International Journal of Surgery 18 (2015) 28–33

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.journal-surgery.net

Original research

Fifty top-cited classic papers in orthopedic elbow surgery: A bibliometric analysis

Yan-qing Huo [a], Xiao-han Pan [a], Qing-bo Li [a], Xi-qian Wang [a], Xie-jia Jiao [a], Zhi-wei Jia [b, **], Shao-jin Wang [a, *]

[a] Department of Orthopaedics, The Second Hospital of Shandong University, Jinan, China
[b] Graduate School, Second Military Medical University, Shanghai, China

HIGHLIGHTS

- All classic elbow papers were written in English and published in nine journals.
- The majority of classic elbow papers originated from United States.
- Fracture was the most discussed topic.
- The majority of classic elbow papers were clinical studies.
- The most common level of evidence was level IV.

ARTICLE INFO

Article history:
Received 10 January 2015
Received in revised form
14 January 2015
Accepted 21 March 2015
Available online 10 April 2015

Keywords:
Elbow
Classic papers
Citations
References

ABSTRACT

Objective: The number of citations that a paper has received reflects the impact of the article within a particular medical area. Citation analysis concerning the most cited articles have been widely reported in orthopedic surgery and its subspecialties. However, which articles are cited most frequently in orthopedic elbow surgery is unknown. This study aimed to identify and analyze the characteristics of the 50 most cited articles in elbow surgery.

Methods: Science Citation Index Expanded was used to search for citations in 181 journals chosen according to the relevance for elbow publications. The 50 most cited articles in elbow surgery were identified. The title, authors, year of publications, article type, journal source, country, institution, number of citations, decade published, citation density and level of evidence were recorded and analyzed.

Results: The 50 most cited articles were published between 1950 and 2010. The 1980s was the most productive decade. The number of citations ranged from 388 to 124. All the articles were written in English and published in nine journals. The majority of articles originated from United States, followed by Canada and United Kingdom. Fracture was the most discussed topic. The majority of the top cited articles were clinical studies, with the remaining basic research. The most common level of evidence was level IV.

Conclusions: Identification of the most cited papers in elbow surgery shows an insight into the historical development of elbow surgery and provides the foundation for further investigations.

1. Introduction

Orthopedic elbow surgery is the special field of medicine including the prevention, diagnosis, treatment, and rehabilitation of elbow-associated diseases. There has been a large number of elbow articles published in medical journals over the years, while the number is still increasing. Among them, the classic papers have promoted the development of elbow surgery. However, little work has been conducted to identify these important papers.

There are many methods to evaluate the significance of a scientific paper. Citation is the acknowledgment that a previous article has been referenced by the author's article. It indicates the

* Corresponding author. No. 247 Beiyuan Street, Jinan 250033, China.
** Corresponding author.
E-mail addresses: jiazhiwei@139.com (Z.-w. Jia), wangshaojinjn@163.com (S.-j. Wang).

http://dx.doi.org/10.1016/j.ijsu.2015.03.020
1743-9191/

contributing effect of a previous work on the current paper. Citation analysis has been widely used to evaluate the academic significance of an article [1–3]. This method is a bibliometric method that examines the frequency and patterns of citations in articles. The number of citations received by an article is an indicator of its scientific impact and provides a reliable approach for ranking articles. The greater the citation history of a paper, the more valuable the paper may be in its field [4,5].

The Institute for Scientific Information (ISI) has been compiling the most relevant bibliometric information from published scientific articles since 1945. Web of science is one of the important database in ISI for collecting citation and other academic impact information. This platform has been increasingly used to identify the most cited articles in various medical fields, including oncology [6], respiratory medicine [7], critical care medicine [8], emergency medicine [9], rehabilitation [10], ophthalmology [11], otolaryngology [12], obstetrics and gynecology [13], anesthesiology [14], dermatology [15], trauma [16], nursing research [17], radiology [18], urology [19], general surgery [20], neurosurgery [21]. Moreover, such articles have been published in orthopedic surgery [5,22] and its subspecialties, including pediatric orthopedics [23], fracture surgery [24], foot and ankle surgery [25], spine surgery [26], hand surgery [27], joint arthroplasty [28], and arthroscopy [29]. This method makes it possible to develop a deeper understanding of the characteristics of the classic papers.

