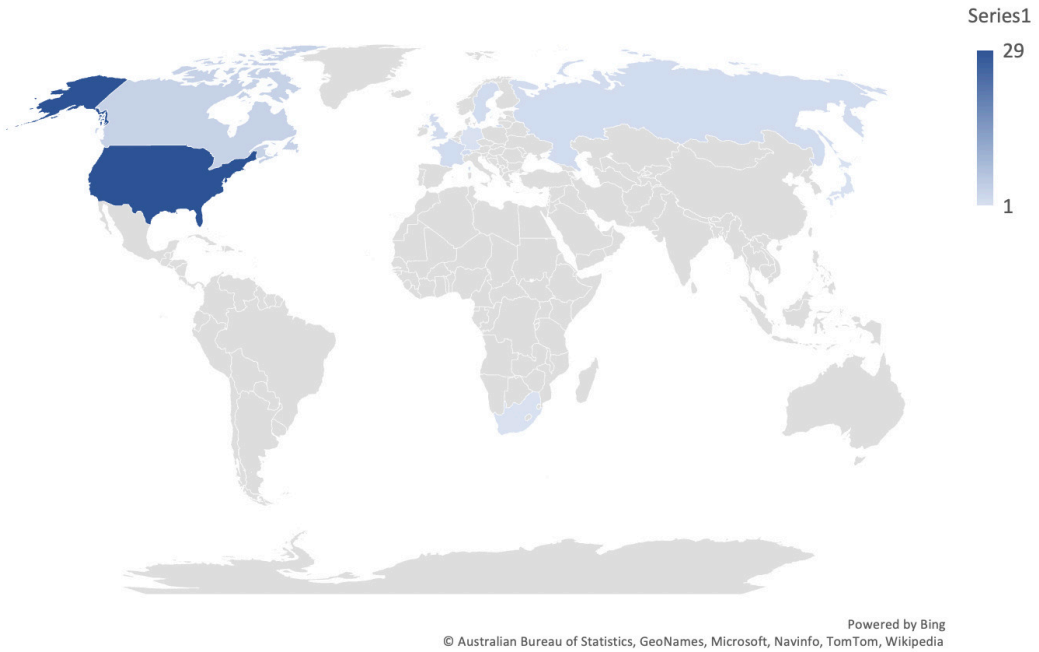

Figure 3. Number of Publications by Country of Origin

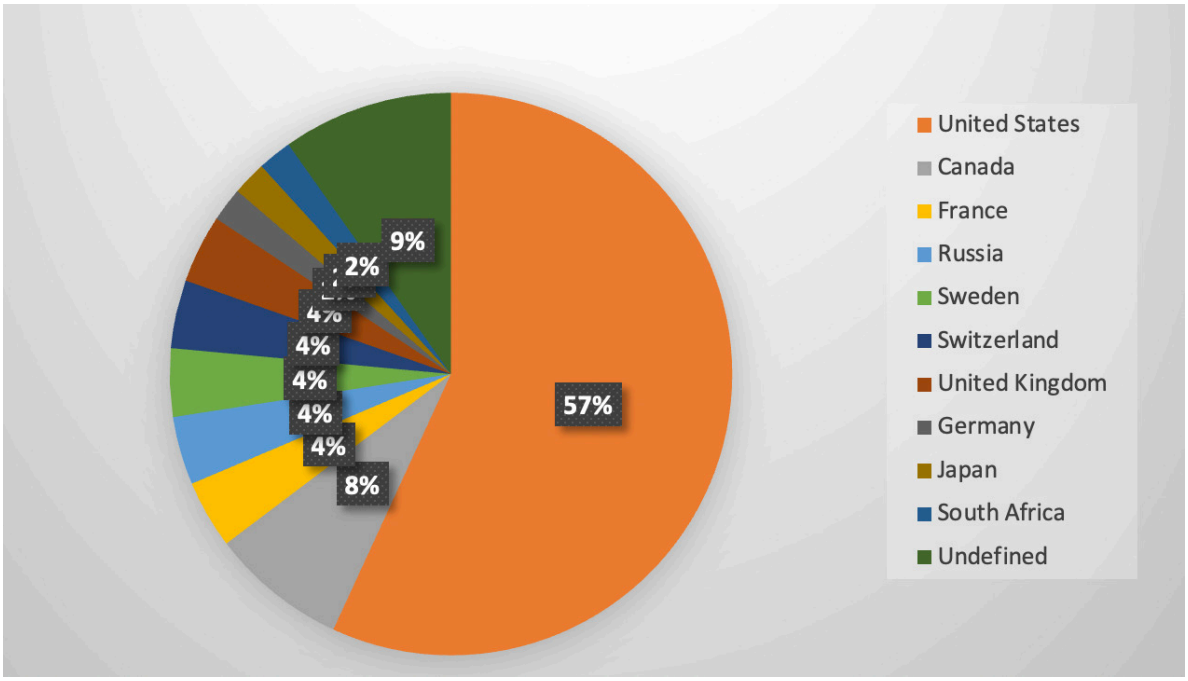

Figure 4. Publications by Country of Origin

DISCUSSION

Since its inception in 1953, Clinical Orthopaedics and Related Research, has been a highly reputable and respected journal in the field of orthopaedic research. A study was published in 2011, which ranked the top 100 most cited articles in orthopaedic surgery. The final list included 13 publications in the top 100 that were published in CORR.[5] Only *The Journal of Bone and Joint Surgery American Volume* had more publications in the top 100. This study also stratified the most cited publications by decade. Their analysis, much like ours, demonstrated that the period between 1980 to 1989 included most of the publications. This predilection to past decades, encompasses a limitation of this study but it also a testament to CORR's tenured history. For example, A 2019 bibliometric analysis on classic orthopaedic publications (defined as publications with more than 1000 total citations as of 2016) found that CORR was the journal with the second most attributable publications.[6] In addition to being one of the most prolific journals of all time, CORR

