The Top 10 Most Cited Indian Articles in Arthroscopy in Last 10 Years

Abstract

The interest in the field of arthroscopy is increasing globally and exponentially in the recent past, including in India. Clinicians interested in this area of super specialization have started publishing their research work in reputed journals in this field. The publication from Indian authors is contributed equally by both the teaching government institutions and nonteaching private hospital specialists. The contributions by the Indian teaching institutes have predominantly Indian authors only, whereas those from the private sectors usually have an association with the foreign authors in their research and publications. The publications with higher hierarchy and level of evidence (1 and 2) are associated with greater citations. In addition, the publications in high-impact, reputed journals attract more citations and therefore it is recommended that the "good" scientific research work should preferably be submitted to these journals to create greater impact and awareness about ones' research and publication.

Keywords: *Arthroscopy, citations, Indian, publications, research*

MeSH terms: *Arthroscopy, collected works, follow-up studies*

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Introduction

The number of times an article has been cited reflects the influence it has on the evolution of knowledge in a particular field. In the recent years, some articles have been written on the most influential papers in the field of science in general[1] as well as various medical specialties,[2-13] including orthopedic surgery.[14-16] Besides these, various authors have attempted to find the most-cited papers in the different subspecialties of orthopaedics;[17-33] and also, influential papers from a particular region.[34-42]

The number of scientific papers contributed by each country toward the global research output, along with the number of citations received by them, has become one of the critical indicators for assessing the strength of research in a nation.[37] The disease patterns and patient demands also vary for each country, and a study of influential articles from a particular country throws light on the locally prevalent health problems and attempts made at solving them, besides global scientific contributions.

In this bibliometric study, we have attempted to find the top 10 Indian contributions in arthroscopic surgery. We utilized the Web of Science (WoS) and SCOPUS databases for this purpose, besides PubMed and general Internet search. The publications presented in this study may serve as a list of Indian "classic" articles to be read by orthopedic surgery postgraduate residents and fellows. This list reflects how and what kind of research work can be carried out in the area of sports medicine and arthroscopic surgery, working within relatively constrained socioeconomic, cultural, and medical practice scenario specific to one's country, and to achieve excellence with limited resources. Studying these papers may also give some inspiration and insights on what makes a paper important to global peers in the subject and also help in writing such articles in the future.

Materials and Methods

Citation databases – WoS and SCOPUS – were searched using key terms (arthroscop* AND India*), in the months of January–March 2017. The search was further refined to include only papers published in English from India in the years 2006–2016. The papers were ranked and arranged according to how many citations they received during this period. The top 10 papers in the field of arthroscopy, which were based on research conducted in India, were manually selected and the full texts were retrieved. The final ranking of the top 10 papers was done according to

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the number of citations in the SCOPUS, as it has broader coverage as compared to the WoS.[43-48] We also checked the citations received by these papers in Google Scholar, which is a free citation database with very broad coverage, but did not use it for finding influential papers because it lacks quality control. Several inaccuracies have been reported in Google Scholar, including content gaps, incorrect citation counts, duplication and manipulation of citation numbers.[46,47] Finally, we also checked citations in the free full-text database PubMed Central, but despite consistency, it has little utility as it covers only those journals, which provide free full texts for it. The methodology of selecting papers has been depicted in detail in Figure 1.

Results

A search on the WoS database, conducted on February 9, 2017, as described in the methods section, revealed 173 papers. A similar search on the SCOPUS yielded 1142 articles. There is a rising trend in the number of papers in the field of arthroscopy from India in the last 10 years, as analyzed on the SCOPUS [Figure 2]. This trend indicates recent growth in the field of arthroscopy practice and research in the past few years in our country. These papers were then arranged according to how many citations did they receive during this period, in both the databases, and then we manually selected top 10 articles, which were based on research conducted in India out of twelve papers relevant to the field of arthroscopy and orthopedic sports medicine[49-60] [Table 1].

Several papers[49-51,55,56] were identified in the SCOPUS but were missed in the WoS search. Similarly, a paper with some Indian authors,[54] published in the Journal of Hand Surgery (Am), was identified on the WoS, but not on the SCOPUS. However, we excluded it as the study was partly conducted in Canada. Another paper,[55] published in arthroscopy, the Journal of Arthroscopic and Related Surgery, was excluded as the study was conducted outside India.

The focus of interest in these papers[49-51,53,56-60] was mainly (50%) on anterior cruciate ligament (ACL) and meniscus injuries. Two papers were on cartilage restoration, one on hip arthroscopy, one on medial patello femoral ligament (MPFL) reconstruction, and one on the role of platelet rich plasma (PRP) in knee osteoarthritis (OA). Half