In the field of shoulder and elbow surgery, the most cited shoulder articles have been recently published [30]. As far as we know, there has not been a study to analyze the most cited papers in orthopedic elbow surgery. The objective of the present study is to identify the 50 most cited papers in elbow surgery and to analyze the principal characteristics.

2. Material and methods

In September 2014, the citation search was performed using the Science Citation Index Expanded of the ISI Web of Science (Thomson Reuters, Philadelphia, Pennsylvania), which has been conducted in the similar studies [18,26,30]. In Journal Citation Reports (JCR) for the year 2013, there were 67 journals and 81 journals in the subject categories of “Orthopedics” and “Sports medicine” respectively. We also searched the subject category of “surgery” and 46 journals of general surgery were included. After excluding the duplicated journals, a total of 181 journals potentially publishing elbow-related articles were indentified (Supplement 1).

To include all articles published in these 181 journals, journal titles were placed in the search window using the “OR” operator. The 50 most cited elbow-related articles were recorded. Our goal was to include papers that orthopedic elbow surgeons could find absolute relevance to their practice. Following the methods of the previous studies [5,23], the basic information was recorded and analyzed, including the title, authors, year of publications, article type, journal of publication, country, institution, number of citations decade published, citation density and level of evidence. All articles were categorized by the field of research including instability/stability, tennis elbow, fracture, distal biceps brachii tendon, ulnar neuritis, arthroplasty, and others. Citation density was calculated by total number of citations over the number of years since publication [18,24,30]. Based on guidelines from *Journal of Bone and Joint Surgery-American Volume* [31], level of evidence for clinical articles was independently determined by two reviewers. Agreement was excellent for level of evidence, with intraclass correlation coefficient of 0.90 [32]. Disagreements between authors was resolved by consensus. The Spearman's test was used to determined the correlations among variables, and $p < 0.05$ was considered statistically. Data analysis was performed using statistical software SPSS version 19.0 (SPSS Inc., Chicago, IL, USA).

3. Results

The top 50 articles and the number of citations were shown in Table 1. The number of citations ranged from 388 to 124. The mean number of citations for the 50 most cited papers was 181. The oldest article in the list was ranked in number twenty-two and was published in 1950, while the most recent article in the top 50 was ranked in number forty-two and was published in 2010. The 1980s accounted for the most articles with a number of 19, and followed by 1990s ($n = 18$) and 1950s ($n = 5$) (Fig. 1). The 1970s represented the highest citation density (206) followed by 2000s (195) (Fig. 2).

All articles of the top 50 list were written in English. These articles were published in 9 of the 181 journals (Table 2), with most papers published in *Journal of Bone and Joint Surgery-American Volume* ($n = 25$) followed by *Clinical Orthopaedics and Related Research* ($n = 7$). There was no correlation between the impact factor and the number of citations ($r = 0.141$, $p = 0.330$) or citation density ($r = 0.159$, $p = 0.271$). The top 50 articles originated from five countries (Table 3). The number of articles in terms of country of origin was led by the United States ($n = 38$), followed by Canada ($n = 5$), England ($n = 5$), Germany ($n = 1$), and The Netherlands ($n = 1$). There were thirty institutions responsible for the most cited articles. The institutions with more than one article were Mayo Clinic and Mayo Foundation ($n = 18$), Johns Hopkins University School of Medicine ($n = 3$) *and* Massachusetts General Hospital ($n = 2$) (Table 4).

