



Review Article

Most cited publications in arthroscopy

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ABSTRACT

Arthroscopy is a rapidly expanding and sub-specializing field of orthopedic surgery. We set out to list the most cited papers in the field of arthroscopy to get an insight of how influential and to what disciplines these papers belong to. We have listed most cited papers from Scopus in different categories which included individual joint related arthroscopy, for each decade and based on the type of study from the titles of citations. This report will help the novice arthroscopic surgeon to gain an insight into the fields and types of research that are happening and guide to explore the literature on this subject. We discussed the advantages and limitations of such a search and listing.

Keywords: Arthroscopy citations, Most cited publications, Most cited arthroscopy literature, Arthroscopy publications scopus

INTRODUCTION

Arthroscopy has come a long way since it was first described by Kenji Takagi who used a cystoscope to examine tuberculous knees.^[1] We set out to look at the most cited articles in the history of arthroscopy from early 1950s to 2019. This knowledge would serve as a record of the most impactful articles in the field of arthroscopy published since the citations were given importance, until the current date. Some path breaking articles like the first publications on knee arthroscopy, however, not necessarily get cited most often. This report will help as a starting point for novice arthroscopic surgeons to explore the literature on this subject and give an idea of the research trends in the listed categories. We have discussed the advantages and limitations of citations. Similar study has not been reported before in the literature.

MATERIALS AND METHODS

A search in the database of SCOPUS was done on April 1, 2020, using the search strategy (arthroscope*) with filters from 1900 to 2019. This gave an output of 50,373 articles.

We arranged top five most cited articles in four categories, based on (a) anatomic location (hip, knee, ankle, shoulder, elbow, and wrist), (b) type of study (systematic review, review, RCT, case report, randomized, randomized controlled, and met-analysis), and (c) each decade these were published with citation of at least one. Articles with no citations were not included in the study. All the above was based on a search within the title of the citation. Hence, any article which does not have the above keywords, even though related, may not be picked up by the search. This information is not given by SCOPUS analysis by default.

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We have used Microsoft Excel 365 for listing and analysis of the output.

RESULTS

The total number of articles from this search was 50373. Table 1 gives the most cited articles for this topic for the whole search. The name of the author along with the year of publication is given with the number of citations in bracket for each entry in Tables 1-4. The related reference is cited as superscript next to the author name. The sum of all citations for all the articles published before 1970 was <100.

DISCUSSION

Citations of the articles published in a period of time are used to calculate the impact factor of journals. It is however not clear how a paper becomes influential and what number of citation count is needed to be an influential paper in a subject. However, it is understood that this number is relative

to other similar publications in the subject. Nevertheless, most cited papers in a subject indicate that they have a significant message that has been cited most by other researchers in that field. Hence, looking at most cited papers in various categories could indicate the most influential work in that field and are worth going through while looking for information in that field. Our lists will give readers important publications in the relative fields.

In the first decade (from 2010 to 2019), none of the publications in the top 10 were published after 2014. Among the top five, the first two were published in 2012.

The focus of topics in the decade 2010–2020; 2000–2010; 1990–2000; 1980–1990; and 1970–1980, respectively, included: Thomboprophyllaxis, osteoarthritis, autologous chondrocyte implantation (ACI), rotator cuff repair; cartilage injuries, and defects and their grading, superior labrum anterior posterior lesions; subacromial decompression, abrasion arthroplasty, triangular fibrocartilage complex tears,

Table 1: Most cited articles of all times in arthroscopy.

All articles	Brittberg <i>et al.</i> ^[2] 1994 (4100)	Zhang <i>et al.</i> ^[3] 2008 (1740)	Tunis <i>et al.</i> ^[4] 2003 (1344)	Galatz <i>et al.</i> ^[5] 2004 (1244)	Guyatt <i>et al.</i> ^[6] 2012 (1159)
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Table 2: Most cited articles by anatomic location.

