

The Most Cited Top 100 Articles in Shoulder Arthroscopy

Nejcitovanějších 100 článků v artroskopii ramena

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ABSTRACT

PURPOSE OF THE STUDY

The purpose of this study was to identify and analyze the current most cited top-100 articles in shoulder arthroscopy literature.

MATERIAL AND METHODS

This retrospective analysis obtained bibliometric information from the Web of Science (WoS) database and analyzed the data via VOSviewer through software package.

RESULTS

The citation count of the most-cited articles varied from 122 to 923 on WoS. Altogether, the top 100 articles were cited 19,726 times; the average number of citations among the articles was 197.26. According to an abstract analysis, the most frequent terms were rotator cuff tear, tear, instability, and pain. A total of 73 of the top-100 cited articles were published between 2000–2014, while the oldest article was published in 1986. The most productive year was in 2007 (15 publications), and the most productive countries were the United States of America (63 publications) and France (15 publications).

CONCLUSIONS

Shoulder arthroscopy has been increasingly performed as an outpatient procedure in recent years. Our study may provide insights into trending topics in shoulder arthroscopy, the qualities which make an article relevant to global peers in the specialty, and may also serve to inspire relevant future articles.

Clinical Relevance: The most cited top 100 articles in shoulder arthroscopy may give some insights on what qualities make an article relevant to global peers in the specialty and also inspire further relevant research in the future.

Key words: arthroscopy, shoulder arthroscopy, bibliometric study, the most cited articles.

INTRODUCTION

Arthroscopy has brought a new dimension to surgical anatomy, making a great impact on shoulder surgery by facilitating the correct diagnosis of glenohumeral joint, subacromial space, and acromioclavicular joint maladies and surgically treating various pathologies involving the shoulder (1, 20). Arthroscopy technique is performed routinely as an outpatient procedure by orthopedic surgeons now. Shoulder arthroscopy is widely used for the treatment of pathological processes involving the shoulder, including rotator cuff tears, labral tears, proximal biceps long-head tendon, degenerative arthritis, and subacromial impingement, and provides important advantages (11, 30, 31). In addition to the contribution of this technique to the diagnosis and treatment of shoulder pathologies, its advantages, including safety, low complication rates, and early mobilization of patients, have attracted attention in orthopedic literature (17).

Numerous publications regarding orthopedic surgery are published in medical journals every year (8). The literature, including the medical literature, shows con-

siderable expansion thanks to contributions and recent developments from researchers, and the number of publications, including orthopedic surgery, increase daily (26). The scientific contribution of a publication is measured by its number of qualified publications, which has determinants, such as the total number of articles of academician, the h-index, and the number of citations per article (21, 32). The number of citations per article is an indication of its impact on the area in which it was published. In other words, a high number of article citations indicates that the validity of the scientific findings put forward by the author is accepted by researchers (9, 25, 29). However, popular research topics can also be effective in getting citations. Lewis ve Pizam stated that a qualified publication is important for the growth and advancement of knowledge in the academic field (22). Even though there are many methods of evaluating the academic impact of scientific publications that have an important role in the development and advancement of science, citation analysis is a frequently used method (8, 12). Citation analysis is a bibliometric process which evaluates citation frequency and patterns in articles. This

analysis is important in terms of the use of quantitative parameters in the evaluation of publication performance and it provides a simple and quick impression regarding the quality of the publication (29). Furthermore, it is common in medical literature to conduct a citation analysis, report citations, and create a citation index specific to a specialty (23). In the literature, some studies have been published in the field of orthopedics and traumatology, as well as hip arthroscopy (4), wrist arthroscopy (12), trauma surgery (25), elbow surgery (16), orthopedic shoulder (23), orthopedic oncology (8), pediatric orthopedic (3), which even analyze publications on the basis of countries and regions (9, 15, 26, 28). The purpose of this study to identify and analyze the most cited top-100 articles in shoulder arthroscopy literature. The hypotheses of this study are 1) the publications after 2000s would have an impact on the total number of times an article was cited, 2) the publications in open access would have to get more citation than published in limited access.

MATERIAL AND METHODS

As the data were obtained from a public database, this study did not require approval from an ethics committee or informed consent. This retrospective analysis obtained bibliometric information from the Web of Science (WoS) database. The Web of Science is a Web technology, owned by Thomson Reuters, consisting of bibliographic databases, citations, and references of scientific publications in all disciplines: scientific, technological, humanistic, and sociological. It contains more than 12,000 live journals, 23 million patents, 148,000 congress proceedings, more than 40 million publications, and 760 million sources of cited references (27).

The query was conducted in April 2020 after determining the keywords related to the selection strategy.

The timespan of the search included the years from 1970 to 2020. Bibliometric analyses and network visualization were performed using VOSviewer (Version 1.6.10) through software package.

SPSS 23 program II was used for statistical analysis of the findings obtained from the study. The consistency of continuous variables to normal distribution was examined with the Kolmogorov-Smirnov test. In order to define the sample, variables suitable for normal distribution were expressed as mean \pm standard deviation and variables that were not suitable for normal distribution were indicated by median (minimum-maximum). In cases where categorical variables test assumptions were provided "Chi-Square" was used for the difference between the two independent variables. A 95% confidence interval (or $\alpha = 0.05$ margin of error) was used to determine the differences in the analyzes.

The following keywords were utilized: "[(shoulder arthroscopy OR arthroscopic shoulder OR shoulder arthroscopic) AND (arthroscopy OR arthroscopic) AND shoulder]". A wide search was used to ensure the greatest number of results; no restrictions were placed on our search.

The publications identified as a result of the search were arranged in descending order by the number of citations. The titles and abstracts of the publications were reviewed, and the two authors independently selected the 100 most-cited publications. Studies that were not related to shoulder arthroscopy were removed. Studies providing information about shoulder arthroscopy, indications, complications, comparative studies, and/or systematic compilation were included. A Kappa test was performed to measure the compatibility between the two authors who selected the publications. As the Kappa statistic value in our study was 0.74 (10), it was seen that a good level of agreement was available among the authors.

