The 50 Most Cited Articles in Meniscal Injury Research

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Background: Meniscal injuries are among the most common orthopaedic injuries, with a significant volume of published literature.

Purpose: To perform a comprehensive bibliometric analysis that appropriately evaluates the 50 most cited articles in meniscal research.

Study Design: Cross-sectional study.

Methods: We performed a keyword search of the ISI Web of Knowledge database and then pared the results down to the 50 most cited articles using specific inclusion and exclusion criteria. Data extracted included title, first author, citation count, year of publication, topic, journal, article type, country of origin, and level of evidence. Correlation coefficients were calculated between publication date and citation density and between publication date and raw citation count.

Results: The 50 most cited articles were published from 1975 to 2013. The mean number of citations was 258.24 (range, 163-926; median, 225). The majority of articles were published in *The American Journal of Sports Medicine* (19%), the *Journal of Bone and Joint Surgery* (12%), and *Arthritis & Rheumatology* (14%). Most articles focused on either the anatomy and biomechanics of meniscal injury or on prevention and physical rehabilitation (12 papers each).

Conclusion: The most popular fields of meniscal research involved anatomy/biomechanics and prevention/rehabilitation, and both are areas that will likely increase the probability of an article's being highly cited in the future. This study provided a quality selection of the most cited articles on meniscal injury and may provide a foundation for both beginner and senior clinician readers for further discussion and research.

Keywords: bibliometric; meniscus; meniscal tear; citation

Surgical management of meniscal injuries remains among the most commonly performed orthopaedic procedures in the United States, with more than half of the 900,000 knee arthroscopies performed annually involving treatment for meniscal pathology.[21] The need to properly manage meniscal injury relates to its important biomechanical role as a shock absorber for tibiofemoral contact as well as the association between meniscal injury with pain, impaired function, and progression of osteoarthritis within the knee.[4,5]

Bibliometric analysis is a common study tool used by the medical community to not only quantifiably rank the top scientific articles in a particular field but to also provide efficient access to the most influential articles in that field in order to track trends. In addition, one could also assess the quality of available literature and identify any deficiencies in knowledge that warrant further study.[31] Although the scientific impact and ultimate influence on clinical practice can be difficult to quantify, citation by other papers can be used as a proxy for a paper's importance in the scientific community. Analysis of the most cited papers has already been performed within orthopaedics in order to address anterior cruciate ligament (ACL), hand, and shoulder injuries as well as trends within total knee arthroplasty

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and pediatric surgery.[8,16,25,30,33,40] However, no such study has been performed with a focus on meniscal injury and management. We sought to perform a comprehensive bibliometric analysis that appropriately evaluates the 50 most cited articles in meniscal research to provide surgeons, clinicians, students, and researchers the most classic or influential papers regarding meniscal pathology and management. We hypothesized that the most influential articles in meniscal injuries would be from predominantly biomechanical and surgical technique studies. Exploring the characteristics of each paper will allow the authors to provide a breakdown as to what has been the major focus surrounding the topic of meniscal injury and management.

METHODS

Search Strategy

In December 2019, The ISI Web of Knowledge database (also known as the Web of Science Core Collection, MEDLINE, BIOSIS Citation Index, SciElo Citation Index, KCI-Korean Journal Database, and Russian Science Citation Index) was utilized to conduct a search for articles pertaining to meniscal injury and management. The following keywords were used: *meniscus*, *lateral meniscus*, *medial meniscus*, *bucket handle meniscus tear*, *radial meniscus tear*, *meniscectomy*, *arthroscopic partial meniscectomy*, *meniscus repair*, *all inside meniscus repair*, *degenerative meniscus tear*, *McMurray*, *meniscus tear*, *discoid meniscus*, *meniscal root tear*, *vertical meniscus tear*, *horizontal meniscus tear*, *traumatic meniscus tear*, *arthroscopic meniscal repair*, *open meniscal repair*, and *open meniscectomy*.

The search output was conducted by a trained research assistant (E.P.) who recorded and sorted by citation count, regardless of data range, journal, or article type, to expedite our analysis. Articles were then screened by title and abstract, and those not related to meniscal injuries, meniscectomy and debridement, or meniscal repair were excluded. Those that were determined to be duplicates or editorials were similarly excluded. Neither countries of publication nor languages served as exclusion critera. Search results were then refined to include only peer-reviewed original articles, review papers, or editorials, which were subsequently sorted by descending number of total citations. In instances in which the number of citations was equivalent for 2 papers, we assigned the higher ranking to the paper with the highest calculated citation density (calculated as the number of citations per year since publication). An orthopaedic surgery resident (D.D.) and then the senior author (L.D.K.) reviewed each of the papers to finalize the top 50 articles cited in our study.