A number of first authors were shown multiple times in the top 50 list. The top first author was Morrey ($n = 9$). The next leading author was Regan ($n = 3$), followed by Broberg, Hotchkiss, Nirschl and Odriscoll ($n = 2$) (Table 5). The majority of the top 50 list were clinical articles ($n = 35$), with the remaining basic science ($n = 15$). Of 35 clinical papers, case series ($n = 20$) was the most common type (Table 6). The level of evidence was not strongly correlated with overall number of citations ($r = 0.234$, $p = 0.176$), citation density ($r = -0.026$, $p = 0.880$), or year of publication ($r = -0.162$, $p = 0.353$). According to the classification, the most common topic of the most cited articles was fracture ($n = 11$) (Fig. 3). Level IV was the most popular level of evidence (Fig. 4).

When the selected papers were analyzed by citation density (mean number of citations per year), all the top-three articles discussed tennis elbow. Peerbooms et al. has the leading article (34 citations per year), which was a double-blind randomized controlled trial published in 2010 and investigated the effects of platelet-rich plasma. Mishra and Pavelko's cohort study in 2006 (33 citations per year) was the second and also associated with the platelet-rich plasma. The third was a review article from Kraushaar and Nirschl published in 1999 (14 citations per year).

4. Discussion

Orthopedic elbow surgery has been a rapidly developing specialty through recent years. This development could be demonstrated by the large number of papers published in scientific literature. Identifying the classic articles is helpful for understanding the history and development of elbow surgery and designing future research. This citation analysis of the top cited articles has been widespread and reported in other fields of medicine. To our knowledge, this is the first study on the most cited articles in the field of orthopedic elbow surgery. This top 50 list is useful for several reasons. It identifies the milestone articles that have contributed greatly to the field of elbow surgery [22,26]. It allows readers to know institutions and authors that have contributed to these landmark papers and have subsequently led

Table 1
The 50 most cited articles in orthopedic elbow surgery.