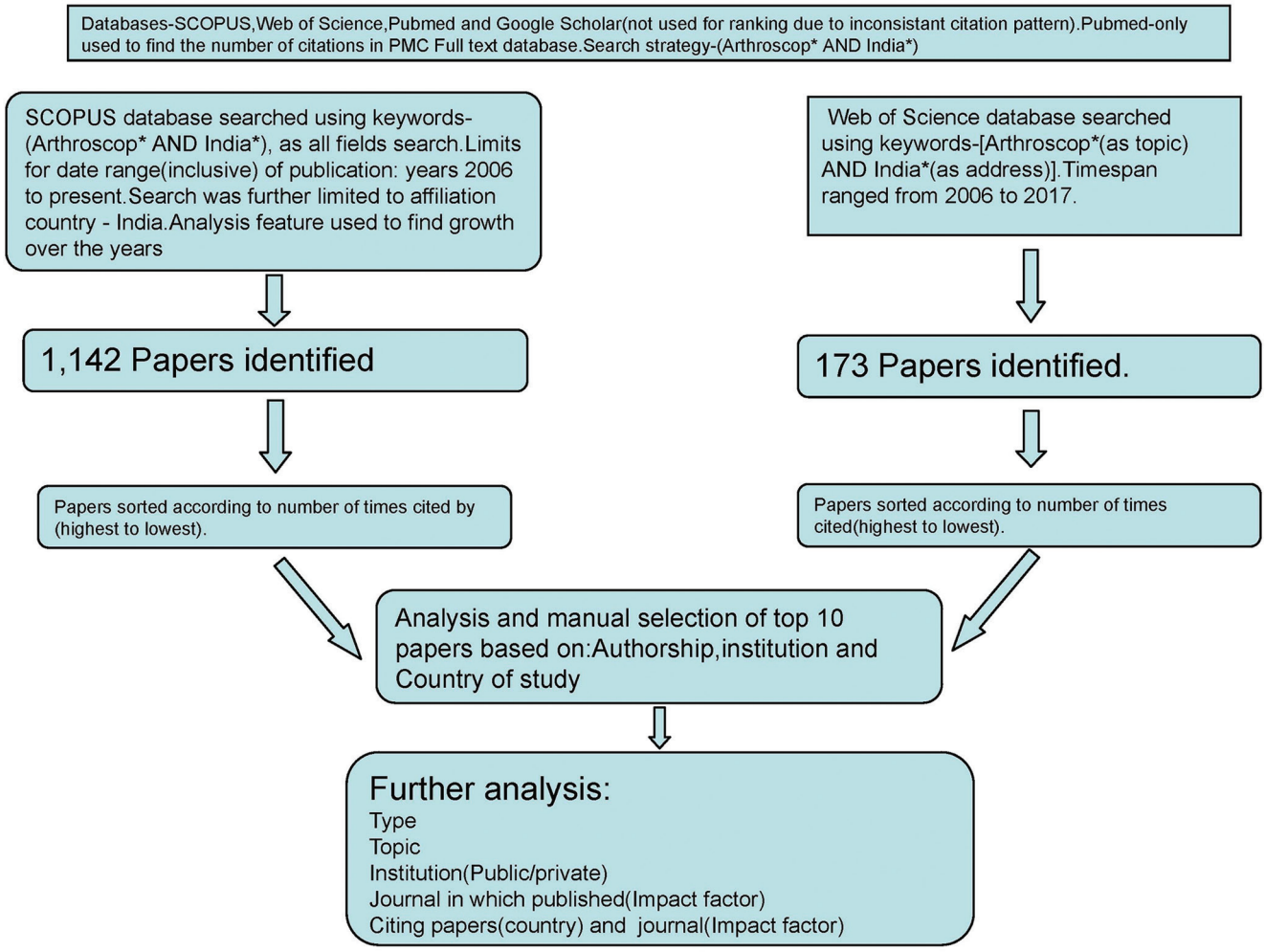

Figure 1: Chart showing the methodology of selecting papers

of these (five papers) were from public teaching hospitals, whereas another half (five articles) were from private centers [Figure 3a]. Seven articles were based on studies conducted in India, whereas three review articles were the result of collaboration with authors in other countries. However, the first author (who was also the corresponding author) was from private centers in India in these cases. The contributions by the Indian teaching institutes have predominantly Indian authors only, whereas those from the private sector usually have an association with the foreign authors.

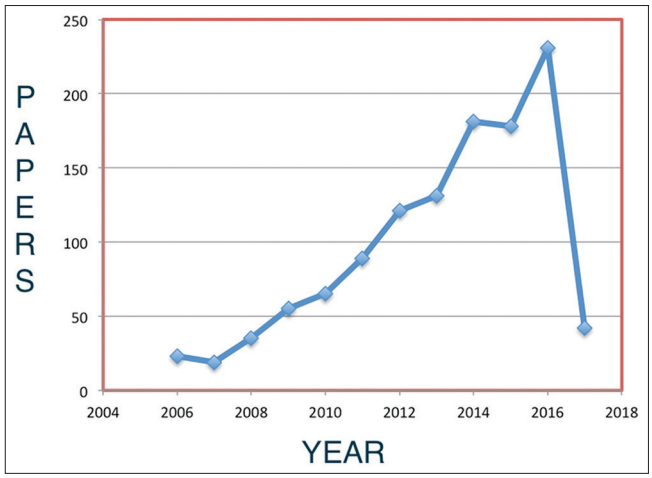

Figure 2: Trend line showing the number of arthroscopy papers published from India in the past 10 years as analyzed in the SCOPUS

All these papers were published in high impact journals in the field of arthroscopy. These included four papers in arthroscopy, two each in the American Journal of Sports Medicine and International Orthopaedics and one each in Knee Surgery, Sports Traumatology and Arthroscopy and the British Journal of Sports Medicine [Figure 3b].

These publications were a mix of different levels of evidence on hierarchy [Figure 3c]. It included one randomized controlled trial (RCT), two systematic reviews, one broad narrative review, one prognostic prospective study, one prospective comparative study, one retrospective cross sectional study, one case series, and two *in vitro* studies.

A repeat search in the SCOPUS after 6 weeks revealed an increase in citations for most papers, and all these articles were widely cited by authors from many different countries and in high impact orthopedic journals, including several citing papers which themselves received many citations in this short time span, reflecting the global influence of these papers on the subject of arthroscopy and orthopedic sports medicine [Table 2 and Figure 4]. Publications in high impact, reputed journals attract more citations.

Discussion

A citation is an expression of the relevance given by the author of a paper to others' work on a topic of discussion.[16] The number of citations received by an article is often used as an indicator of influence within a field for authors,