Data Analysis

Based on the above criteria, a final list was generated. Data extracted from these articles were as follows: manuscript title; first author; total citation count; year of publication; topic; journal title; article type; country of origin, as defined by the institution of the first author; level of evidence, defined based on guidelines of the *Journal of Bone and Joint Surgery*[44]; category; and the Coleman Methodology Score.

After individual review of each article, articles were then organized into categories based on article type: basic science, review and meta-analysis, clinical science and outcomes, and classification and scoring. Articles were then assigned into topics based on the respective research question that the authors attempted to address, including anatomy and biomechanics, classification and scoring, imaging, injury mechanism, prevention and rehabilitation, surgical technique and outcome, or tissue engineering.

All statistical analysis was calculated in Microsoft Excel (XLW) Version 16.33 (Microsoft), with a significance set at $P < .05$. All P values were 2-tailed. Most of the analyses involved quantifying and comparing the topics, journals, country of origin, and other listed variables. Correlation coefficients were calculated between publication date to citation density and publication date to raw citation count. These r values were calculated using the correlation function in XLW.

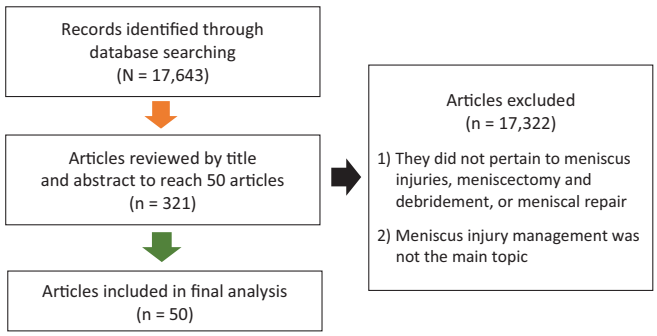

Figure 1. Modified PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) diagram detailing the collection of the top 50 most cited articles pertaining to meniscus injury.

RESULTS

The initial search yielded 17,643 publications. We reviewed the first 321 results of the sorted list to eventually identify the 50 articles that pertained to the meniscal criteria (Figure 1). The 50 most cited articles are listed in Appendix Table A1. The mean number of citations was 258.2 ± 130.2 (range, 163-926; median, 225). The mean citation density was 17.9 ± 14.8 (range, 3.8-84.2; median, 12.1). There was a moderate and statistically significant positive correlation between year of publication and citation density ($r = 0.625$; $P < .001$), and little correlation with no statistical significance was found between year of publication and raw citation count ($r = 0.241$; $P = .10$) (Figure 2). All articles were published between 1975 and 2013 (Figure 3), with most of the articles being published between 2000 to 2010 (n = 25 articles) and 1990 to 1999 (15 articles).

A total of 11 countries contributed to this top 50 list, with the United States having by far the largest contribution (n = 28; 56%), followed by Sweden (n = 9; 18%). The other

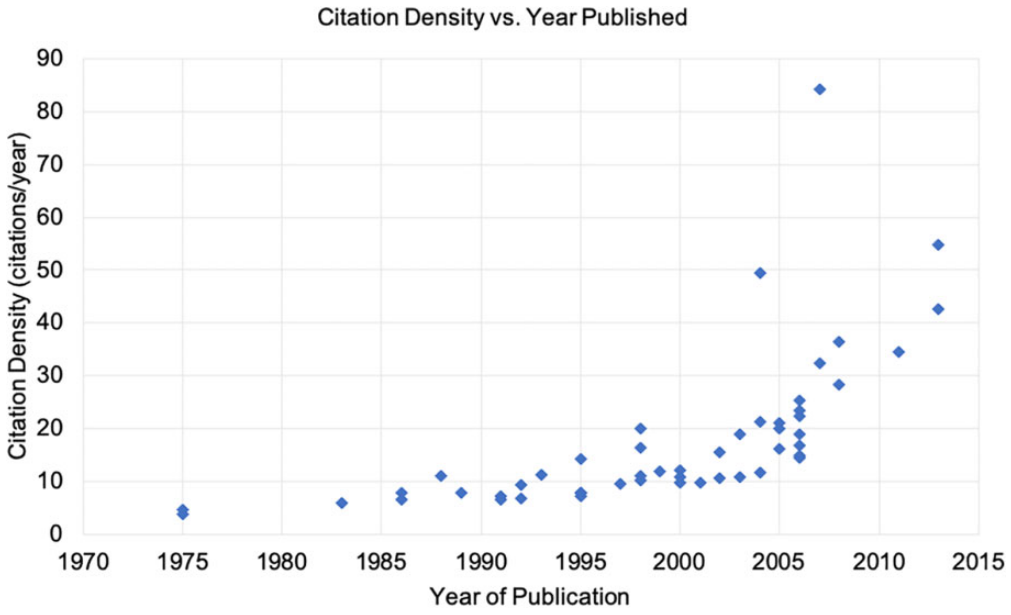

Figure 2. Correlation of the year of publication and citation density ($r = 0.625$; $P < .001$).