Rank	Article	No. of citations (citation density)
1	Morrey BF, Askew LJ, Chao EY. A biomechanical study of normal functional elbow motion. J Bone Joint Surg Am 1981; 63:872–7.	388(12)
2	Morrey BF, An KN. Articular and ligamentous contributions to the stability of the elbow joint. Am J Sports Med 1983; 11:315–9.	314(10)
3	O'Driscoll SW, Bell DF, Morrey BF. Posterolateral rotatory instability of the elbow. J Bone Joint Surg Am 1991; 73:440–6.	287(12)
4	Nirschl RP, Pettrone FA. Tennis elbow. The surgical treatment of lateral epicondylitis. J Bone Joint Surg Am 1979; 61:832–9.	282(8)
5	Mason ML. Some observations on fractures of the head of the radius with a review of 100 cases. Br J Surg 1954; 42:123–32.	270(5)
6	Broberg MA, Morrey BF. Results of delayed excision of the radial head after fracture. J Bone Joint Surg Am 1986; 68:669–74.	264(9)
7	Morrey BF, Tanaka S, An KN. Valgus stability of the elbow. A definition of primary and secondary constraints. Clin Orthop Relat Res 1991; 265:187–95.	262(11)
8	Mishra A, Pavelko T. Treatment of chronic elbow tendinosis with buffered platelet-rich plasma. Am J Sports Med 2006; 34:1774–8.	261(33)
9	Conway JE, Jobe FW, Glousman RE, Pink M. Medial instability of the elbow in throwing athletes. Treatment by repair or reconstruction of the ulnar collateral ligament. J Bone Joint Surg Am 1992; 74:67–83.	226(10)
10	Morrey BF, Adams RA. Semiconstrained arthroplasty for the treatment of rheumatoid arthritis of the elbow. J Bone Joint Surg Am 1992; 74:479–90.	212(10)
11	Kraushaar BS, Nirschl RP. Tendinosis of the elbow (tennis elbow). Clinical features and findings of histological, immunohistochemical, and electron microscopy studies. J Bone Joint Surg Am 1999; 81:259–78.	210(14)
12	Jobe FW, Stark H, Lombardo SJ. Reconstruction of the ulnar collateral ligament in athletes. J Bone Joint Surg Am 1986; 68:1158–63.	199(7)
13	Coonrad RW, Hooper WR. Tennis elbow: its course, natural history, conservative and surgical management. J Bone Joint Surg Am 1973 55:1177–82.	197(5)
14	Flynn JC, Matthews JG, Benoit RL. Blind pinning of displaced supracondylar fractures of humerus in children. Sixteen years' experience with long-term follow-up. J Bone Joint Surg Am 1974; 56:263–72.	194(5)
15	Morrey BF, Askew LJ, An KN, Dobyns JH. Rupture of the distal tendon of the biceps brachii. A biomechanical study. J Bone Joint Surg Am 1985; 67:418–21.	191(7)
16	Regan W, Morrey B. Fractures of the coronoid process of the ulna. J Bone Joint Surg Am 1989; 71:1348–54.	189(8)
17	Nirschl RP. Elbow tendonosis/tennis elbow. Clin Sport Med 1992; 11:851–70.	189(9)
18	O'Driscoll SW, Morrey BF, Korinek S, An KN. Elbow subluxation and dislocation. A spectrum of instability. Clin Orthop Relat Res 1992; 280:186–97.	183(8)
19	Broberg MA, Morrey BF. Results of treatment of fracture-dislocations of the elbow. Clin Orthop Relat Res 1987; 216:109–19.	183(7)
20	Morrey BF, An KN. Functional anatomy of the ligaments of the elbow. Clin Orthop Relat Res 1985; 201:84–90.	179(6)
21	Baker BE, Bierwagen D. Rupture of the distal tendon of the biceps brachii. Operative versus non-operative treatment. J Bone Joint Surg Am 1985; 67:414–7.	178(6)
22	McGowan AJ. The results of transposition of the ulnar nerve for traumatic ulnar neuritis. J Bone Joint Surg Br 1950; 32-B:293–301.	176(3)
23	Dellon AL. Review of treatment results for ulnar nerve entrapment at the elbow. J Hand Surg Am 1989; 14:688–700.	175(7)
24	Pirone AM, Graham HK, Krajbich JI. Management of displaced extension-type supracondylar fractures of the humerus in children. J Bone Joint Surg Am 1988; 70:641–50.	160(6)
25	Morrey BF. Post-traumatic contracture of the elbow. Operative treatment, including distraction arthroplasty. J Bone Joint Surg Am 1990; 72: 601–18.	158(7)
26	Gill DR, Morrey BF. The Coonrad-Morrey total elbow arthroplasty in patients who have rheumatoid arthritis. A ten to fifteen-year follow-up study. J Bone Joint Surg Am 1998; 80:1327–35.	157(10)