RESULTS

After the first search, 4,239 preliminary results were obtained. The first 150 articles were reviewed in terms of title, keywords, and summary, and the 100 most-cited publications were selected (Fig. 1).

The top 100 articles on the shoulder arthroscopy received a total of 19,726 citations, and all of the citations appeared over 100 times. All of the articles were published between 1990 and 2014; 48 were published from 2005 to present. Among the top-100 cited articles, 27 articles were published in the 1990s (1989–1999); 62 in the 2000s (2000–2009); and 11 were published from 2010 to present (Fig. 2). In 2007, the most articles (15) were published.

The study conducted by Bukhart et al. (6) ranked first among the most-cited publications (923), the study conducted by Boileau et al. (5) ranked second with 747 citations, and the study conducted by Ogilvie-Harris and Wiley (24) was the. Details on the 100 most-cited articles in shoulder arthroscopy are shown in Table 1.

The oldest publication was published by Ogilvie-Harris and Wiley (24) in 1986, the newest publication

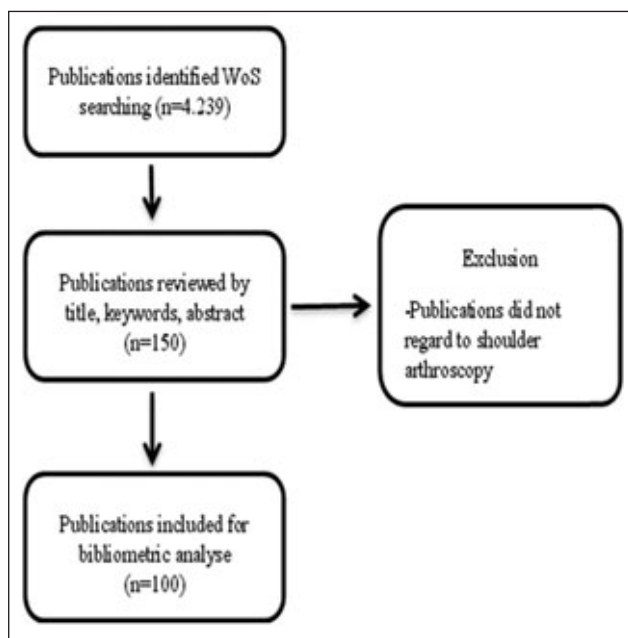


Fig. 1. Flow chart.

Table 1. The most cited top 100 publications in shoulder arthroscopy

| Rank | WoS citation | Average citation | Title |
|------|--------------|------------------|---|
| 1 | 923 | 43.95 | Traumatic glenohumeral bone defects and their relationship to failure of arthroscopic Bankart repairs: significance of the inverted-pear glenoid and the humeral engaging Hill-Sachs lesion |
| 2 | 747 | 46.69 | Arthroscopic repair of full-thickness tears of the supraspinatus: does the tendon really heal? |
| 3 | 508 | 33.87 | Risk factors for recurrence of shoulder instability after arthroscopic Bankart repair |
| 4 | 449 | 32.07 | Repair integrity and functional outcome after arthroscopic double-row rotator cuff repair – a prospective outcome study |
| 5 | 399 | 24.94 | Functional and structural outcome after arthroscopic full-thickness rotator cuff repair: single-row versus dual-row fixation |
| 6 | 352 | 23.47 | Cuff integrity after arthroscopic versus open rotator cuff repair: a prospective study |
| 7 | 325 | 19.12 | Detection and quantification of rotator cuff tears – comparison of ultrasonographic, magnetic resonance imaging, and arthroscopic findings in seventy-one consecutive cases |
| 8 | 292 | 13.9 | Ultrasonography of the rotator cuff – a comparison of ultrasonographic and arthroscopic findings in one hundred consecutive cases |
| 9 | 288 | 20.57 | Isolated arthroscopic biceps tenotomy or tenodesis improves symptoms in patients with massive irreparable rotator cuff tears |
| 10 | 286 | 17.88 | Arthroscopic tenotomy of the long head of the biceps in the treatment of rotator cuff tears: clinical and radiographic results of 307 cases |
| 11 | 279 | 19.93 | Equivalent clinical results of arthroscopic single-row and double-row suture anchor repair for rotator cuff tears – a randomized controlled trial |
| 12 | 277 | 12.04 | Arthroscopic repair of full-thickness tears of the rotator cuff |
| 13 | 276 | 19.71 | The outcome and structural integrity of arthroscopic rotator cuff repair with use of the double-row suture anchor technique |
| 14 | 273 | 27.3 | Platelet-rich plasma augmentation for arthroscopic rotator cuff repair a randomized controlled trial |
| 15 | 269 | 11.21 | Pathologic changes associated with shoulder dislocations – arthroscopic and physical examination findings in first-time, traumatic anterior dislocations |
| 16 | 260 | 9.63 | Arthroscopic Bankart repair versus nonoperative treatment for acute, initial anterior shoulder dislocations |
| 17 | 240 | 15 | Arthroscopic single-row versus double-row suture anchor rotator cuff repair |
| 18 | 234 | 11.14 | Arthroscopic treatment of anterior-inferior glenohumeral instability – two to five-year follow-up |
| 19 | 229 | 22.9 | Platelet rich plasma in arthroscopic rotator cuff repair: a prospective RCT study, 2-year follow-up |
| 20 | 227 | 11.35 | Arthroscopic rotator cuff repair: analysis of results by tear size and by repair technique – margin convergence versus direct tendon-to-bone repair |
| 21 | 227 | 10.81 | Comparison of arthroscopic and open anterior shoulder stabilization – a two to six-year follow-up study |
| 22 | 214 | 26.75 | Clinical results of arthroscopic superior capsule reconstruction for irreparable rotator cuff tears |
| 23 | 210 | 11.05 | A prospective, randomized evaluation of arthroscopic stabilization versus nonoperative treatment in patients with acute, traumatic, first-time shoulder dislocations |
| 24 | 209 | 11.61 | Arthroscopic anterior stabilization of the shoulder – two to six-year follow-up |
| 25 | 197 | 14.07 | The arthroscopic Latarjet procedure for the treatment of anterior shoulder instability |
| 26 | 196 | 11.53 | Arthroscopic versus open treatment of Bankart lesion of the shoulder: a prospective randomized study |
| 27 | 194 | 13.86 | Arthroscopic rotator cuff repair with double-row fixation |
| 28 | 193 | 10.16 | Arthroscopic biceps tenodesis: a new technique using bioabsorbable interference screw fixation |
| 29 | 190 | 14.62 | Arthroscopic replacement of massive, irreparable rotator cuff tears using a graftjacket allograft: technique and preliminary results |
| 30 | 190 | 6.13 | Arthroscopic evaluation of acute initial anterior shoulder dislocations |
| 31 | 188 | 6.48 | Rotator cuff disease – assessment with MR arthrography versus standard MR imaging in 36 patients with arthroscopic confirmation |
| 32 | 186 | 14.31 | Hill-Sachs remplissage: an arthroscopic solution for the engaging Hill-Sachs lesion |
| 33 | 186 | 11.63 | Arthroscopic anterior shoulder stabilization of collision and contact athletes |
| 34 | 185 | 6.85 | The Buford complex – the cord-like middle glenohumeral ligament and absent anterosuperior labrum complex – a normal anatomic capsulolabral variant |