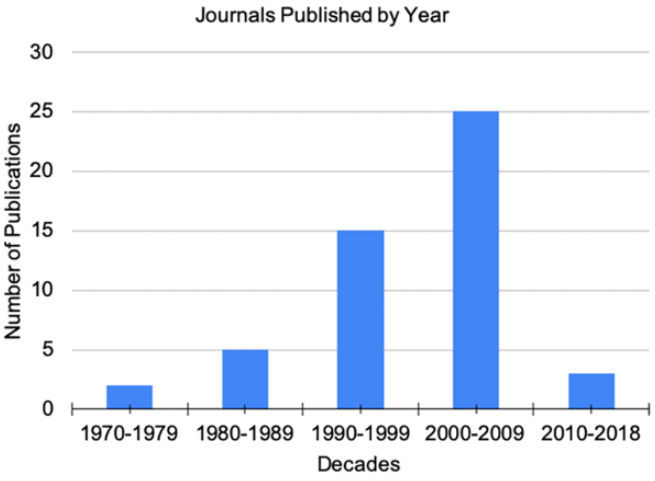

Figure 3. Frequency of articles published per decade.

contributing countries published, at most, 2 articles each. Articles that were among the 50 most cited were published in 19 journals. The majority of articles were published in *The American Journal of Sports Medicine* (*AJSM*), with 9 papers (18%), followed by *Arthritis & Rheumatology* and the *Journal of Bone and Joint Surgery* (*JBJS*; also known as the *Journal of Bone and Joint Surgery–American Volume*), with 7 (14%) and 6 (12%) articles, respectively (Figure 4). Other journals containing 2 or more publications within the list included the *Journal of Orthopaedic Research*, *The New England Journal of Medicine*, *Radiology*, *Arthroscopy*, *Biomaterials*, the *Bone and Joint Journal* (known until 2013 as the *Journal of Bone and Joint Surgery–British Volume*), and *Osteoarthritis and Cartilage*.

Most articles had a clinical science and outcome focus (n = 26; 52%), followed by basic science (n = 16; 32%), with only 6 (12%) reviews or meta-analyses (Figure 5). Within clinical science and outcome papers, most papers were level 2 evidence (n = 8; 30.7%), followed by levels 3 and 5 (n = 7; 26.9%), then level 1 (n = 6; 23.7%). The 2 oldest articles, both published in 1975, focused on the pathology and degenerative effects of meniscal injury and have been cited at least 3 times per year.[9,34] Finally, the majority of articles were published between 2000 and 2009, with only 3 papers[19,29,39] reaching a comparably high number of citations from 2010 to 2018. The citation density demonstrates a similar trend, with the most influential articles regarding meniscal injury being published relatively recently.

The majority of articles focused either on anatomy and biomechanics of meniscal injury or prevention and physical rehabilitation (Figure 6), with both groups contributing 12 papers each. In terms of the anatomy and biomechanical focus, as expected, most studies (n = 9) evaluated these topics using cadaveric and animal models, while the remaining 3 were level 1 or 2 studies with patient cohorts. In the prevention and physical rehabilitation category, the level of evidence was somewhat weaker and more diversified, with only 1 level 1 and 4 level 5 studies. However, the most cited meniscal injury paper in the literature was written by Lohmander et al,[27] despite being published in 2007 and being rated a level 5 study. The remaining categories were not as heavily represented and included the evaluation of injury mechanism (n = 9), surgical techniques and outcome (n = 7), imaging (n = 5), tissue engineering (n = 3), and classification and scoring systems (n = 2).

DISCUSSION

In the current study, we identified the 50 most cited articles relating to meniscal injury across the categories of anatomy and biomechanics, prevention and rehabilitation, injury