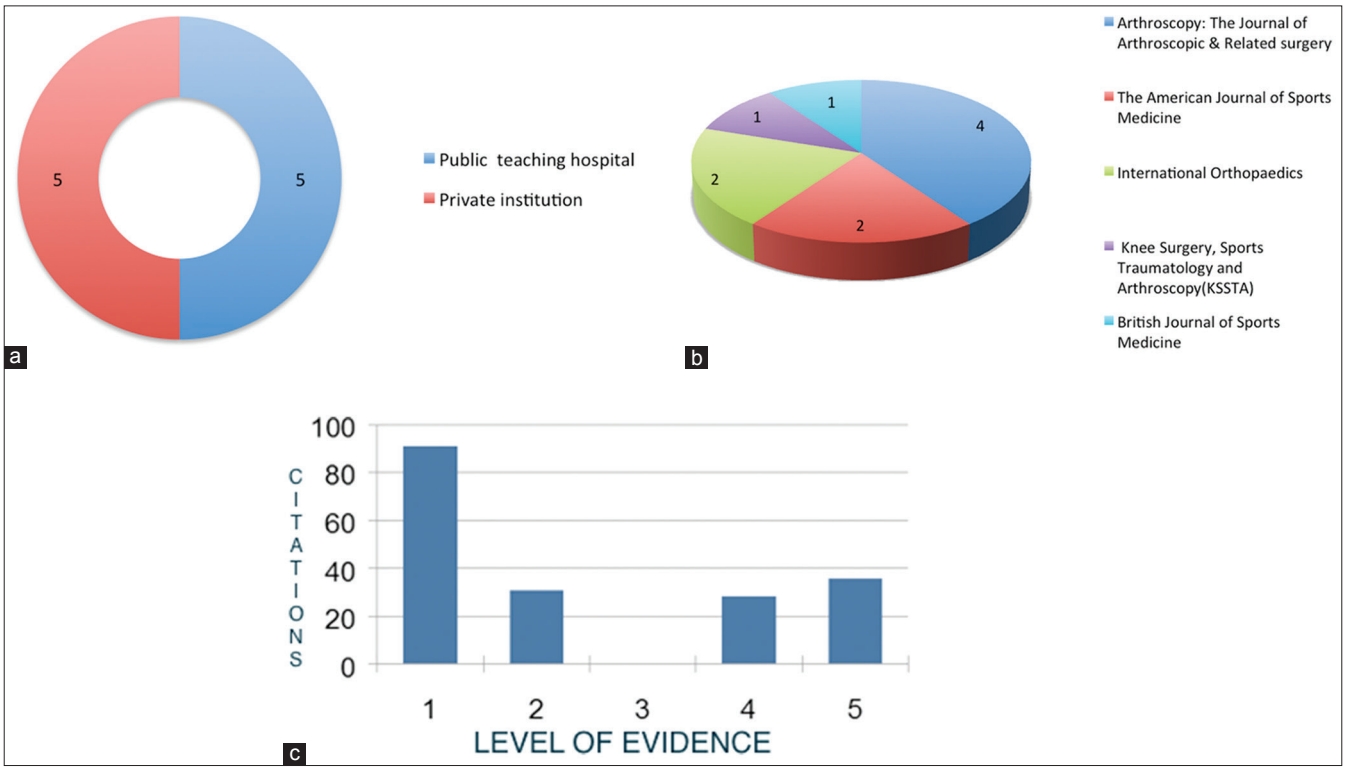

Figure 3: Pie charts showing distribution of top 10 arthroscopy papers from India according to (a) type of institution (public/private sector), (b) journal of publication, and (c) level of evidence versus the average number of citations received on the SCOPUS

Table 1: Top 10 most cited papers in arthroscopy from India

Serial number	Paper	Citations in Scopus (citation density)	Citations in Web of Science (citation density)	Citations in PMC
1	Treatment with platelet-rich plasma is more effective than placebo for knee osteoarthritis: A prospective, double-blind, randomized trial By Sandeep Patel, Mandeep S Dhillon, Sameer Aggarwal, Neelam Marwaha, Ashish Jain The American Journal of Sports Medicine (2013) Volume: 41, Issue: 2, Pages: 356-64 ISSN: 1552-3365 ISBN: 0363-5465 DOI: 10.1177/0363546512471299 PubMed: 23299850 From the Department of Orthopaedics, PGIMER, 92, Sector 24A, Chandigarh - 160 023, India Randomized controlled trial (Level 1)	150 (50)	117 (39)	55
2	Immunohistological evaluation of proprioceptive potential of the residual stump of injured ACL By Mandeep S. Dhillon, Kamal Bali, R. K. Vasistha International Orthopaedics (2010) Volume: 34, Issue: 5, Pages: 737-41 ISSN: 03412695 ISBN: 1432-5195 DOI: 10.1007/s00264-009-0948-1 PubMed: 20135121 From the Department of Orthopaedics, PGIMER, Sector 12, Chandigarh - 160 023, India "*In vitro*" study (Level 5)	43 (7.17)	24 (4)	13
3	Evidence based status of micro fracture technique: A systematic review of Level 1 and 2 studies By Deepak Goyal, Sohrab Keyhani, Eng Hin Lee, James Hoi Po Hui Arthroscopy: The Journal of Arthroscopic and Related Surgery (2013) Volume: 29, Issue: 9, Pages: 1579-1588 ISSN: 15263231 ISBN: 0749-8063 DOI: 10.1016/j.arthro. 2013.05.027 PubMed: 23992991 From Saumya Orthocare: Centre for Advanced Surgeries of the Knee Joint, 210 Baronet, Ahmedabad - 380 005, Gujarat, India Systematic review of Level 1 and Level 2 studies (Level 2)	40 (13.33)	45 (15)	22
4	Hip arthroscopy: Current concepts and review of literature By Vijay D. Shetty, Richard N. Villar British Journal of Sports Medicine (2007) Volume: 41, Pages: 64-68 ISSN: 1473-0480 ISBN: 03063674 DOI: 10.1136/bj ftsm. 2006.027755 PubMed: 17138638 From Hiranandani Hospital, Powai, Mumbai - 400 076, Maharashtra, India Broad narrative review (Level 5)	37 (4.11)	24 (2.67)	7

Contd...

Table 1: Contd...