| Rank | WoS citation | Average citation | Title |
|------|--------------|------------------|---|
| 35 | 184 | 9.68 | Arthroscopic subscapularis tendon repair: technique and preliminary results |
| 36 | 177 | 7.38 | Immunolocalization of cytokines and their receptors in adhesive capsulitis of the shoulder |
| 37 | 176 | 7.65 | Arthroscopic rotator cuff repair: analysis of technique and results at 2- and 3-year follow-up |
| 38 | 175 | 6.25 | Interscalene block for shoulder arthroscopy – comparison with general-anesthesia |
| 39 | 173 | 14.42 | Arthroscopic treatment of isolated type ii slap lesions biceps tenodesis as an alternative to reinsertion |
| 40 | 173 | 7.86 | Prospective randomized clinical trial comparing the effectiveness of immediate arthroscopic stabilization versus immobilization and rehabilitation in first traumatic anterior dislocations of the shoulder |
| 41 | 171 | 5.7 | Arthroscopic treatment of massive rotator cuff tears – clinical-results and biomechanical rationale |
| 42 | 170 | 12.14 | Structural integrity and clinical outcomes after arthroscopic repair of isolated subscapularis tears |
| 43 | 169 | 7.04 | Arthroscopic Bankart repair in a high demand patient population |
| 44 | 169 | 6.04 | Arthroscopic surgery compared with supervised exercises in patients with rotator cuff disease (stage-I impingement syndrome) |
| 45 | 168 | 6.46 | US depiction of partial-thickness tear of the rotator cuff |
| 46 | 167 | 18.56 | A prospective, randomized evaluation of acellular human dermal matrix augmentation for arthroscopic rotator cuff repair |
| 47 | 167 | 15.18 | Factors affecting healing rates after arthroscopic double-row rotator cuff repair |
| 48 | 167 | 9.82 | Anterosuperior impingement of the shoulder as a result of pulley lesions: a prospective arthroscopic study |
| 49 | 166 | 12.77 | Use of preoperative three-dimensional computed tomography to quantify glenoid bone loss in shoulder instability |
| 50 | 166 | 10.38 | Arthroscopic release of the long head of the biceps tendon – functional outcome and clinical results |
| 51 | 164 | 11.71 | Arthroscopic rotator cuff repair: prospective functional outcome and repair integrity at minimum 2-year follow-up |
| 52 | 163 | 13.58 | A prospective randomized clinical trial comparing arthroscopic single- and double-row rotator cuff repair magnetic resonance imaging and early clinical evaluation |
| 53 | 161 | 7.32 | Arthroscopic surgery versus supervised exercises in patients with rotator cuff disease (stage II impingement syndrome): a prospective, randomized, controlled study in 125 patients with a 2 1/2-year follow-up |
| 54 | 160 | 11.43 | Arthroscopic repair of massive rotator cuff tears with stage 3 and 4 fatty degeneration |
| 55 | 159 | 6.36 | An arthroscopic technique for anterior stabilization of the shoulder with a bioabsorbable tack |
| 56 | 155 | 9.69 | Prospective randomized clinical trial comparing the effectiveness of immediate arthroscopic stabilization versus immobilization and rehabilitation in first traumatic anterior dislocations of the shoulder: long-term evaluation |
| 57 | 154 | 11 | Magnetic resonance imaging of arthroscopic supraspinatus tendon repair |
| 58 | 153 | 5.46 | Arthroscopic Bankart suture repair |
| 59 | 152 | 10.13 | Arthroscopic versus open shoulder stabilization for recurrent anterior instability – a prospective randomized clinical trial |
| 60 | 152 | 8.94 | Arthroscopic rotator cuff repair: 4-to 10-year results |
| 61 | 152 | 7.6 | Subscapularis, medial, and lateral head coracohumeral ligament insertion anatomy: arthroscopic appearance and incidence of hidden rotator interval lesions |
| 62 | 151 | 10.79 | Can a double-row anchorage technique improve tendon healing in arthroscopic rotator cuff repair? A prospective, nonrandomized, comparative study of double-row and single-row anchorage techniques with computed tomographic arthrography tendon healing assessment |
| 63 | 151 | 10.79 | Complications after arthroscopic rotator cuff repair |
| 64 | 151 | 7.95 | Bankart repair in traumatic anterior shoulder instability: open versus arthroscopic technique |
| 65 | 150 | 5 | Arthroscopic subacromial decompression for chronic impingement - 2-year to 5-year results |
| 66 | 150 | 4.29 | Arthroscopic surgery of the shoulder – a general appraisal |
| 67 | 149 | 10.64 | Arthroscopic stabilization in patients with an inverted pear glenoid – results in patients with bone loss of the anterior glenoid |
| 68 | 148 | 8.22 | All-arthroscopic versus mini-open rotator cuff repair: a long-term retrospective outcome comparison |
| 69 | 148 | 7.05 | Arthroscopic findings in the overhand throwing athlete: evidence for posterior internal impingement of the rotator cuff |