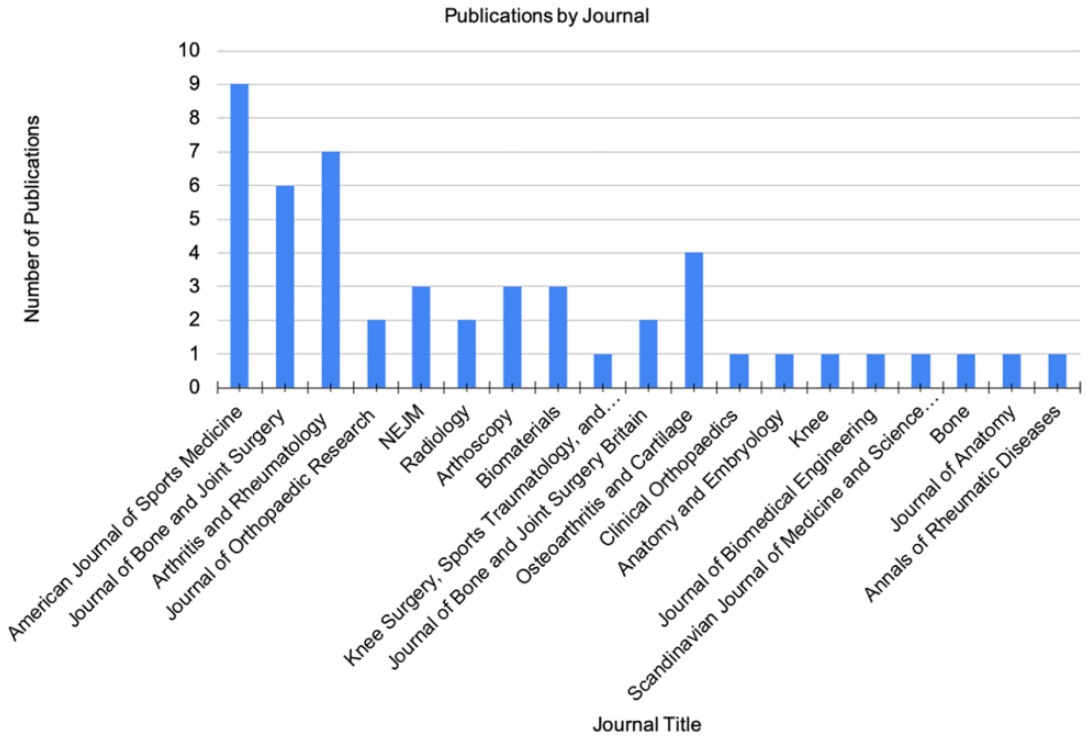

Figure 4. Number of publications per journal.

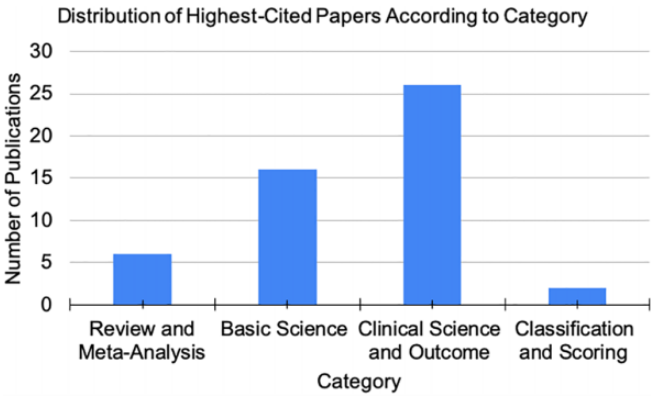

Figure 5. Type of study, with the majority being related to clinical science and outcomes.

mechanism, surgical technique and outcome, imaging, tissue engineering, and classification and scoring systems. The majority of articles were categorized as either anatomy and biomechanics of meniscal injury or prevention and physical rehabilitation.

Most articles with an anatomic and biomechanical focus evaluated these topics using cadaveric and animal models, with the most influential being analysis of the biomechanical consequences of posterior root tears of the medial meniscus by Allaire et al[2] in the *Journal of Bone and Joint Surgery*. Despite its being one of the most recent papers published in our analysis, the surge in this article's citation may reflect the recent interest in posterior root tears. In particular, their biomechanical findings presented evidence that posterior root tears may warrant surgical repair in a time when posterior root tears began to gain popularity in the literature. This highlights one of the faults of this type of bibliometric analysis in that such searches are unable to differentiate the scientific importance and impact of a study on the field. For example, although initial studies about the importance of menisci for pressure distribution within the knee highlighted the importance of meniscal repair and had a major impact on the field, they do appear in our list. Only 2 papers[10,17] in this category were level 1 or level 2 studies, with the most cited being the report of incidental meniscal magnetic resonance imaging findings in middle-aged and elderly populations by Englund et al.[10] In their paper, they concluded that incidental findings without any clinical correlation do not warrant surgical management, which altered practice during their time.

Within the prevention and physical rehabilitation category, the level of evidence was weaker and more varied, with only 1 level 1 study. Despite being a level 5 study, the meniscal injury paper by Lohmander et al[27] (published in 2007) was the most cited paper in the literature, which may be related to the study's conclusion that injury to the ACL and meniscus led to a 50% chance of having osteoarthritis of the knee within 10 to 20 years of injury. The next 2 most frequently cited papers in this category were also level 5 studies that sought to explore risk factors and meniscal injury patterns that also predicted onset of osteoarthritis.[11,12] Despite their level of evidence, these papers were among the 10 most cited, suggesting that superior levels of