Serial number	Paper	Citations in Scopus (citation density)	Citations in Web of Science (citation density)	Citations in PMC
5	Arthroscopic and Magnetic Resonance Imaging Evaluation of Meniscus Lesions in the Chronic Anterior Cruciate Ligament-Deficient Knee By Sameer Naranje, Ravi Mittal, Hiralal Nag, Raju Sharma Arthroscopy - Journal of Arthroscopic and Related Surgery (2008) Volume: 24, Issue: 9, Pages: 1045-1051 ISSN: 07498063 DOI: 10.1016/j.arthro. 2008.03.008 PubMed: 18760213 From the Department of Orthopaedics, All India Institute of Medical Sciences, New Delhi, India Prognostic prospective study (Level 1)	332 (4)	32 (4)	5
6	Evidence-based status of second- and third-generation autologous chondrocyte implantation over first generation: A systematic review of Level 1 and 2 studies By Deepak Goyal, Anjali Goyal, Sohrab Keyhani, Eng Hin Lee, James Hoi Po Hui Arthroscopy - Journal of Arthroscopic and Related Surgery (2008) Volume: 29, Issue: 11, Pages: 1872-1878 ISSN: 07498063 ISBN: 0749-8063 DOI: 10.1016/j.arthro. 2013.07.271 PubMed: 24075851 From Saumya Orthocare: Centre for Advanced Surgeries of the Knee Joint, 210 Baronet, Sabarmati, Ahmedabad - 380 005, Gujarat, India Systematic review of Level 1 and Level 2 studies (Level 2)	31 (10.33)	26 (8.67)	8
7	Medial patellofemoral ligament reconstruction: The superficial quad technique By Deepak Goyal The American Journal of Sports Medicine (2013) Volume: 41, Issue: 5, Pages: 1022-9 ISSN: 1552-3365 DOI: 10.1177/0363546513477828 PubMed: 23460327 From Saumya Orthocare: Centre for Advanced Surgeries of the Knee Joint, 210, Baronet Sabarmati, Ahmedabad - 380 005, Gujarat, India Case series (Level 4)	29 (9.67)	25 (8.33)	8
8	Is ACL reconstruction only for athletes? A study of the incidence of meniscal and cartilage injuries in an ACL-deficient athlete and nonathlete population: An Indian experience By Clement Joseph, Shirish S. Pathak, M. Aravinda, David Rajan International Orthopaedics (2008) Volume: 32, Issue: 1, Pages: 57-61 ISSN: 03412695 ISBN: 0341-2695 (Print) DOI: 10.1007/s00264-006-0273-x PubMed: 17033759 From the Department of Orthopaedics; Sports Injury and Arthroscopy Clinic, GKNM Hospital, P.N. Palayam, Coimbatore - 641 037, Tamil Nadu, India Retrospective cross-sectional study (Level 4)	27 (3.38)	21 (2.62)	10

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Table 1: Contd...

Serial number	Paper	Citations in Scopus (citation density)	Citations in Web of Science (citation density)	Citations in PMC
9	Efficacy of immunohistological methods in detecting functionally viable mechanoreceptors in the remnant stumps of injured ACL and its clinical importance By Kamal Bali, Mandeep S. Dhillon, R. K. Vasistha, Nandita Kakkar, Rishi Chana, Sharad Prabhakar Knee Surgery, Sports Traumatology, Arthroscopy (2012) Volume: 20, Issue: 1, Pages: 75-80 ISSN: 09422056 ISBN: 1433-7347 (Electronic)\r0942-2056 (Linking) DOI: 10.1007/s00167-011-1526-9 PubMed: 21541706 From the Department of Orthopedic Surgery, PGIMER, Sector 12, Chandigarh - 160 012, India "*In vitro*" study (Level 5)	27 (6.75)	21 (5.25)	8
10	Tunnel widening after anterior cruciate ligament reconstruction: A prospective randomized computed tomography-based study comparing two different femoral fixation methods for hamstring graft By Dhananjaya Sabat, Kundan Kundu, Sumit Arora, Vinod Kumar Arthroscopy - Journal of Arthroscopic and Related Surgery (2011) Volume: 27, Issue: 6, Pages: 776-783 ISSN: 07498063 DOI: 10.1016/j.arthro. 2011.02.009 PubMed: 21624672 From the Department of Orthopaedics, Maulana Azad Medical College and Lok Nayak Hospital, New Delhi, India Prospective comparative study (Level 2)	21 (4.25)	19 (3.8)	4

ACL=Anterior cruciate ligament, PMC=PubMed Central, PGIMER=Postgraduate Institute of Medical Education and Research

Table 2: Distribution of citations received by these ten papers in selected arthroscopy and orthopedic journals

Rank of paper	Arthroscopy: JARS	AJSM	KSSTA	BJSM	IO	JBJS (American)	BJJ/JBJS (British)	Acta Orthopaedica (AO)	IJO	Others	Total
1	8	18	9	0	1	0	0	0	1	119	156
2	7	3	2	0	0	0	0	0	1	31	44
3	5	1	1	0	1	0	1	0	0	31	40
4	8	0	2	1	1	1	2	0	0	22	37
5	2	3	4	0	0	0	0	0	2	21	32
6	2	3	2	0	3	0	0	0	0	23	33
7	3	5	2	0	0	0	0	0	2	17	29
8	2	2	1	0	4	0	0	1	1	17	28
9	4	1	4	0	0	0	0	0	0	18	27
10	4	2	6	0	1	0	0	0	1	7	21
Total	45	38	33	1	11	1	3	1	8	306	447

JARS=The Journal of Arthroscopy and Related Surgery, AJSM=American Journal of Sports Medicine, KSSTA=Knee Surgery, Sports Traumatology and Arthroscopy, IO=International Orthopaedics, JBJS=Journal of Bone and Joint Surgery, BJJ=Bone and Joint Journal, BJSM=British Journal of Sports Medicine, IJO=Indian Journal of Orthopaedics

journals, and the topics of study.[1,14,15] Citation analysis is the process of studying the citation history of published data. Citation rate of an article can be calculated by dividing the total number of citations received by years since publication. The impact factor is the ratio of the number of citations in a year to articles published in the journal in the two preceding years divided by the total number of citable items published in the same 2 years. It determines the importance of a journal in its field and has emerged as a quality indicator.[16,61-64]