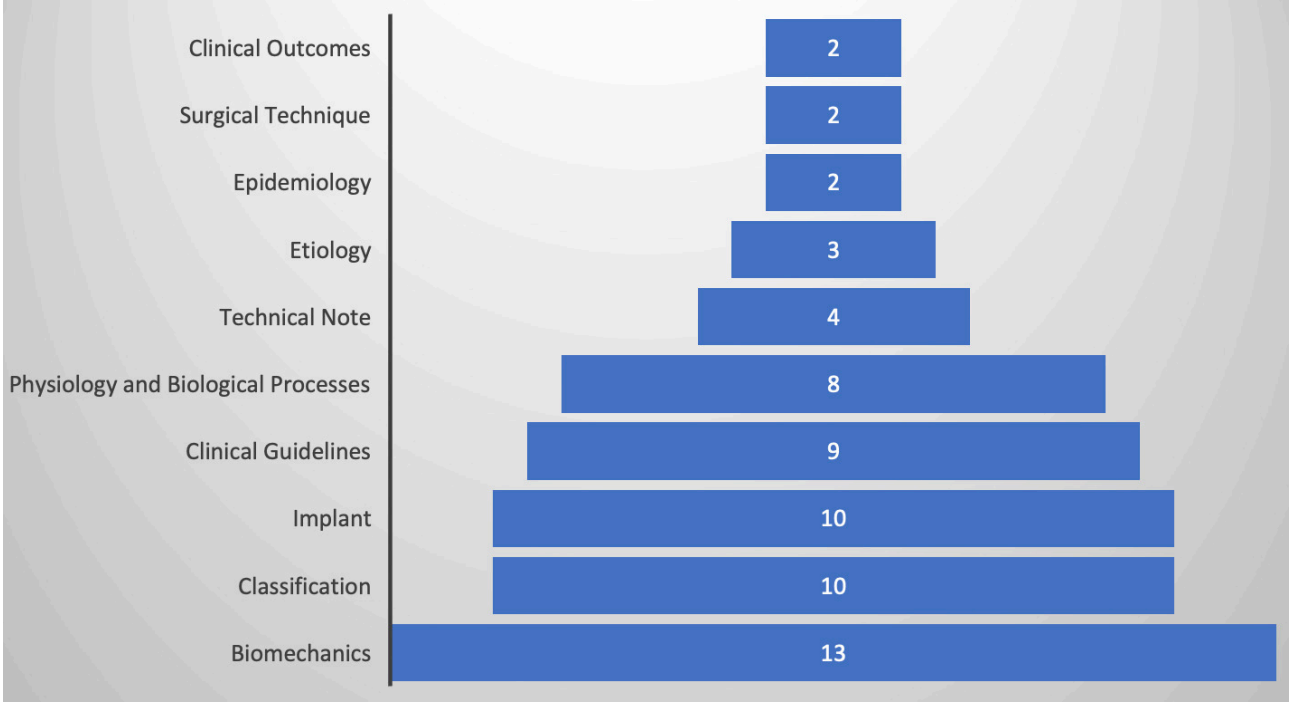

Figure 5. Article Classifications

Table 1. Author Frequency

Author	Number of Papers
Amstutz, H.C.	2
Bobyn, J.D.	2
Engh, C.A.	2
Enneking, W.F.	2
Hollinger, J.O.	2
Ilizarov, G.A.	2
Pilliar, R.M.	2
Wiltse, L.L.	2

Only authors with 2 or more contributions are included. Order of authorship is not considered.

Table 2. Contributing Institutions

Name of Institution	Location of Institution	Number of Articles
University of Florida	Gainesville, Florida, USA	4
Mayo Clinic	Rochester, Minnesota, USA	3
University of Toronto	Toronto, Ontario, Canada	3
Baylor College of Medicine	Houston, Texas, USA	2
Anderson Orthopaedic Clinic	Arlington, Virginia, USA	2
University of Bern	Bern, Switzerland	2
National Ilizarov Medical Research Center for Traumatology & Orthopedics	Kurgan Oblast, Russia	2

Multiple institutions may be attributed to a single publication. Only institutions with 2 or more contributions are included.

continues to be one of the most influential journals in modern history. From 2000 to 2009 a total of 2,460 articles were published in CORR, nearly 500 more publications than the second most prolific journal in terms of number of publications.[7]

The oldest publication in this study was the 1971 article by Meunier et al., "Osteoporosis and the replacement of cell populations of the marrow by adipose tissue. A quantitative study of 84 iliac bone biopsies." The study summarized the difference between age-related degeneration of bone marrow compared to pathologic changes seen in patients with osteoporosis. The authors concluded that while there is a natural regression of total trabecular bone in the marrow of aging patients, the rate and quantity of this decline is much faster and more extensive in individuals with osteoporosis.

The newest publication included in this bibliometric review was "Periprosthetic joint infection: The incidence, timing, and predisposing factors," a 2008 article by Pulido et al.. The authors of this article conducted a prospective review on over 9,000 patients who underwent primary hip or knee replacement to study the incidence and associated risk factors of periprosthetic knee infections. This Level II prognostic study was able to identify Staphylococcus aureus and epidermidis as the most common causative organisms. Additionally, the authors were able to identify and/