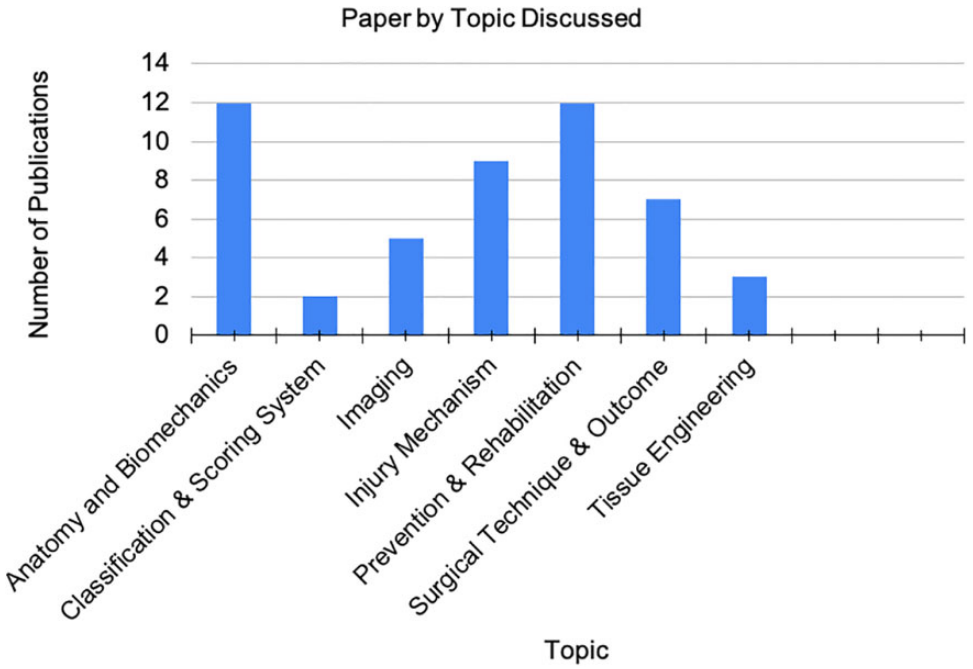

Figure 6. Papers according by topic discussed.

evidence may not necessarily correlate with impact. Nonetheless, the prevention and physical rehabilitation category produced 8 studies[7,14,28,32,35,38,41,43] with levels of evidence of 1 to 3, suggesting that this category is overall not lacking with production of higher level of evidence publications, especially when compared with other fields such as shoulder or fracture surgery.[3,33]

The next most common article category involved the evaluation of the mechanism of injury, with a large focus on anatomic and biomechanical cadaveric or animal model studies. The most cited article in this category established a gold standard meniscal disease modification model to challenge mice with gene deletions and then explore potential future human therapy targets in osteoarthritis.[13] The next 2 articles[15,36] in this category also sought to explore risk factors for osteoarthritis after meniscal injury as well as characterization of articular cartilage defects and subchondral bone changes. This trend further suggests that the current literature is now more focused on the long-term effects of meniscal injuries, such as osteoarthritis, as well as what strategies may mitigate the consequences of these injuries. Focusing on knee-joint preservation may be a future trend, resulting in more heavily cited papers that could alter clinical practice.

There was a lack of representation regarding papers addressing surgical techniques (n = 7). The orthopaedic community has long maintained that repair or meniscectomy are appropriate management strategies for meniscal injury in most populations, with the evolution of surgical approach and technique not varying wildly over the past decades because of the relative ease of surgical management compared with other arthroscopic procedures such as ACL surgery. Thus while this dearth may initially be suprising, it may not be completely unexpected.[22] This may also be explained by the fact that a sizable amount of technique papers entering the literature have focused on posterior root repair, which in only the past decade has gained considerable attention in the literature and is therefore not yet heavily cited.[23]

The most heavily cited paper in this category represents a recent trend questioning the need to perform meniscectomies over repairs or even operate on meniscal injuries at all. Sihvonen et al[39] demonstrated that arthroscopic partial meniscectomy led to no improvement over patients who underwent a sham surgical procedure in patients with symptomatic degenerative medial meniscal tears. The most heavily cited papers in this category focus more on the indications for meniscectomy versus meniscal repair rather than surgical techniques.

In terms of country of publication, the United States provided the largest contribution to this top 50 list, with Sweden a distant second. This reflects the fact that a significant amount of orthopaedic meniscal research is conducted in the United States, which is further confirmed by the publishing journals, almost all of which are either based in the United States or published in English. The proportion of articles heavily favors *The American Journal of Sports Medicine*, *Arthritis & Rheumatology*, and the *Journal of Bone and Joint Surgery*, which reflects distributions similar to other orthopaedic bibliometric analyses.[8,20,26,33]

The biggest limitation of a bibliometric search is that it provides only a snapshot of the most frequently cited papers in specific fields or disciplines, with number of absolute citations being the most common method of organization. This method of selection may result in the exclusion of important and influential articles on meniscal injury,

especially articles that have been published within the past decade or are not published in English. Furthermore, because our search was conducted in the Thomson ISI Web of Science database, citation numbers may be artificially inflated by self-citations and subpublications and may not include articles recently published, articles in nonindexed journals or textbooks, or citations from lectures or digital media not found in the public domain.[18,37] As described previously, more objective metrics such as the SCImago Journal Rank, which evaluates the importance of citations from various sources while eliminating self-citations, exist but are not feasible with our search methodology. This is because such metrics evaluate journal importance and do not evaluate single articles.[37] Vielgut et al[42] described the development of the Web and social media platforms as alternative metric scores for articles as well, and this may be important to take into consideration in future analyses.