| Rank | WoS citation | Average citation | Title |
|------|--------------|------------------|--|
| 70 | 147 | 8.65 | Pain relief after arthroscopic shoulder surgery: a comparison of intraarticular analgesia, suprascapular nerve block, and interscalene brachial plexus block |
| 71 | 145 | 12.08 | Single-row versus double-row arthroscopic rotator cuff repair: a prospective randomized clinical study |
| 72 | 144 | 9 | Exercises versus arthroscopic decompression in patients with subacromial impingement: a randomised, controlled study in 90 cases with a one year follow up |
| 73 | 143 | 11 | Repair site integrity after arthroscopic transosseous-equivalent suture-bridge rotator cuff repair |
| 74 | 143 | 6.5 | Arthroscopic debridement and acromioplasty versus mini-open repair in the treatment of significant partial-thickness rotator cuff tears |
| 75 | 142 | 8.88 | Arthroscopic osseous Bankart repair for chronic recurrent traumatic anterior glenohumeral instability |
| 76 | 139 | 19.86 | Biologic augmentation of rotator cuff repair with mesenchymal stem cells during arthroscopy improves healing and prevents further tears: a case-controlled study |
| 77 | 139 | 7.32 | Complications associated with arthroscopic shoulder surgery |
| 78 | 138 | 7.26 | Arthroscopic repair of medium to large full-thickness rotator cuff tears: outcome at 2-to 6-year follow-up |
| 79 | 137 | 11.42 | Incidence and treatment of postoperative stiffness following arthroscopic rotator cuff repair |
| 80 | 137 | 9.79 | Is arthroscopic surgery for stabilisation of chronic shoulder instability as effective as open surgery? A systematic review and meta-analysis of 62 studies including 3044 arthroscopic operations |
| 81 | 137 | 6.52 | An analysis of the diagnostic accuracy of the hawkins and neer subacromial impingement signs |
| 82 | 137 | 4.89 | Arthroscopic versus open Bankart procedures – a comparison of early morbidity and complications |
| 83 | 136 | 9.71 | Arthroscopic compared with open repairs for recurrent anterior shoulder instability – a systematic review and meta-analysis of the literature |
| 84 | 135 | 9 | Outcome and structural integrity after arthroscopic rotator cuff repair using 2 rows of fixation – minimum 2-year follow-up |
| 85 | 135 | 5.19 | The resistant frozen shoulder – manipulation versus arthroscopic release |
| 86 | 134 | 13.4 | Factors affecting rotator cuff healing after arthroscopic repair osteoporosis as one of the independent risk factors |
| 87 | 134 | 7.44 | Arthroscopic posterior labral repair and capsular shift for traumatic unidirectional recurrent posterior subluxation of the shoulder |
| 88 | 134 | 5.15 | Arthroscopic stabilization for recurrent anterior shoulder dislocation – results of 59 cases |
| 89 | 132 | 12 | Retear patterns after arthroscopic rotator cuff repair single-row versus suture bridge technique |
| 90 | 132 | 5.28 | Arthroscopic release for chronic, refractory adhesive capsulitis of the shoulder |
| 91 | 129 | 12.9 | Arthroscopic rotator cuff repair using a suture bridge technique is the repair integrity actually maintained? |
| 92 | 129 | 4.61 | Arthroscopic treatment of full-thickness rotator cuff tears – 2-year to 7-year follow-up-study |
| 93 | 128 | 10.67 | Reverse total shoulder arthroplasty after failed rotator cuff surgery |
| 94 | 128 | 9.85 | Range of impingement-free abduction and adduction deficit after reverse shoulder arthroplasty hierarchy of surgical and implant-design-related factors |
| 95 | 128 | 9.85 | Arthroscopic treatment of cam-type femoroacetabular impingement |
| 96 | 127 | 6.68 | Arthroscopic repair of full-thickness tears of the rotator cuff: 2-to 14-year follow-up |
| 97 | 126 | 5.48 | Arthroscopic capsular plication for posterior shoulder instability |
| 98 | 125 | 15.63 | I.V. and perineural dexamethasone are equivalent in increasing the analgesic duration of a single-shot interscalene block with ropivacaine for shoulder surgery: a prospective, randomized, placebo-controlled study |
| 99 | 125 | 10.42 | Outcomes after arthroscopic repair of type-II slap lesions |
| 100 | 122 | 8.13 | Arthroscopic capsulolabral reconstruction for posterior instability of the shoulder – a prospective study of 100 shoulders |

was published by Hernigou et al. (14) in 2014 and the average age of the publications is 16.95; the mean annual citation is 12.16. The most-cited publication accumulated 923 citations. The number of citations per publication varied between 122 and 923, with an average of 197.26 (Table 2). The year 2012 received the highest number

of citations on an annual basis (1.628), and 2016 was second (1.436). The first 11 of the top 100 most-cited articles were published between 2000 and 2007; these publications received a total of 4,848 citations. This figure constitutes approximately one fourth of the total citations ($4.848/19.726 = 0.24$). It was seen that 75 of the