Table 3. Most Cited Articles in Top 50 Published after 1990

Rank	Publication	Total Citations	Citations per Year	Year Published
1	Peterson, L., et al. (2000). "Two- to 9-year outcome after autologous chondrocyte transplantation of the knee." Clin Orthop Relat Res(374): 212-234.	1178	56.1	2000
2	Arrington, E. D., et al. (1996). "Complications of iliac crest bone graft harvesting." Clin Orthop Relat Res(329): 300-309.	1158	46.3	1996
3	Engh, C. A., et al. (1990). "Roentgenographic assessment of the biologic fixation of porous-surfaced femoral components." Clin Orthop Relat Res(257): 107-128.	1107	35.7	1990
4	Pulido, L., et al. (2008). "Periprosthetic joint infection: the incidence, timing, and predisposing factors." Clin Orthop Relat Res 466(7): 1710-1715.	812	62.5	2008
5	Amstutz, H. C., et al. (1992). "Mechanism and clinical significance of wear debris-induced osteolysis." Clin Orthop Relat Res(276): 7-18.	639	22.0	1992
6	Morrey, B. F., et al. (1991). "Valgus stability of the elbow. A definition of primary and secondary constraints." Clin Orthop Relat Res(265): 187-195.	571	19.0	1991
7	Cummings, S. R., et al. (1990). "The future of hip fractures in the United States. Numbers, costs, and potential effects of postmenopausal estrogen." Clin Orthop Relat Res(252): 163-166.	559	18.0	1990
8	Hsu, R. W., et al. (1990). "Normal axial alignment of the lower extremity and load-bearing distribution at the knee." Clin Orthop Relat Res(255): 215-227.	556	17.9	1990

or confirm several independent predictors for the development of joint infections.

By observing the dichotomy between the oldest and newest publications analyzed in this study one can appreciate how encompassing and influential CORR has been in the field of orthopaedic surgery. Meunier et al.'s 1971 article on osteoporosis helped develop the foundation of the pathogenesis of osteoporosis, the most common bone disease in humans.[8] While Pulido et al.'s 2008 publication presents clinicians ammunition to combat one of the most dreaded complications of knee and hip replacements. This is of great importance given that the rate of total knee and hip replacements is projected to grow to nearly 2 million by 2030.[9]

By stratifying the publications by a set number of categories, we were able to establish what topics were correlated with more citation frequency. It was deduced that articles pertaining to biomechanics (n=13), classification (n=10), and implants (n=10) were the most popular topics among the Top 50 most cited articles in CORR. Perhaps indicating that a focus on either of these three topics would garner authors a better chance to be more frequently cited.

Of note, none of the publications in our analysis met the criteria for Level I study. This is comparable to a similar bibliometric review of the top 100 articles in orthopedic surgery, which only had one.[5] Level of evidence, however, is not synonymous with quality and a lack of Level I publications should not be mistaken as an indication of inadequacy.

There are many inherent limitations to bibliometric studies. When conducting a search query in order to narrow down search results, there are certain filters that are applied so that the search results match the scope of the project. In doing so, however, certain publications with tremendous influence may be omitted. For example, the CORR article titled "Rationale of the Knee Society clinical rating system", by Insall et al., was noted to be the seventh most cited article of all time in orthopedic surgery by one study.[5] Yet, for the study in this paper, it was omitted since the search criteria did not include "Conference Paper". Additionally, there is some controversy regarding the correlation between frequency of citation and genuine impact of quality of a publication.[10] Though this citation analysis used Scopus to ascertain citation count and many other metrics, different databases such as Web of Science and Google Scholar may yield slightly different results.

CONCLUSION

In conclusion, our study recognizes CORR as one of the most influential orthopaedic journals of all time with a strong predilection for older articles and a continued strength for modern publications. The United States was the most influential country in terms of country of origin, though The University of Toronto, Canadian-based institution, was one of the most prolific in terms of number of publications. Biomechanics was the most common category of article in the top 50 publications (23%), and the most common Level of Evidence was level III (40%). This analysis may serve as a guide for those looking to analyze the historical significance or the future trend of orthopaedic research.