We also concede that organizing manuscripts by total number of citations may not be the only parameter to determine the clinical relevance of an article.[6] Citation analysis via this method will also not account for self-citations, citations within textbooks, or citations within lectures in public record.[20] However, total number of citations is considered a parameter that may determine scientific relevance on specialized topics of choice and thus should be included as a parameter in these bibliometric analyses.[24] Furthermore, this type of analysis allows the authors to pool different types of research activity in various disciplines regarding a single topic.

Despite the above limitations, this type of bibliometric citation analysis remains the gold standard for assessing the individual impact of scientific articles in their respective fields.[1] Our study represents a valuable and comprehensive summary of meniscal injury in all facets, and the diversity of our articles, from discipline type to study design, represents the diversity of the content looking to address this specific pathology. The quality of prior scientific discoveries as well as future focus is also well-reflected in this analysis.

CONCLUSION

To summarize, the top 50 cited meniscus papers were most frequently published in the 2000s, published in *The American Journal of Sports Medicine*, *Arthritis & Rheumatology*, or the *Journal of Bone and Joint Surgery* and dealt with anatomy and biomechanics or prevention and rehabilitation. When compared with other joints such as the shoulder, the meniscus garnered less attention in terms of citation counts; however, when compared with other related orthopaedic sports-related procedures such as hand surgery, meniscal injury papers garnered more citations. Our search demonstrated that the most popular fields of meniscal injury research involved anatomy and biomechanics and prevention and physical rehabilitation and are therefore the fields that will likely increase the probability of an article's being highly cited in the future. Our study provides a quality selection of the most cited articles on the topic of meniscal injury, which may provide a secure foundation for both beginner and senior clinician readers for further discussion and research in this field.

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APPENDIX

TABLE A1
The 50 Most Cited Meniscal Injury Publications, 1975-2013

Rank	Publication	Total Citations	Citation Density
1	Lohmander LS, Englund PM, Dahl LL, Roos EM. The long-term consequence of anterior cruciate ligament and meniscus injuries: osteoarthritis. *Am J Sports Med*. 2007;35(10):1756-1769.	926	84.18
2	Peterfy CG, Guermazi A, Zaim S, et al. Whole-organ magnetic resonance imaging score (WORMS) of the knee in osteoarthritis. *Osteoarthritis Cartilage*. 2004;12(3):177-190.	692	49.43
3	Roos H, Lauren M, Adalberth T, Roos EM, Jonsson K, Lohmander LS. Knee osteoarthritis after meniscectomy: prevalence of radiographic changes after 21 years compared with matched controls. *Arthritis Rheum*. 1998;41(4):687-693.	401	20.05
4	Englund M, Guermazi A, Gale D, et al. Incidental meniscal findings on knee magnetic resonance imaging (MRI) in middle-aged and elderly persons. *N Engl J* Med. 2008;359(11):1108-1115.	365	36.50
5	Glasson SS, Blanchet TJ, Morris EA. The surgical destabilization of the medial meniscus (DMM) model of osteoarthritis in the 129/SvEv mouse. *Osteoarthritis Cartilage*. 2007;15(9):1061-1069.	356	32.36
6	Mink JH, Levy T, Crues JV III. Tears of the anterior cruciate ligament and menisci of the knee: magnetic resonance imaging (MRI) evaluation. *Radiology*. 1988;167(3):769-774.	332	11.07
7	Roos H, Adalberth T, Dahlberg L, Lohmander LS. Osteoarthritis of the knee after injury to the anterior cruciate ligament or meniscus: the influence of time and age. *Osteoarthritis Cartilage*. 1995;3(4):261-267.	326	14.17
8	Roos EM, Roos HP, Ekdahl C, Lohmander LS. Knee injury and Osteoarthritis Outcome Score (KOOS) — validation of a Swedish version. *Scand J Med Sci Sports*. 1998;8(6):439-448.	326	16.30

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Table A1 (continued)