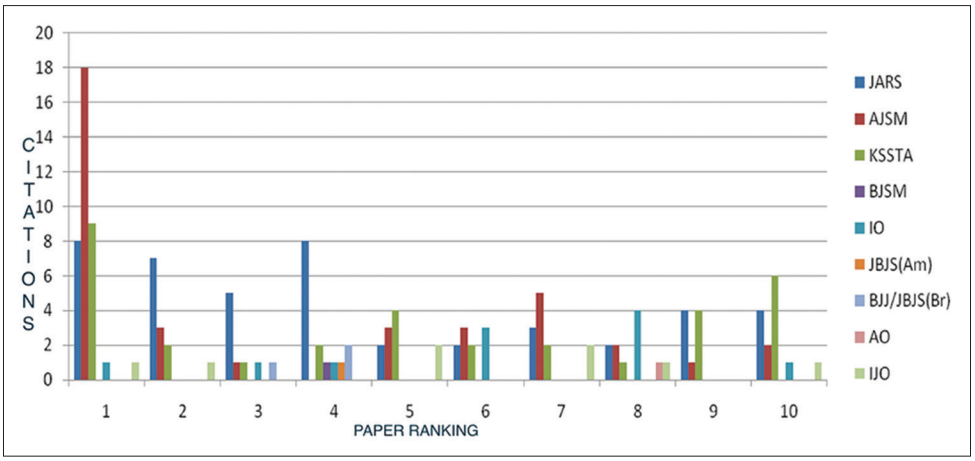

Figure 4: Bar graph showing citations received by these ten papers in selected arthroscopy and orthopedic journals

Bibliometrics is the science of citation analysis and is frequently used to evaluate research performance. It assumes that the more often a paper is cited, the greater its influence on the field (Garfield 1979).[48,65] Several authors have studied factors affecting citation rates in various fields, including orthopedics and arthroscopy.[8,27,48,61,62] Citation counts vary with the database used; and this questions the usefulness or even possibility and validity of such analyses.[44-48] Some other problems regarding citations include self-citation, researchers' preference to cite articles in their target journal, and unaccounted textbook and conference citations.[15,62,63] There is a preference for citing English language articles. Recently published articles are at a disadvantage as citation counts rise with time. Furthermore, other authors are more likely to cite a previously well-cited article because of its previous citations, rather than for its quality or content (snowball effect).[15]

"Obliteration by incorporation" phenomenon happens when classic papers are cited less frequently as they get absorbed into the body of current knowledge. Some of the truly classic papers can be found in the bibliography of the so-called top-cited papers. "Incomplete citing" describes the erroneous citations, made just to convince or persuade the reader, rather than to give credit to original or important workers. Overall, one cannot easily account for biases such as self-citation, in-house bias, journal bias, powerful person bias, national bias, state or institutional bias, language bias, and omission bias (not citing competitors).[2,16,66,67]

H-index was introduced by Hirsch (2005)[48,68] to measure the scientific performance of a researcher through publications. In our top 10 list of Indian arthroscopy papers, all papers have received >10 citations and lay within the H-core of: "Indian arthroscopy."[48]

The most-cited paper[49] in our study, a well-conducted RCT by Patel *et al*., concluded that the treatment with PRP is more effective than placebo for knee OA in 78 patients (156 knees) with bilateral knee OA. They found that the treatment with PRP led to better results than injection with saline only. A single dose of leukocyte-filtered PRP in concentrations of ten times the normal amount was found to be as effective as two injections of PRP with same concentrations, to alleviate symptoms in early knee OA, with deterioration after 6 months.

In the second study,[50] Dhillon *et al*. evaluated the proprioceptive potential in ACL, from tissue harvested from ruptured ACLs in 63 consecutive patients, which were examined for evidence of residual proprioceptive fibers by hematoxylin and eosin staining and monoclonal antibodies to S-100 and neurofilament protein. The histological examination in their series found good subsynovial and intrafascicular vascularity (with free nerve endings) in the majority of cases. Morphologically, normal mechanoreceptors and proprioceptive fibers were found in about half of the stumps, with a significant correlation between injury duration and persistence of mechanoreceptors and proprioceptive fibers. Based on their findings, the authors recommended that preserving the ACL remnants (by not shaving it) might be of potential benefit during ACL reconstruction, as there is a possibility of reinnervation and recovery of proprioceptive potential, which may ultimately improve clinical outcomes.

In an extension of this study,[60] another paper was published by Bali *et al*., which ranked ninth in our study. This article elaborated upon the methodology in great detail in 95 patients, and evaluated immunohistochemical methods for detecting functional ACL proprioceptor remnants, and also, conventional histological techniques. They concluded that immunological methods were more reliable and easier compared to traditional methods of histological staining for identifying remnant stumps with proprioceptive value.

The third study,[51] by Goyal *et al*., is a systematic review of Level 1 and 2 studies on microfracture (MF) techniques to treat cartilage defects. Fifteen studies that involved MF techniques were considered (6 long term & 9 short term)

which compared the clinical outcomes of MF techniques with those of other treatments such as autologous chondrocyte implantation (ACI) and osteochondral cylinder transfers. Most studies reported poor clinical outcomes, whereas two studies reported a lack of any significant difference in the results. Small lesions and young patients showed good short term results. OA and treatment failures were observed at 5–10 years. Overall, MF was found to be useful only for the treatment of small lesions and in patients with low postoperative demands.

The fourth paper[56] by Shetty and Villar is a broad narrative review on hip arthroscopy. Hip arthroscopy has undergone several and rapid advances. Athletes and other individuals with hip injuries are now being diagnosed and treated for newer conditions such as acetabular labral injuries, femoro-acetabular impingement, chondral lesions, avascular necrosis, loose bodies, synovial lesions, cotyloid fossa problems, ligamentum tear problems, and synovial chondromatosis which were previously unrecognized and therefore left untreated, resulting in premature career demise. The procedure is still not widely available as it requires specialist equipment and long learning time. Authors estimate that complications occur in <5% of cases.

The fifth paper[57] by Naranje *et al*. in a prospective study of fifty patients (who underwent ACL reconstruction for injuries >6 weeks old) evaluated the incidence of meniscus tears arthroscopically and compared the effectiveness of magnetic resonance imaging (MRI) in detecting these lesions in patients with chronic ACL-deficient knees. The overall sensitivity, specificity, positive and negative predictive values for detecting meniscus tears in chronic ACL-deficient knees on MRI were 90%, 89%, 87%, and 93%, respectively. Authors concluded that, in chronic ACL-deficient patients, tears of posterior horn medial meniscus are common, whereas anterior horn tears and radial and horizontal patterns of the meniscus are rare. MRI has a high negative predictive value and correlates well with arthroscopy.