Table 4. Top 50 publications by total number of citations

Rank	Publication	Total Citations	Citations/ Year of Publication Until 2021
1	Constant, C. R. and A. H. Murley (1987). "A clinical method of functional assessment of the shoulder." Clin Orthop Relat Res(214): 160-164.	3692	108.6
2	Gruen, T. A., et al. (1979). ""Modes of failure" of cemented stem-type femoral components: a radiographic analysis of loosening." Clin Orthop Relat Res(141): 17-27.	3129	74.5
3	Tegner, Y. and J. Lysholm (1985). "Rating systems in the evaluation of knee ligament injuries." Clin Orthop Relat Res(198): 43-49.	3022	83.9
4	DeLee, J. G. and J. Charnley (1976). "Radiological demarcation of cemented sockets in total hip replacement." Clin Orthop Relat Res(121): 20-32.	2533	56.3
5	Jarcho, M. (1981). "Calcium phosphate ceramics as hard tissue prosthetics." Clin Orthop Relat Res(157): 259-278.	1734	43.35
6	Enneking, W. F., et al. (1980). "A system for the surgical staging of musculoskeletal sarcoma." Clin Orthop Relat Res(153): 106-120.	1700	41.5
7	Ilizarov, G. A. (1989). "The tension-stress effect on the genesis and growth of tissues. Part I. The influence of stability of fixation and soft-tissue preservation." Clin Orthop Relat Res(238): 249-281.	1550	48.4
8	Neer, C. S., 2nd (1983). "Impingement lesions." Clin Orthop Relat Res(173): 70-77.	1547	40.7
9	Ilizarov, G. A. (1989). "The tension-stress effect on the genesis and growth of tissues: Part II. The influence of the rate and frequency of distraction." Clin Orthop Relat Res(239): 263-285.	1343	42.0
10	Peterson, L., et al. (2000). "Two- to 9-year outcome after autologous chondrocyte transplantation of the knee." Clin Orthop Relat Res(374): 212-234.	1178	56.1
11	Arrington, E. D., et al. (1996). "Complications of iliac crest bone graft harvesting." Clin Orthop Relat Res(329): 300-309.	1158	46.32
12	Engh, C. A., et al. (1990). "Roentgenographic assessment of the biologic fixation of porous-surfaced femoral components." Clin Orthop Relat Res(257): 107-128.	1107	35.7
13	Schmitz, J. P. and J. O. Hollinger (1986). "The critical size defect as an experimental model for craniomandibulofacial nonunions." Clin Orthop Relat Res(205): 299-308.	988	28.2
14	Pilliar, R. M., et al. (1986). "Observations on the effect of movement on bone ingrowth into porous-surfaced implants." Clin Orthop Relat Res(208): 108-113.	891	25.5
15	Radin, E. L. and R. M. Rose (1986). "Role of subchondral bone in the initiation and progression of cartilage damage." Clin Orthop Relat Res(213): 34-40.	863	24.7
16	Pulido, L., et al. (2008). "Periprosthetic joint infection: the incidence, timing, and predisposing factors." Clin Orthop Relat Res 466(7): 1710-1715.	812	62.5
17	Ganz, R., et al. (1988). "A new periacetabular osteotomy for the treatment of hip dysplasias. Technique and preliminary results." Clin Orthop Relat Res(232): 26-36.	803	24.3
18	Burchardt, H. (1983). "The biology of bone graft repair." Clin Orthop Relat Res(174): 28-42.	787	20.7
19	Enneking, W. F. (1986). "A system of staging musculoskeletal neoplasms." Clin Orthop Relat Res(204): 9-24.	765	21.9
20	Wickiewicz, T. L., et al. (1983). "Muscle architecture of the human lower limb." Clin Orthop Relat Res(179): 275-283.	693	18.2
21	Schatzker, J., et al. (1979). "The tibial plateau fracture. The Toronto experience 1968--1975." Clin Orthop Relat Res(138): 94-104.	688	16.4
22	Bobyn, J. D., et al. (1980). "The optimum pore size for the fixation of porous-surfaced metal implants by the ingrowth of bone." Clin Orthop Relat Res(150): 263-270.	673	16.4
23	Roy-Camille, R., et al. (1986). "Internal fixation of the lumbar spine with pedicle screw plating." Clin Orthop Relat Res(203): 7-17.	670	19.1
24	Mirels, H. (1989). "Metastatic disease in long bones. A proposed scoring system for diagnosing impending pathologic fractures." Clin Orthop Relat Res(249): 256-264.	659	20.6
25	Amstutz, H. C., et al. (1992). "Mechanism and clinical significance of wear debris-induced osteolysis." Clin Orthop Relat Res(276): 7-18.	639	22.0