Rank	Publication	Total Citations	Citation Density
9	Hayami T, Pickarski M, Zhuo Y, Wesolowski GA, Rodan GA, Duong LT. Characterization of articular cartilage and subchondral bone changes in the rat anterior cruciate ligament transection and meniscectomized models of osteoarthritis. *Bone*. 2006;38(2):234-243.	303	25.25
10	Englund M, Lohmander LS. Risk factors for symptomatic knee osteoarthritis 15 to 22 years after meniscectomy. *Arthritis Rheum*. 2004;50(9):2811-2819.	297	21.21
11	Englund M, Roos EM, Lohmander LS. Impact of type of meniscal tear on radiographic and symptomatic knee osteoarthritis: a 16-year follow-up of meniscectomy with matched controls. *Arthritis Rheum*. 2003;48(8):2178-2187.	285	19.00
12	Allaire R, Muriuki M, Gilbertson L, Harner CD. Biomechanical consequences of a tear of the posterior root of the medial meniscus. Similar to total meniscectomy. *J Bone Joint Surg Am*. 2008;90(9):1922-1931.	284	28.40
13	Lohmander LS, Hoerrner LA, Lark MW. Metalloproteinases, tissue inhibitor, and proteoglycan fragments in knee synovial fluid in human osteoarthritis. *Arthritis Rheum*. 1993;36(2):181-189.	282	11.28
14	Hunter DJ, Zhang YQ, Niu JB, et al. The association of meniscal pathologic changes with cartilage loss in symptomatic knee osteoarthritis. *Arthritis Rheum*. 2006;54(3):795-801.	280	23.33
15	Sihvonen R, Paavola M, Malmivaara A, et al. Arthroscopic partial meniscectomy versus sham surgery for a degenerative meniscal tear. *N Engl J Med*. 2013;369(26):2515-2524.	274	54.80
16	Berthiaume MJ, Raynauld JP, Martel-Pelletier J, et al. Meniscal tear and extrusion are strongly associated with progression of symptomatic knee osteoarthritis as assessed by quantitative magnetic resonance imaging. *Ann Rheum Dis*. 2005;64(4):556-563.	273	21.00
17	Majewski M, Susanne H, Klaus S. Epidemiology of athletic knee injuries: A 10-year study. *Knee*. 2006;13(3):184-188.	269	22.42
18	Roos EM, Dahlberg L. Positive effects of moderate exercise on glycosaminoglycan content in knee cartilage: a 4-month, randomized, controlled trial in patients at risk of osteoarthritis. *Arthritis Rheum*. 2005;52(11):3507-3514.	260	20.00
19	Shoemaker SC, Markolf KL. The role of the meniscus in the anterior-posterior stability of the loaded anterior cruciate-deficient knee. Effects of partial versus total excision. *J Bone Joint Surg Am*. 1986;68(1):71-79.	250	7.81
20	Donahue TL, Hull ML, Rashid MM, Jacobs CR. A finite element model of the human knee joint for the study of tibiofemoral contact. *J Biomech Eng*. 2002;124(3):273-280.	248	15.50
21	Makris EA, Hadidi P, Athanasiou KA. The knee meniscus: structure-function, pathophysiology, current repair techniques, and prospects for regeneration. *Biomaterials*. 2011;32(30):7411-7431.	242	34.57
22	Cannon WD Jr, Vittori JM. The incidence of healing in arthroscopic meniscal repairs in anterior cruciate ligament-reconstructed knees versus stable knees. *Am J Sports Med*. 1992;20(2):176-181.	241	9.27
23	Proctor CS, Schmidt MB, Whipple RR, Kelly MA, Mow VC. Material properties of the normal medial bovine meniscus. *J Orthop Res*. 1989;7(6):771-782.	230	7.93
24	Gale DR, Chaisson CE, Totterman SM, Schwartz RK, Gale ME, Felson D. Meniscal subluxation: association with osteoarthritis and joint space narrowing. *Osteoarthritis Cartilage*. 1999;7(6):526-532.	228	12.00
25	McDermott ID, Amis AA. The consequences of meniscectomy. *J Bone Joint Surg Br*. 2006;88(12):1549-1556.	227	18.92
26	Messner K, Gao J. The menisci of the knee joint: anatomical and functional characteristics and a rationale for clinical treatment. *J Anat*. 1998;193(Pt 2):161-178.	223	11.15
27	Shelbourne KD, Gray T. Results of anterior cruciate ligament reconstruction based on meniscus and articular cartilage status at the time of surgery: five- to 15-year evaluations. *Am J Sports Med*. 2000;28(4):446-452.	220	12.22
28	Katz JN, Brophy RH, Chaisson CE, et al. Surgery versus physical therapy for a meniscal tear and osteoarthritis. *N Engl J Med*. 2013;368(18):1675-1684.	213	42.60
29	Scott GA, Jolly BL, Henning CE. Combined posterior incision and arthroscopic intra-articular repair of the meniscus: an examination of factors affecting healing. *J Bone Joint Surg Am*. 1986;68(6):847-861.	211	6.59
30	Kobayashi M, Chang YS, Oka M. A 2-year in vivo study of polyvinyl alcohol-hydrogel (PVA-H) artificial meniscus. *Biomaterials*. 2005;26(16):3243-3248.	209	16.08
31	Clark CR, Ogden JA. Development of the menisci of the human knee joint: morphological changes and their potential role in childhood meniscal injury. *J Bone Joint Surg Am*. 1983;65(4):538-547.	208	5.94
32	Stone KR, Steadman JR, Rodkey WG, Li ST. Regeneration of meniscal cartilage with use of a collagen scaffold: analysis of preliminary data. *J Bone Joint Surg Am*. 1997;79(12):1770-1777.	203	9.67
33	Petersen W, Tillmann B. Collagenous fibril texture of the human knee joint menisci. *Anat Embryol (Berl)*. 1998;197(4):317-324.	203	10.15
34	Lee SJ, Aadalen KJ, Malaviya P, et al. Tibiofemoral contact mechanics after serial medial meniscectomies in the human cadaveric knee. *Am J Sports Med*. 2006;34(8):1334-1344.	202	16.83
35	Noble J, Hamblen DL. The pathology of the degenerate meniscus lesion. *J Bone Joint Surg Br*. 1975;57(2):180-186.	196	4.56
36	Thompson WO, Thaete FL, Fu FH, Dye SF. Tibial meniscal dynamics using 3-dimensional reconstruction of magnetic resonance images. *Am J Sports Med*. 1991;19(3):210-215; discussion 215-216.	195	7.22
37	Allen CR, Wong EK, Livesay GA, Sakane M, Fu FH, Woo SL. Importance of the medial meniscus in the anterior cruciate ligament-deficient knee. *J Orthop Res*. 2000;18(1):109-115.	194	10.78