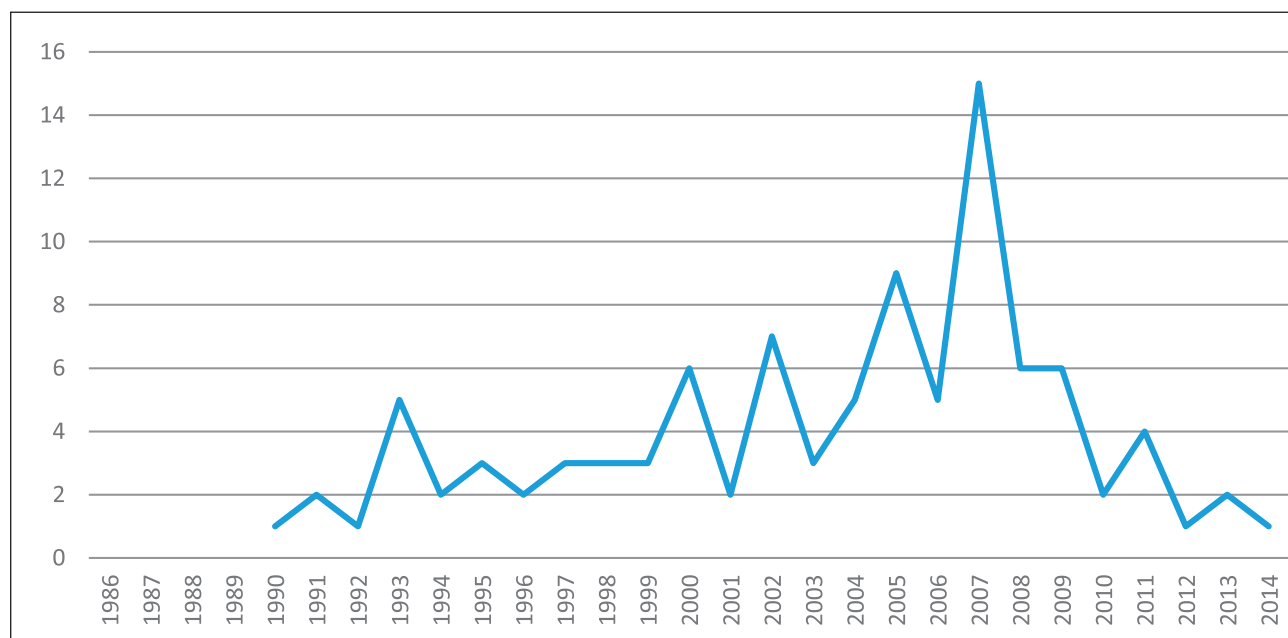


Fig. 2. The publication year of the most cited publications.

Table 2. Description statistics

| | N | Minimum | Maximum | Mean | Std. deviation |
|-------------------------|-----|---------|---------|--------|----------------|
| The age of publications | 100 | 6 | 34 | 16.95 | 6.02 |
| Publication year | 100 | 1986 | 2014 | 2003 | 6 |
| Total citation | 100 | 122 | 923 | 197.26 | 114.91 |
| Annual average citation | 100 | 4.3 | 46.7 | 12.16 | 7.51 |

Table 5. Statistics publication age, year, total citation, annual average citation and publication year group

| Variables | Publication year group | | P |
|-------------------------|------------------------|-------------------|-------|
| | 2000 and before (n=32) | After 2000 (n=68) | |
| Publication age | 24.313±3.5600 | 13.485±3.0493 | 0.000 |
| Publication year | 1995±3 | 2006±3 | 0.000 |
| Total citation | 200.531±139.3647 | 195.721±102.5644 | 0.668 |
| Annual average citation | 8.301±6.9169 | 13.9827±7.1253 | 0.000 |

Table 3. Groups of the accessibility and publication years

| | | Count | % |
|-------------------------|----------------|-------|----|
| Accessibility group | Open access | 75 | 75 |
| | Limited access | 25 | 25 |
| Publication years group | Before 2000 | 32 | 32 |
| | After 2000 | 68 | 68 |

Table 4. Statistics publication age, year, total citation, annual average citation and accessibility

| Variables | Accessibility group | | P |
|-------------------------|---------------------|-----------------|-------|
| | Open(n=75) | Limited(n=25) | |
| Publication age | 15.173±5.1291 | 22.280±5.2956 | 0.000 |
| Publication year | 2004±5 | 1997±5 | 0.000 |
| Total citation | 204.827±129.9876 | 174.560±40.7575 | 0.962 |
| Annual average citation | 13.576±8.0644 | 7.927±2.7087 | 0.000 |

100 most cited publications were open access, 25 were limited access, 68 publications were published after 2000 and 32 publications before 2000 (Table 3).

According to the accessibility of the publication, the average of open access was higher in the total number of citations and there was no statistically significant was found ($p = 0.962$). It was observed that open access publications received more citations on an annual basis, but there was no statistically significant difference found in the total number of citations over the years. In addition, the age of publication and the year of publication was found to be statistically significant according to their accessibility ($p < 0.005$) (Table 4).

Between the publication year group, the total number of citations, no statistically significant difference was found ($p = 0.668$). Although the average of 2000s and earlier publications was higher, the difference was very little. According to the publication year group, after-2000 publications were significantly superior in the average number of citations per year ($p < 0.005$). (Table 5).