The sixth paper[58] by Goyal *et al*. is a systematic review of Level 1 and 2 studies comparing newer generations of ACI with the first-generation ACI and to establish whether the newer generations have overcome the limitations associated with the first-generation ACI. These authors found only weak evidence showing that collagen membrane-based ACI (C-ACI) is better than periosteum-based ACI (P-ACI). The membrane-associated ACI was found to be comparable with both P-ACI and C-ACI. No evidence supported scaffold-based ACI or arthroscopic implantation over the first-generation ACI.

The seventh paper[52] describes a novel "superficial quads" technique (in 32 cases) for MPFL reconstruction. MPFL reconstruction is now routinely performed for patellar instability. Most techniques require hardware fixation or a bony procedure at the patella. It is also known that the most problems related to MPFL reconstruction are attributed to patellar fixation. The "superficial quad technique" uses the superficial slip of the quadriceps tendon as graft material, as it provides a better anatomic match to the native MPFL. It also provides anatomic patellar fixation without a bony procedure and patellar complications. The rationale suggested by the author is that the superficial slip of the quadriceps tendon is purely aponeurotic and closely matches the anatomic profile and also embryology (both are derivatives of ventral mesenchyme) of the MPFL. A broad patellar fixation strip is expected to provide better rotational control of the patella in different ranges of flexion. Hamstrings will also be spared for future surgeries of the knee if needed. Their results were comparable to other studies in the literature using hamstring grafts but without patellar complications.

The eighth paper[59] is a retrospective, cross-sectional, comparative study of 1375 cases with meniscal and cartilage injuries in ACL-deficient knees in Indian athlete and nonathlete population, and discusses the rationale of ACL restoration in nonathletes with ACL injury. Authors carried out an analysis to compare the incidence of meniscal and cartilage injuries in an athlete and nonathlete population at presentation time. The results were used to justify the rationale of ACL reconstruction in the nonathlete population. A significant increase in the incidence of meniscal and cartilage injuries after 1 year was noted in both the groups, whereas no difference was pointed out in the incidence of meniscal and cartilage injuries in athletes and nonathletes among the corresponding groups (Chi-square test, $P = 0.05$). Thus it was concluded that both athletes and nonathletes are equally susceptible to long term meniscal and cartilage injuries in the absence of ACL reconstruction. The authors suggested that the primary tears in the lateral meniscal are slightly more widespread than those in the medial meniscus. Late increase in the incidence of medial meniscal tears indicates secondary tears occurring as a result of repeated episodes of instability, and these are preventable by early ACL reconstruction.

The tenth paper[53] compared the effect of two femoral graft fixation techniques (quadrupled hamstring graft by use of either ENDOBUTTON CL [Smith & Nephew Endoscopy, Andover, MA, USA] or Transfix [Arthrex, Naples, FL, USA]) with a bioabsorbable interference screw in the tibial tunnel on tunnel widening after ACL reconstruction. Thirty four patients were randomized into two groups – ENDOBUTTON and Transfix. Tunnel diameters were measured on computed tomograms, perpendicular to the tunnel long axis on oblique coronal and oblique sagittal planes at three levels: aperture, midway, and suspension point. Femoral tunnel widening at the aperture and midway was found to be significantly greater in the ENDOBUTTON group as compared to the Transfix group. Smaller loop length in the ENDOBUTTON group was associated with

lesser tunnel widening (not statistically significant). A trend toward decreased tunnel widening was observed at the aperture on the tibial side when the tip of the screw was 10–15 mm away from the aperture. Authors argued that the role of aperture fixation on the tibial side in decreasing tunnel widening is still not clear. Moreover, placing the screw very close to the joint line increases synovial fluid tracking into tibial tunnels. The least tunnel widening at the tibial tunnel aperture was noted in this Indian study when the screw tip to joint line distance was 10–15 mm. This trend was contradictory to the popular belief of aperture fixation. Authors speculated that, probably by keeping the screw tip about 10 mm away from the joint line, the graft fills the tunnel aperture better, decreasing synovial fluid tracking and allowing for better graft healing. This "near-" aperture fixation may provide advantages of aperture fixation, preserving biology at the same time.

Some papers written earlier have also been well cited and may be mentioned here.[69,70] One of these is a series of five cases of "Mucoid degeneration of the ACL" published in the year 2004 in the arthroscopy journal (cited 34 times in the SCOPUS and 26 times in the WoS). Another paper was "An anatomic study of the popliteo-fibular ligament" published in the year 2003 in "International Orthopaedics" (cited 14 times in the SCOPUS and 14 times in the WoS).

Arthroscopy became popular in India, only at the beginning of the 21st century. Although quite away from the top 25 papers in the field globally,[27] the pace of work has been fast in India. A lot has been achieved in the past 10 years, and it is expected that the research and practice in the subject will grow rapidly shortly.

Conclusion

In this paper, we have briefly discussed the most cited papers in arthroscopy from India. It may give a unique insight into the inspiring history and development of arthroscopy in India, in the recent past, and also about the institutions and authors who have contributed to this and have since become national leaders in arthroscopy as well as orthopedics in general. Publications in high-impact, reputed journals attract more citations and therefore it is recommended that the "good" scientific research and work should preferably be submitted to these journals to create greater impact and awareness about ones' research and publication. We believe that the articles presented in this study may serve as a list of Indian "classic" articles in arthroscopy and orthopedic sports medicine, to be read by postgraduate residents and fellows. Studying these papers may give some insights on what qualities make an article relevant to global peers in the specialty and also inspire for writing such articles in the future.