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Table A1 (continued)

Rank	Publication	Total Citations	Citation Density
38	Rangger C, Klestil T, Gloetzer W, Kemmler G, Benedetto KP. Osteoarthritis after arthroscopic partial meniscectomy. *Am J Sports Med*. 1995;23(2):240-244.	180	7.83
39	Verdonk PC, Verstraete KL, Almqvist KF, et al. Meniscal allograft transplantation: long-term clinical results with radiological and magnetic resonance imaging correlations. *Knee Surg Sports Traumatol Arthrosc*. 2006;14(8):694-706.	180	15.00
40	Graf BK, Lange RH, Fujisaki CK, Landry GL, Saluja RK. Anterior cruciate ligament tears in skeletally immature patients: meniscal pathology at presentation and after attempted conservative treatment. *Arthroscopy*. 1992;8(2):229-233.	179	6.88
41	Pollard ME, Kang Q, Berg EE. Radiographic sizing for meniscal transplantation. *Arthroscopy*. 1995;11(6): 684-687.	179	7.78
42	Morgan CD, Wojtys EM, Casscells CD, Casscells SW. Arthroscopic meniscal repair evaluated by second-look arthroscopy. *Am J Sports Med*. 1991;19(6):632-637; discussion 637-638.	178	6.59
43	Wirth CJ, Peters G, Milachowski KA, Weismeier KG, Kohn D. Long-term results of meniscal allograft transplantation. *Am J Sports Med*. 2002;30(2):174-181.	176	9.78
44	Hunter DJ, Zhang YQ, Tu X, et al. Change in joint space width: hyaline articular cartilage loss or alteration in meniscus? *Arthritis Rheum*. 2006;54(8):2488-2495.	174	14.50
45	Millett PJ, Willis AA, Warren RF. Associated injuries in pediatric and adolescent anterior cruciate ligament tears: does a delay in treatment increase the risk of meniscal tear? *Arthroscopy*. 2002;18(9):955-959.	169	10.56
46	Eggli S, Wegmuller H, Kosina J, Huckell C, Jakob RP. Long-term results of arthroscopic meniscal repair: an analysis of isolated tears. *Am J Sports Med*. 1995;23(6):715-720.	166	7.22
47	Cox JS, Nye CE, Schaefer WW, Woodstein IJ. The degenerative effects of partial and total resection of the medial meniscus in dogs' knees. *Clin Orthop Relat Res*. 1975(109):178-183.	165	3.84
48	Rodeo SA. Meniscal allografts — where do we stand? *Am J Sports Med*. 2001;29(2):246-261.	165	9.71
49	Oei EH, Nikken JJ, Verstijnen AC, Ginai AZ, Myriam Hunink MG. Magnetic resonance imaging (MRI) of the menisci and cruciate ligaments: a systematic review. *Radiology*. 2003;226(3):837-848.	164	10.93
50	Buma P, Ramrattan NN, van Tienen TG, Veth RP. Tissue engineering of the meniscus. *Biomaterials*. 2004;25(9):1523-1532.	163	11.64