There were 400 authors responsible for the top 100 most-cited articles. The network chart of 38 authors re-

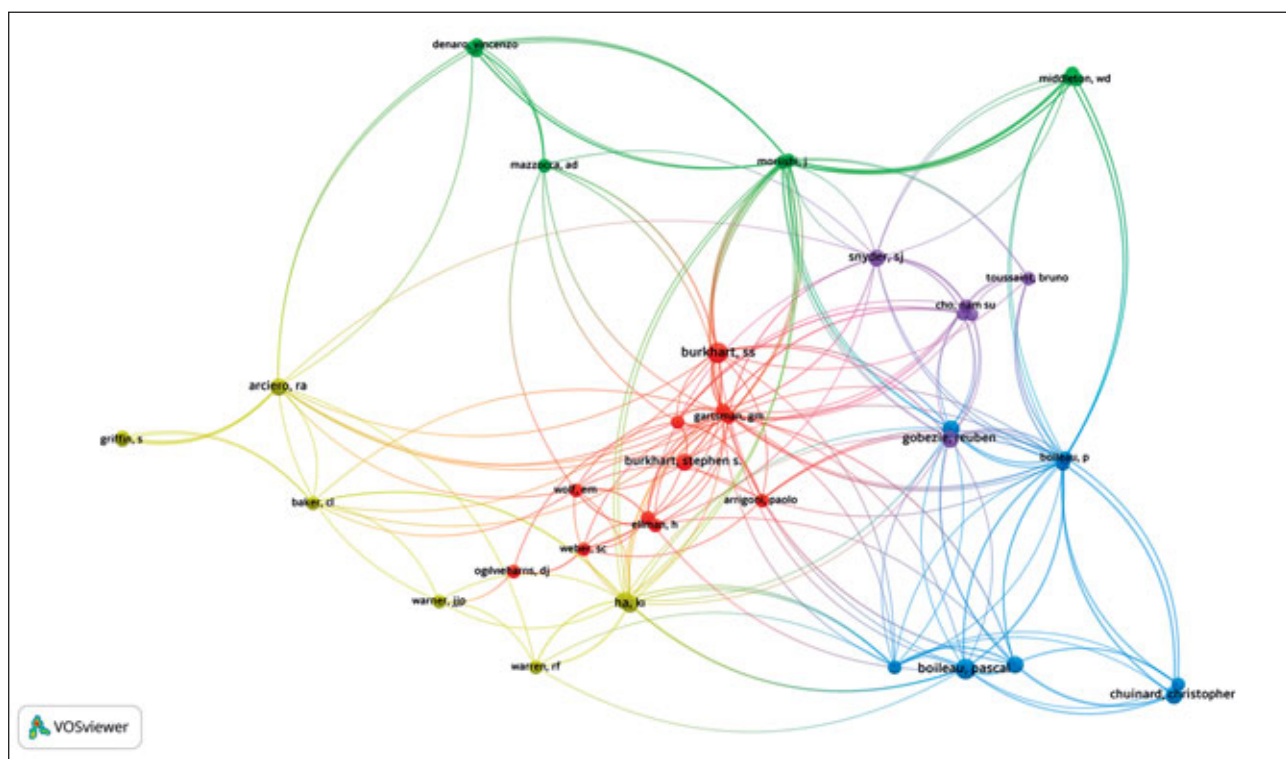


Fig. 3. Network visualization map for author analysis. Footnote: the size of the circle shows a large number of articles. The colors indicate the clusters and the thickness of the lines indicates the strength of the relationship. The number of citations from blue to red (blue-green-yellow-red) increases.

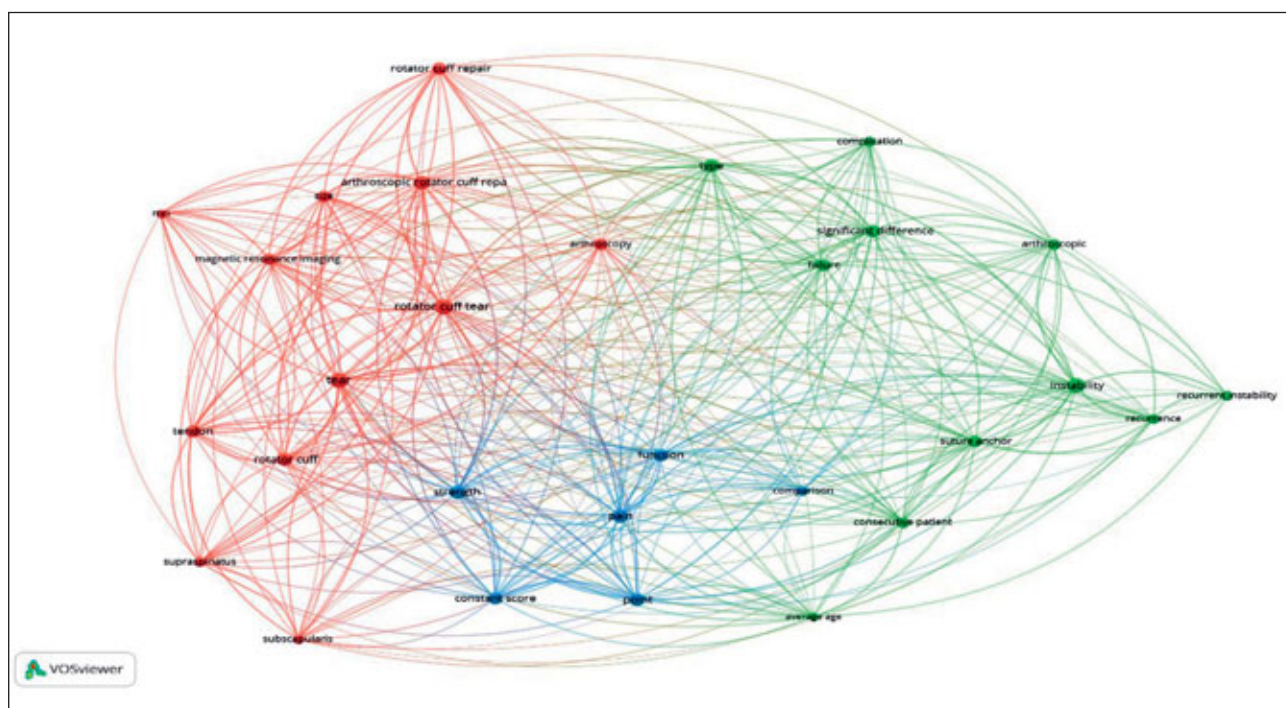


Fig. 4. Network visualization map for trend words. The size of the circle shows a large number of articles. The colors indicate the clusters and the thickness of the lines indicates the strength of the relationship. Indicator shows current publications from blue to red.

ceiving at least 20 citations is shown in Figure 3. Boileau P., Burkhart S. S., Chuinard C., Snyder S.J., Gobeze R. are among the most prolific authors of the top 100 most-cited articles; Boileau P. is the main author in 6 of 8 publications, Burkhart S.S. is the single author in one

of 7 publications, in 4 of which he is the main author, and Snyder S.J. has 4 publications.