Rank	Publication	Total Citations	Citations/ Year of Publication Until 2021
26	Harris, W. H. (1986). "Etiology of osteoarthritis of the hip." Clin Orthop Relat Res(213): 20-33.	619	17.7
27	Johnson, K. A. and D. E. Strom (1989). "Tibialis posterior tendon dysfunction." Clin Orthop Relat Res(239): 196-206.	599	18.7
28	Meunier, P., et al. (1971). "Osteoporosis and the replacement of cell populations of the marrow by adipose tissue. A quantitative study of 84 iliac bone biopsies." Clin Orthop Relat Res 80: 147-154.	585	11.7
29	Zindrick, M. R., et al. (1986). "A biomechanical study of intrapeduncular screw fixation in the lumbosacral spine." Clin Orthop Relat Res(203): 99-112.	577	16.5
30	Morrey, B. F., et al. (1991). "Valgus stability of the elbow. A definition of primary and secondary constraints." Clin Orthop Relat Res(265): 187-195.	571	19.0
31	Whitesides, T. E., et al. (1975). "Tissue pressure measurements as a determinant for the need of fasciotomy." Clin Orthop Relat Res(113): 43-51.	570	12.4
32	Noble, P. C., et al. (1988). "The anatomic basis of femoral component design." Clin Orthop Relat Res(235): 148-165.	561	17.0
33	Cummings, S. R., et al. (1990). "The future of hip fractures in the United States. Numbers, costs, and potential effects of postmenopausal estrogen." Clin Orthop Relat Res(252): 163-166.	559	18.0
34	Hsu, R. W., et al. (1990). "Normal axial alignment of the lower extremity and load-bearing distribution at the knee." Clin Orthop Relat Res(255): 215-227.	556	17.9
35	Tonnis, D. (1976). "Normal values of the hip joint for the evaluation of X-rays in children and adults." Clin Orthop Relat Res(119): 39-47.	555	12.3
36	Mooney, V. and J. Robertson (1976). "The facet syndrome." Clin Orthop Relat Res(115): 149-156.	554	12.3
37	Kirkaldy-Willis, W. H. and H. F. Farfan (1982). "Instability of the lumbar spine." Clin Orthop Relat Res(165): 110-123.	550	14.1
38	D'Antonio, J. A., et al. (1989). "Classification and management of acetabular abnormalities in total hip arthroplasty." Clin Orthop Relat Res(243): 126-137.	543	17.0
39	Denis, F., et al. (1988). "Sacral fractures: an important problem. Retrospective analysis of 236 cases." Clin Orthop Relat Res 227: 67-81.	543	16.5
40	Palmer, A. K. and F. W. Werner (1984). "Biomechanics of the distal radioulnar joint." Clin Orthop Relat Res(187): 26-35.	539	14.6
41	Cooney, W. P., et al. (1987). "Difficult wrist fractures. Perilunate fracture-dislocations of the wrist." Clin Orthop Relat Res(214): 136-147.	539	14.6
42	Cotrel, Y., et al. (1988). "New universal instrumentation in spinal surgery." Clin Orthop Relat Res 227: 10-23.	523	15.8
43	Buck, B. E., et al. (1989). "Bone transplantation and human immunodeficiency virus. An estimate of risk of acquired immunodeficiency syndrome (AIDS)." Clin Orthop Relat Res(240): 129-136.	511	16.0
44	Letournel, E. (1980). "Acetabulum fractures: classification and management." Clin Orthop Relat Res(151): 81-106.	504	12.3
45	Kurosawa, H., et al. (1980). "Load-bearing mode of the knee joint: physical behavior of the knee joint with or without menisci." Clin Orthop Relat Res(149): 283-290.	504	12.3
46	Ashton, B. A., et al. (1980). "Formation of bone and cartilage by marrow stromal cells in diffusion chambers in vivo." Clin Orthop Relat Res(151): 294-307.	496	12.1
47	Engh, C. A. and J. D. Bobyn (1988). "The influence of stem size and extent of porous coating on femoral bone resorption after primary cementless hip arthroplasty." Clin Orthop Relat Res(231): 7-28.	482	14.6
48	Eggli, P. S., et al. (1988). "Porous hydroxyapatite and tricalcium phosphate cylinders with two different pore size ranges implanted in the cancellous bone of rabbits. A comparative histomorphometric and histologic study of bony ingrowth and implant substitution." Clin Orthop Relat Res(232): 127-138.	480	14.5
49	Hollinger, J. O. and G. C. Battistone (1986). "Biodegradable bone repair materials. Synthetic polymers and ceramics." Clin Orthop Relat Res(207): 290-305.	476	13.6