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Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Van Noorden R, Maher B, Nuzzo R. The top 100 papers. Nature 2014;514:550-3.
2. Baltussen A, Kindler CH. Citation classics in anesthetic journals. Anesth Analg 2004;98:443-51.
3. Baltussen A, Kindler CH. Citation classics in critical care medicine. Intensive Care Med 2004;30:902-10.
4. Fan JC, McGhee CN. Citation analysis of the most influential authors and ophthalmology journals in the field of cataract and corneal refractive surgery 2000-2004. Clin Exp Ophthalmol 2008;36:54-61.
5. Guimarães JA, Carlini CR. Most cited papers in Toxicon. Toxicon 2004;44:345-59.
6. Key JD. Citation classics: Most-cited articles from archives of PM&R. Arch Phys Med Rehabil 1988;69:1058-9.
7. Loonen MP, Hage JJ, Kon M. Value of citation numbers and impact factors for analysis of plastic surgery research. Plast Reconstr Surg 2007;120:2082-91.
8. Loonen MP, Hage JJ, Kon M. Plastic surgery classics: Characteristics of 50 top-cited articles in four plastic surgery journals since 1946. Plast Reconstr Surg 2008;121:320e-27e.
9. Ollerton JE, Sugure M. Citation classics in trauma. J Trauma 2005;58:364-9.
10. Paladugu R, Schein M, Gardezi S, Wise L. One hundred citation classics in general surgical journals. World J Surg 2002;26:1099-105.
11. Roy D, Hughes JP, Jones AS, Fenton JE. Citation analysis of otorhinolaryngology journals. J Laryngol Otol 2002;116:363-6.
12. Stern RS, Arndt KA. Classic and near-classic articles in the dermatologic literature. Arch Dermatol 1999;135:948-50.
13. Stern RS, Arndt KA. Top-cited dermatology authors publishing in 5 "high-impact" general medical journals. Arch Dermatol 2000;136:357-61.
14. Lefaivre KA, Shadgan B, O'Brien PJ. 100 most cited articles in orthopaedic surgery. Clin Orthop Relat Res 2011;469:1487-97.
15. Kelly JC, Glynn RW, O'Briain DE, Felle P, McCabe JP. The 100 classic papers of orthopaedic surgery: A bibliometric analysis. J Bone Joint Surg Br 2010;92:1338-43.
16. Banaszkiewicz PA. Main introduction. In: Banaszkiewicz PA, Kader DF, editors. Classic Papers in Orthopaedics. 1st ed. Springer-Verlag London; 2014. p. 1-3.
17. Namdari S, Baldwin K, Kovatch K, Huffman GR, Glaser D. Fifty most cited articles in orthopedic shoulder surgery. J Shoulder Elbow Surg 2012;21:1796-802.
18. Huo YQ, Pan XH, Li QB, Wang XQ, Jiao XJ, Jia ZW, *et al.* Fifty top-cited classic papers in orthopedic elbow surgery: A bibliometric analysis. Int J Surg 2015;18:28-33.
19. Baldwin KD, Kovatch K, Namdari S, Sankar W, Flynn JM, Dormans JP, *et al.* The 50 most cited articles in pediatric orthopedic surgery. J Pediatr Orthop B 2012;21:463-8.
20. Bayley M, Brooks F, Tong A, Hariharan K. The 100 most cited papers in foot and ankle surgery. Foot (Edinb) 2014;24:11-6.
21. Ahmad SS, Evangelopoulos DS, Abbasian M, Röder C, Kohl S. The hundred most-cited publications in orthopaedic knee research. J Bone Joint Surg Am 2014;96:e190.
22. Lefaivre KA, Guy P, O'Brien PJ, Blachut PA, Shadgan B, Broekhuyse HM. Leading 20 at 20: Top cited articles and authors in the Journal of Orthopaedic Trauma, 1987-2007. J Orthop Trauma 2010;24:53-8.