A total of 2485 terms were used in the abstracts of the publications. Thirty-seven terms were used at least ten times. The network chart obtained as a result of clus-

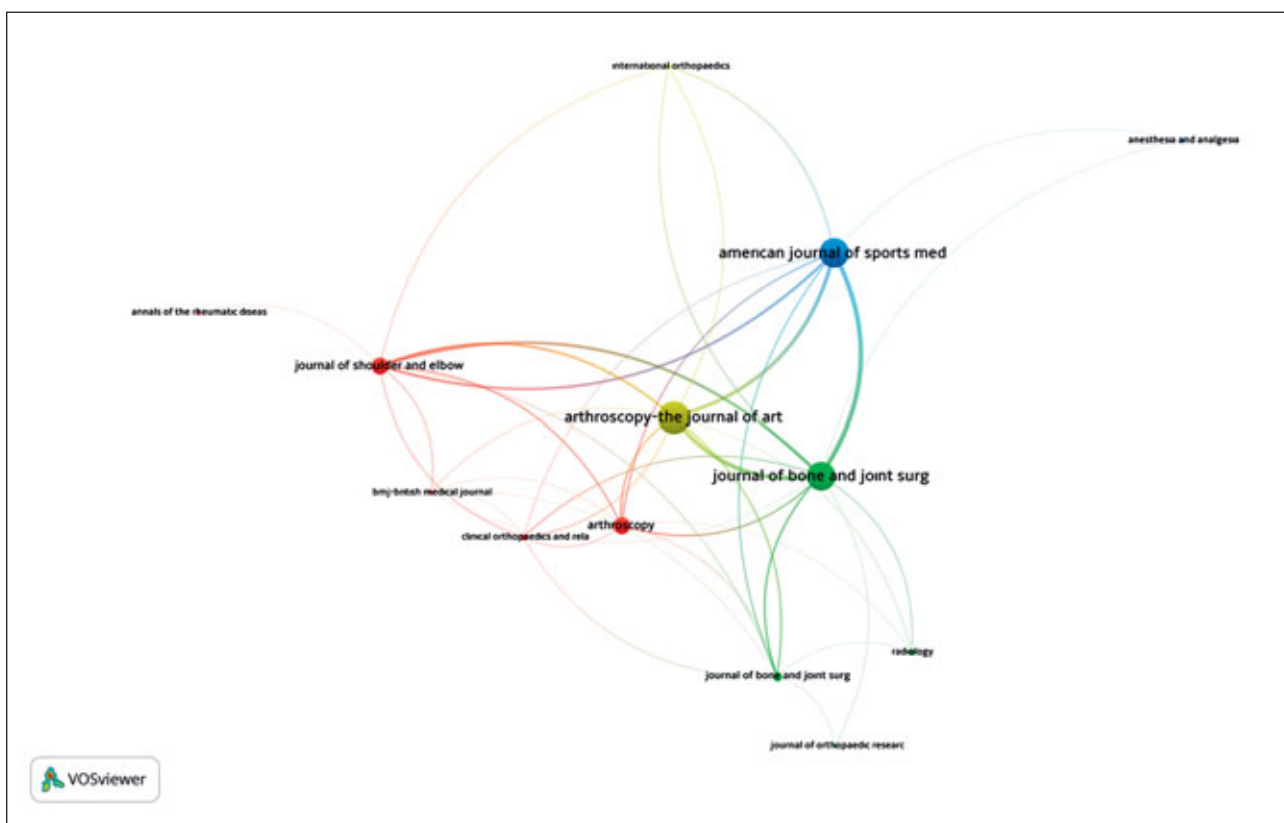


Fig. 5. Network visualization map for the citation analysis of the journals publishing articles. The size of the circle shows a large number of articles. The colors indicate the clusters and the thickness of the lines indicates the strength of the relationship.