Hip	Zhang <i>et al.</i> ^[3] 2008 (1740)	Ganz <i>et al.</i> ^[7] 2001 (944)	Phillippon <i>et al.</i> ^[8] 2009 (547)	Zhang <i>et al.</i> ^[9] 2007 (543)	McCarthy <i>et al.</i> ^[10] 2001 (424)
Knee	Brittberg <i>et al.</i> ^[2] 1994 (4100)	Zhang <i>et al.</i> ^[3] 2008 (1740)	Peterson <i>et al.</i> ^[11] 2000 (1135)	Moseley <i>et al.</i> ^[12] 2002 (1095)	Knutsen <i>et al.</i> ^[13] 2004 (943)
Ankle	Van Dijk <i>et al.</i> ^[14] 2000 (327)	Hangody <i>et al.</i> ^[15] 2001 (323)	Harrington 1979 ^[16] (321)	Hinterman <i>et al.</i> ^[17] 2002 (281)	Lo <i>et al.</i> ^[18] 2003 (244)
Shoulder	Snyder <i>et al.</i> ^[19] 1990 (968)	Burkhart <i>et al.</i> ^[20] 2003 (719)	Sher <i>et al.</i> ^[21] 1995 (710)	Boileau <i>et al.</i> ^[22] 2006 (561)	Gummesson <i>et al.</i> 2003 (509)
Elbow	Cain Jr <i>et al.</i> ^[23] 2003 (265)	Kelly <i>et al.</i> ^[24] 2001 (240)	Rohrbough <i>et al.</i> ^[25] 2002 (234)	Andrews <i>et al.</i> ^[26] 1995 (214)	O'Driscoll <i>et al.</i> ^[27] 1992 (213)
Wrist	Zlatkin <i>et al.</i> ^[28] 1989 (165)	Corso <i>et al.</i> ^[29] 1997 (153)	Schweitzer <i>et al.</i> ^[30] 1992 (150)	Thornburg ^[31] 1999 (125)	Potter <i>et al.</i> ^[32] 1997 (124)

Table 3: Most cited articles by type of study.

Systematic review	Zhang <i>et al.</i> ^[9] 2007 (543)	Zengerink <i>et al.</i> ^[33] 2010 (310)	Nelson ^[34] 2014 (280)	Harris ^[35] 2010 (236)	Dinnes ^[36] 2003 (221)
Randomized	Knutsen <i>et al.</i> ^[13] 2004 (943)	Knutsen <i>et al.</i> ^[37] 2007 (665)	Kirkley <i>et al.</i> ^[38] 2008 (424)	Gudas <i>et al.</i> ^[39] 2005 (408)	Muneta <i>et al.</i> ^[40] 2007 (338)
Met-analysis	Freedman <i>et al.</i> ^[41] 2003 (498)	Prodromos <i>et al.</i> ^[42] 2007 (438)	De Jesus <i>et al.</i> ^[43] 2009 (310)	Goldblatt <i>et al.</i> ^[44] 2005 (217)	Benjaminse <i>et al.</i> ^[45] 2006 (211)
Randomized controlled	Castricini <i>et al.</i> ^[46] 2011 (325)	Franceschi <i>et al.</i> 2007 (296)	Buvanendran <i>et al.</i> ^[47] 2003 (283)	Gobbi <i>et al.</i> ^[48] 2006 (222)	Haringman <i>et al.</i> ^[49] 2006 (183)
Case report	Wakitani <i>et al.</i> ^[50] 2004 (265)	Byrd ^[51] 1996 (167)	Sanchez <i>et al.</i> ^[52] 2003 (162)	Petty <i>et al.</i> ^[53] 2004 (138)	Larson <i>et al.</i> ^[54] 2011 (134)
Review	Curl <i>et al.</i> ^[55] 1997 (894)	Zhang <i>et al.</i> ^[9] 2007 (543)	Zengerink <i>et al.</i> ^[33] 2010 (310)	Kelly <i>et al.</i> ^[56] 2005 (302)	Phillippon <i>et al.</i> ^[57] 2007 (284)

Table 4: Most cited articles in each decade.