23. Baldwin K, Namdari S, Donegan D, Kovatch K, Ahn J, Mehta S, *et al*. 100 most cited articles in fracture surgery. Am J Orthop (Belle Mead NJ) 2013;42:547-52.
24. Lee S, Shin J, Haro M, Khair M, Riboh JC, Kuhns BD, *et al.* Fifty most cited articles for femoroacetabular impingement and hip arthroscopy. Front Surg 2015;2:41.
25. Nayar SK, Dein EJ, Spiker AM, Bernard JA, Zikria BA. The top 100 cited articles in clinical orthopedic sports medicine. Am J Orthop (Belle Mead NJ) 2015;44:E252-61.
26. Voleti PB, Tjoumakaris FP, Rotmil G, Freedman KB. Fifty most-cited articles in anterior cruciate ligament research. Orthopedics 2015;38:e297-304.
27. Cassar Gheiti AJ, Downey RE, Byrne DP, Molony DC, Mulhall KJ. The 25 most cited articles in arthroscopic orthopaedic surgery. Arthroscopy 2012;28:548-64.
28. Arshi A, Siesener NJ, McAllister DR, Williams RJ, Sherman SL, Jones KJ. The 50 most cited articles in orthopedic cartilage surgery. Cartilage 2016;7:238-47.
29. Joyce CW, Kelly JC, Carroll SM. The 100 top-cited classic papers in hand surgery. J Plast Surg Hand Surg 2014;48:227-33.
30. To P, Atkinson CT, Lee DH, Pappas ND. The most cited articles in hand surgery over the past 20-plus years: A modern-day reading list. J Hand Surg Am 2013;38:983-7.
31. Holzer LA, Holzer G. The 50 highest cited papers in hip and knee arthroplasty. J Arthroplasty 2014;29:453-7.
32. Elgafy HK. Top 20 cited Spine journal articles, 1990-2009. World J Orthop 2014;5:392.
33. Murray MR, Wang T, Schroeder GD, Hsu WK. The 100 most cited spine articles. Eur Spine J 2012;21:2059-69.
34. Dong F, Fan M, Jia Z. Fifty top-cited fracture articles from china: A systematic review and bibliometric analysis. J Orthop Surg Res 2016;11:71.
35. Jia Z, Ding F, Wu Y, He Q, Ruan D. The 50 most-cited articles in orthopaedic surgery from mainland China. Clin Orthop Relat Res 2015;473:2423-30.
36. Makris GC, Spanos A, Rafailidis PI, Falagas ME. Increasing contribution of China in modern biomedical research. Statistical data from ISI web of knowledge. Med Sci Monit 2009;15:SR15-21.
37. Kanna RM, Falavigna A, da Silva PG, Quadros FW, Merlin LH, Radaelli L, *et al*. Trends in scientific publications of Indian spine surgeons over 14 years (2000-2013). Indian J Orthop 2016;50:322-6.
38. Ray S, Shah I, Nundy S. The research output from Indian medical institutions between 2005 and 2014. Curr Med Res Pract 2016;6:49-58.
39. Holmgren M, Schnitzer SA. Science on the rise in developing countries. PLoS Biol 2004;2:e1.
40. Government of India. Bibliometric Study of India's Scientific Publication Outputs during 2001-2010 – Evidence for Changing Trends. New Delhi: Department of Science and Technology, Government of India; 2012.
41. Piolanti N, Nesti A, Andreani L, Parchi PD, Cervi V, Castellini I, *et al*. The fifty most cited Italian articles in the orthopaedic literature. Musculoskelet Surg 2015;99:105-11.
42. Gürbüz Y, Süğün TS, Özaksar K. A bibliometric analysis of orthopedic publications originating from Turkey. Acta Orthop Traumatol Turc 2015;49:57-66
43. Fingerman S. Web of science and Scopus: Current features and capabilities. Issues Sci Technol Librarianship 2006;48. Available online from: http://www.istl.org/06-fall/electronic2.html. [Last accessed on 2017 Jul 25].
44. Burnham JF. Scopus database: A review. Biomed Digit Libr 2006;3:1.
45. LaGuardia C. E-views and reviews: Scopus vs. Web of science. Libr J 2005; 130:40-3.
46. Jacso P. As we may search-comparison of major features of the Web of Science, Scopus, and Google Scholar citation based and citation-enhanced databases. Curr Sci 2005;89:1537-47.
47. Waltman W. A review of the literature on citation impact indicators. J Inf 2016;10:365-91.
48. Martínez MA, Herrera M, López-Gijón J, Herrera-Viedma E. H-Classics: Characterizing the concept of citation classics through H-index. Scientometrics 2014;98:1971-83.
49. Patel S, Dhillon MS, Aggarwal S, Marwaha N, Jain A. Treatment with platelet-rich plasma is more effective than placebo for knee osteoarthritis: A prospective, double-blind, randomized trial. Am J Sports Med 2013;41:356-64.
50. Dhillon MS, Bali K, Vasistha RK. Immunohistological evaluation of proprioceptive potential of the residual stump of injured anterior cruciate ligaments (ACL). Int Orthop 2010;34:737-41.
51. Goyal D, Keyhani S, Lee EH, Hui JH. Evidence-based status of microfracture technique: A systematic review of level I and II studies. Arthroscopy 2013;29:1579-88.
52. Goyal D. Medial patellofemoral ligament reconstruction: The superficial quad technique. Am J Sports Med 2013;41:1022-9.
53. Sabat D, Kundu K, Arora S, Kumar V. Tunnel widening after anterior cruciate ligament reconstruction: A prospective randomized computed tomography-based study comparing 2 different femoral fixation methods for hamstring graft. Arthroscopy 2011;27:776-83.
54. Grewal R, MacDermid JC, Shah P, King GJ. Functional outcome of arthroscopic extensor carpi radialis brevis tendon release in chronic lateral epicondylitis. J Hand Surg Am 2009;34:849-57.
55. Han SB, Shetty GM, Lee DH, Chae DJ, Seo SS, Wang KH, *et al.* Unfavorable results of partial meniscectomy for complete posterior medial meniscus root tear with early osteoarthritis: A 5- to 8-year followup study. Arthroscopy 2010;26:1326-32.
56. Shetty VD, Villar RN. Hip arthroscopy: Current concepts and review of literature. Br J Sports Med 2007;41:64-8.
57. Naranje S, Mittal R, Nag H, Sharma R. Arthroscopic and magnetic resonance imaging evaluation of meniscus lesions in the chronic anterior cruciate ligament–deficient knee. Arthroscopy 2008;24:1045-51.
58. Goyal D, Goyal A, Keyhani S, Lee EH, Hui JH. Evidence-based status of second- and third-generation autologous chondrocyte implantation over first generation: A systematic review of level I and II studies. Arthroscopy 2013;29:1872-8.
59. Joseph C, Pathak SS, Aravinda M, Rajan D. Is ACL reconstruction only for athletes? A study of the incidence of meniscal and cartilage injuries in an ACL-deficient athlete and non-athlete population: An Indian experience. Int Orthop 2008;32:57-61.
60. Bali K, Dhillon MS, Vasistha RK, Kakkar N, Chana R, Prabhakar S, *et al.* Efficacy of immunohistological methods in detecting functionally viable mechanoreceptors in the remnant stumps of injured anterior cruciate ligaments and its clinical importance. Knee Surg Sports Traumatol Arthrosc 2012;20:75-80.
61. Adams AB, Simonson D. Publication, citations, and impact factors of leading investigators in critical care medicine. Respir Care 2004;49:276-81.
62. Bhandari M, Busse J, Devereaux PJ, Montori VM, Swiontkowski M, Tornetta Iii P, *et al.* Factors associated with citation rates in the orthopedic literature. Can J Surg 2007;50:119-23.
63. Cheek J, Garnham B, Quan J. What's in a number? Issues in

providing evidence of impact and quality of research (ers). Qual Health Res 2006;16:423-35.
64. Seglen PO. Why impact factor of journals should not be used for evaluating research. BMJ 1997;314:498-502.
65. Garfield E, Merton RK. Citation indexing: Its theory and application in science, technology, and humanities. New York: Wiley; 1979
66. Cole S. Citation and the evaluation of individual scientists. Trends Biochem Sci 1989;14:9-13.
67. Campbell FM. National bias: A comparison of citation practices by health professionals. Bull Med Libr Assoc 1990;78:376-82.
68. Hirsch JE. An index to quantify an individual's scientific research output. Proc Natl Acad Sci USA 2005;102:16569-72.
69. Narvekar A, Gajjar S. Mucoid degeneration of the anterior cruciate ligament. Arthroscopy 2004;20:141-6.
70. Wadia FD, Pimple M, Gajjar SM, Narvekar AD. An anatomic study of the popliteofibular ligament. Int Orthop 2003;27:172-4.