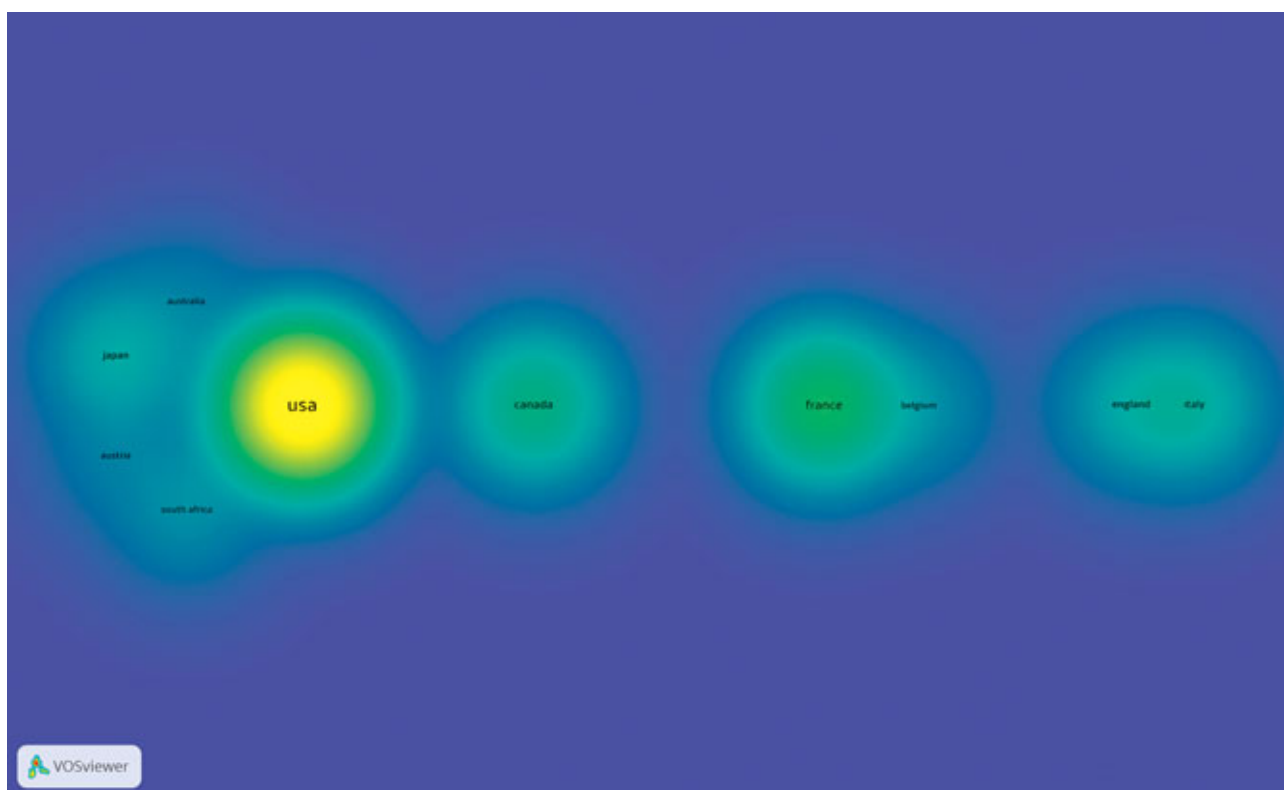


Fig. 6. Network visualization map of country analysis.

ter analysis conducted for grouping these terms is shown in Figure 4. The most frequently repeated terms were *rotator cuff tear* and *tear* (30 times), *instability* (26 times), and *pain* (24 times). This is understood from the fact that the circles of these terms are larger than the others. *Recurrent instability*, *recurrence* and *comparison* (12 times), and *supraspinatus* and *Magnetic Resonance Image (MRI)* (11 times) were among the least repeated terms.

Figure 5 shows the citation network chart among the journals in which the top 100 most-cited articles are published. The 100 most-cited publications were published in a total of 15 journals. Among them, 25 articles were published in *The Journal of Arthroscopic and Related Surgery*, 22 in the *American Journal of Sports Medicine*, and 21 were published in the *Journal of Bone and Joint Surgery – American Volume*.

The countries releasing the most-cited publications are shown in Figure 6. Among the 15 countries which published the top-100 cited articles, 63 were published in the United States of America, 15 in France, and 9 were published in Canada. Considering the institutions where the publications are produced, Southern California Orthopedic Institute (n = 5), University of Texas (n = 5) in the United States of America, and the University of Nice (n = 5) in France stand out as the most productive institutions, with a total of 15 publications.

DISCUSSION

This investigation and analysis of the top-100 most cited articles on shoulder arthroscopy contains results consistent with other similar studies (3, 23, 26). Shoulder arthroscopy, which has been widely performed since the 1990s, is a relatively new field. Considering the findings of our research, 74 of the top 100 most-cited publications in the field of shoulder arthroscopy were published after 2000. Furthermore, the first 11 of the 100 most-cited articles were published between 2000 and 2007 (a total of 4,848 citations).

Although the average number of citations of 2000 and later publications is higher than the total number of citations, there was no statistically significant difference with the average of 2000 and before publications; this finding supports that hypothesis 1).

In the analysis of the terms in the publication summaries, the words *rotator cuff tear*, *tear*, *instability*, and *pain* are distinguished from others in terms of frequency of use. Rotator cuff tears are the most common health problem in adults and are usually characterized by pain; it is estimated that 4.5 million people in the U.S. annually apply to hospital better annually present themselves to hospitals (7). Thus, it is not surprising that studies were conducted on such a commonly encountered phenomenon. In this study, it is seen that studies focused on rotator cuff, instability, and pain, whereby recurrence and its comparative studies were cited less frequently.

The most publications were produced in 2007 with 15 publications. In addition, the United States of America produced most of, with France taking second place. A to-

tal of 15 countries in the world contributed to the top 100 cited articles on shoulder arthroscopy. These results can be associated with the incidence of shoulder arthroscopies, which shows increasing tendency throughout the world (2, 3). Jain et al. reported that 272,148 arthroscopic rotator cuff repairs were performed in the USA in 2006 (18). In addition, Jo et al. reported that the prevalence of rotator cuff tears in Korea accounted for approximately 20% of the general population, and 383,719 arthroscopic rotator cuff tear surgeries were performed between 2007 and 2015 (19).

Considering the number of publications by journal, the 100 most-cited publications were published in a total of 15 journals. The following journals published 68 of the top-100 cited articles: *Arthroscopy – The Journal of Arthroscopic and Related Surgery*, *American Journal of Sports Medicine*, and the *Journal of Bone and Joint Surgery – American Volume*. It is considered that these journals are preferred by authors as they are leading journals with a high impact factor in the field of orthopedics and traumatology.

Limitations

Although our study describes the most effective publications in shoulder arthroscopy literature, it should be evaluated within the framework of certain limitations. Scanning only from the WoS database is the most important limitation of our research. The most-cited publications in other databases may not be included in our analysis. Another limitation of our study is that there is no evaluation of factors affecting citation analysis (such as publication bias).

CONCLUSIONS

Shoulder arthroscopy is a surgical method that has been increasingly applied as an outpatient procedure in recent years. It is inevitable that there is an increase in the number of publications in parallel with the daily development of evidence-based medical practices and medical technology. Our study may provide a perspective into trending topics in shoulder arthroscopy research. Additionally, these papers may give some insights on what qualities make an article relevant to global peers in the specialty and perhaps inspire additional research in the future.

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