2010–2019	Guyatt <i>et al.</i> ^[6] 2012 (1159)	Falck-Ytter <i>et al.</i> ^[58] 2012 (1093)	Goldring <i>et al.</i> ^[59] 2011 (538)	Sellam <i>et al.</i> ^[60] 2010 (524)	Sihvonen <i>et al.</i> ^[61] 2013 (408)
2000–2009	Zhang <i>et al.</i> ^[3] 2008 (1740)	Tunis <i>et al.</i> ^[4] 2003 (1344)	Galatz <i>et al.</i> ^[5] 2004 (1244)	Peterson <i>et al.</i> ^[11] 2000 (1135)	Moseley <i>et al.</i> ^[112] 2002 (1095)
1990–1999	Brittberg <i>et al.</i> ^[2] 1994 (4100)	Snyder <i>et al.</i> ^[19] 1990 (968)	Curl <i>et al.</i> ^[55] 1997 (894)	Sher <i>et al.</i> ^[21] 1995 (710)	Kujala <i>et al.</i> ^[62] 1993 (686)
1980–1989	Palmer ^[63] 1989 (643)	Andrews <i>et al.</i> ^[26] 1985 (628)	Baratz <i>et al.</i> ^[64] 1986 (563)	Daniel <i>et al.</i> ^[65] 1985 (472)	Noyes <i>et al.</i> ^[66] 1980 (466)
1970–1979	Fujisawa <i>et al.</i> ^[67] 1979 (399)	Harrington ^[16] 1979 (321)	Thomas <i>et al.</i> 1975 (112)	Jackson <i>et al.</i> ^[68] 1972 (111)	Ficat <i>et al.</i> ^[69] 1979 (110)
1960–1969	Jayson <i>et al.</i> ^[70] 1968 (30)	Ohnsorge ^[71] 1969 (5)	Watanabe ^[72] 1968 (1)	Ohnsorge ^[73] 1969 (1)	
1950–1959	Mayer and Burman ^[74] 1939 (4)	Hurter ^[75] 1955 (3)	Imbert ^[76] 1956 (1)	Imbert ^[77] 1957 (1)	

meniscal tears; and role of arthroscopy in different conditions of the knee.

Table 1 shows that the authors with most citations in the given search strategy are Brittberg *et al.*,^[2] Zhang *et al.*,^[3] Tunis *et al.*,^[4] Galatz *et al.*,^[5] and Guyatt *et al.*^[2-6] It can also be seen from their references that there is only one specialist orthopedic journal in the first five most cited articles. That too is a general orthopedic journal. All other journals have a wider readership than just orthopedic surgeons. Nevertheless, these articles have had a significant impact on the knowledge and research in their respective fields. As focus of research and interests change over time, the citation counts could change.

The citations for articles take time to peak. The average is about 7–10 years from the date of publication of a manuscript. This is seen in the list of publications in the first decade. This duration may decrease in the future as the ease, reach, and speed of access to scientific literature increases. It must also be borne in mind that there are limitations and biases involved in the process of analyzing citation counts.^[78,79] Nevertheless, this is the best indicator among the indicators currently available in assessing the quality of an article.^[80] They also indicate the trend or focus of research during a particular period of time or in a given specialty.

Articles published in high impact factor journals tend to be cited more. It also indicates that these journals publish more high-quality articles that pave the way for new branches of research and hence are cited more. It also sets up a cycle to increase the impact factor since impact factor of journals depends on citations. Articles published in a general journal tend to be cited more than those published in a specialty or a subspecialty journal since the impact factor and readership of general journals is more. For example, an arthroscopy article published in JAMA, NEJM, or BMJ will have more general readership and citations compared to one in JBJS or BJJ which in turn will have more than those compared to a

publication in the knee or KSSTA. Important basic science articles also tend to have more citations compared to clinical articles for the same condition since basic science is the foundation over which the knowledge about a particular topic is built and clinical application is the final process.

Limitations

The analysis of this nature is often challenging and fraught with several limitations similar to our study. First, we took the number of citations as the benchmark for selecting the best papers, which has its limitations, as mentioned before. Second, we took citation counts from one search engine only. The values may differ in different search engines and depends on how and from when they recruit citations in their database. Third, Scopus lists about 1.4 billion references dating back to 1970. So references before this date may not show true citation counts.

Another limitation is that our search included the terms searched only in the titles of the articles. If the authors have not given the relevant keyword in the title of the article, it will not be picked up by our search. To make such searches more robust, one of our recommendations will be to include such terms in titles of articles in future to make searching easier for such studies. Alternatively, search databases could give the keywords related to each publication in the output. The limitation of such a strategy is that historical publications which do not have keywords information would be left out.

CONCLUSION

The most cited article with the search strategy used was by Mats Brittberg of Sweden, related to ACI. Most cited articles listed in each category are influential papers in the respective categories. The limitations of our search strategy have been discussed. Search engines could make subtle changes in their listing or output to improve the search output and accuracy of similar studies in the future.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

Dr. Raju Vaishya is on the Editorial Board of the Journal.

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