Rank	Publication	Total Citations	Citations/ Year of Publication Until 2021
50	Wiltse, L. L., et al. (1976). "Classification of spondylolisis and spondylolisthesis." Clin Orthop Relat Res(117): 23-29.	473	10.5

CONFLICTS OF INTEREST AND SOURCE OF FUNDING

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REFERENCES

1. Angell M, Kassirer JP. The Ingelfinger Rule revisited. *N Engl J Med*. 1991;325(19):1371-1373. doi:10.1056/nejm199111073251910

2. Leopold SS, Haddad FS, Sandell LJ, Swiontkowski M. Clinical Orthopaedics and Related Research, The Bone & Joint Journal, the Journal of Orthopaedic Research, and The Journal of Bone and Joint Surgery will not accept clinical research manuscripts previously posted to preprint servers. *Bone Joint J*. 2019;101-B(1):1-3. doi:10.1302/0301-620x.101b1.bjj-2018-1289

3. Mohamed NS, Gwam CU, Etcheson JI, et al. Impact factors of orthopaedic journals between 2010 and 2016: trends and comparisons with other surgical specialties. *Ann Transl Med*. 2018;6(7):114-114. doi:10.21037/atm.2018.03.02

4. Donnally CJ 3rd, Lugo-Pico JG, Bondar KJ, Chen CJ, McCormick JR, Errico TJ. Characteristics and Trends of the Most Cited Spine Publications. *Spine*. 2021;46(11):765-771. doi:10.1097/brs.0000000000003890

5. Lefaivre KA, Shadgan B, O'Brien PJ. 100 most cited articles in orthopaedic surgery. *Clin Orthop Relat Res*. 2011;469(5):1487-1497. doi:10.1007/s11999-010-1604-1

6. Li Y, Xu G, Long X, Ho YS. A bibliometric analysis of classic publications in web of science category of orthopedics. *J Orthop Surg Res*. 2019;14(1):227. doi:10.1186/s13018-019-1247-1

7. Lee KM, Ryu MS, Chung CY, et al. Characteristics and trends of orthopedic publications between 2000 and 2009. *Clin Orthop Surg*. 2011;3(3):225. doi:10.4055/cios.2011.3.3.225

8. Sozen T, Ozisik L, Basaran NC. An overview and management of osteoporosis. *Eur J Rheumatol*. 2017;4(1):46-56. doi:10.5152/eurjrheum.2016.048

9. Sloan M, Premkumar A, Sheth NP. Projected Volume of Primary Total Joint Arthroplasty in the U.S., 2014 to 2030. *J Bone Joint Surg Am*. 2018;100(17):1455-1460. doi:10.2106/jbjs.17.01617

10. Mavrogenis AF, Pećina M, Chen W, Scarlat MM. Useful and useless publications measured by bibliometrics and scientometrics in orthopaedic surgery. Are the relevance of a journal and publication metrics useful enough for the scientific promotion of surgeons? *Int Orthop*. 2020;44(10):1875-1879. doi:10.1007/s00264-020-04803-7