27	Hotchkiss RN, Weiland AJ. Valgus stability of the elbow. J Orthop Res 1987; 5:372–7.	156(6)
28	Rompe JD, Hope C, Kullmer K, Heine J, Burger R. Analgesic effect of extracorporeal shock-wave therapy on chronic tennis elbow. J Bone Joint Surg Br 1996; 78:233–7.	155(9)
29	Labelle H, Guibert R, Joncas J, Newman N, Fallaha M, Rivard CH. Lack of scientific evidence for the treatment of lateral epicondylitis of the elbow. An attempted meta-analysis. J Bone Joint Surg Br 1992; 74:646–51.	155(7)
30	Regan WD, Korinek SL, Morrey BF, An KN. Biomechanical study of ligaments around the elbow joint. Clin Orthop Relat Res 1991; 271:170–9.	155(7)
31	Schwab GH, Bennett JB, Woods GW, Tullos HS. Biomechanics of elbow instability: the role of the medial collateral ligament. Clin Orthop Relat Res 1980; 146:42–52.	153(5)
32	Morrey BF, Chao EY, Hui FC. Biomechanical study of the elbow following excision of the radial head. J Bone Joint Surg Am 1979; 61:63–8.	150(4)
33	Essex-Lopresti P. Fractures of the radial head with distal radio-ulnar dislocation; report of two cases. J Bone Joint Surg Br 1951; 33B:244–7.	150(2)
34	Boyd HB, Anderson LD. A method for reinsertion of the distal biceps brachii tendon. J Bone Joint Surg Am 1961; 43:1041–3.	148(3)
35	Werner SL, Fleisig GS, Dillman CJ, Andrews JR. Biomechanics of the elbow during baseball pitching. J Orthop Sport Phys Ther 1993; 17:274–8.	148(7)
36	Regan W, Wold LE, Coonrad R, Morrey BF. Microscopic histopathology of chronic refractory lateral epicondylitis. Am J Sports Med 1992; 20:746–9.	147(7)
37	Morrey BF, Bryan RS, Dobyns JH, Linscheid RL. Total elbow arthroplasty. A five-year experience at the Mayo Clinic. J Bone Joint Surg Am 1981; 63:1050–63.	138(4)
38	Cobb TK, Morrey BF. Total elbow arthroplasty as primary treatment for distal humeral fractures in elderly patients. J Bone Joint Surg Am 1997; 79:826–32.	138(8)
39	Bryan RS, Morrey BF. Extensive posterior exposure of the elbow. A triceps-sparing approach. Clin Orthop Relat Res 1982; 166:188–92.	138(4)
40	Knight DJ, Rymaszewski LA, Amis AA, Miller JH. Primary replacement of the fractured radial head with a metal prosthesis. J Bone Joint Surg Br 1993; 75:572–6.	137(7)
41	Jupiter JB, Neff U, Holzach P, Allgower M. Intercondylar fractures of the humerus. An operative approach. J Bone Joint Surg Am 1985; 67: 226–39.	135(5)
42	Peerbooms JC, Sluimer J, Bruijn DJ, Gosens T. Positive Effect of an autologous platelet concentrate in lateral epicondylitis in a double-blind randomized controlled trial platelet-rich plasma versus corticosteroid injection with a 1-year follow-up. Am J Sports Med 2010; 38:255–62.	134(34)
43	Timmerman LA, Schwartz ML, Andrews JR. Preoperative evaluation of the ulnar collateral ligament by magnetic resonance imaging and computed tomography arthrography. Evaluation in 25 baseball players with surgical confirmation. Am J Sports Med 1994; 22:26–31; discussion 32.	132(7)
44	Osborne GV, Parkes AR, Apley AG, Nissen KI, Seddon HJ. The surgical treatment of tardy ulnar neuritis. J Bone Joint Surg Br 1957; 39:782.	132(2)
45	London JT. Kinematics of the elbow. J Bone Joint Surg Am 1981; 63:529–35.	130(4)
46	Wilson FD, Andrews JR, Blackburn TA, McCluskey G. Valgus extension overload in the pitching elbow. Am J Sports Med 1983; 11:83–8.	130(4)
47	Ring D, Jupiter JB, Zilberfarb J. Posterior dislocation of the elbow with fractures of the radial head and coronoid. J Bone Joint Surg Am 2002; 84-A:547–51.	128(11)
48	Hotchkiss RN, An KN, Sowa DT, Basta S, Weiland AJ. An anatomic and mechanical study of the interosseous membrane of the forearm: pathomechanics of proximal migration of the radius. J Hand Surg Am 1989; 14:256–61.	127(5)
49	Basmajian JV, Latif A. Integrated actions and functions of the chief flexors of the elbow: a detailed electromyographic analysis. J Bone Joint Surg Am 1957; 39-A:1106–18.	125(2)
50	Nestor BJ, O'Driscoll SW, Morrey BF. Ligamentous reconstruction for posterolateral rotatory instability of the elbow. J Bone Joint Surg Am 1992; 74:1235–41.	124(6)

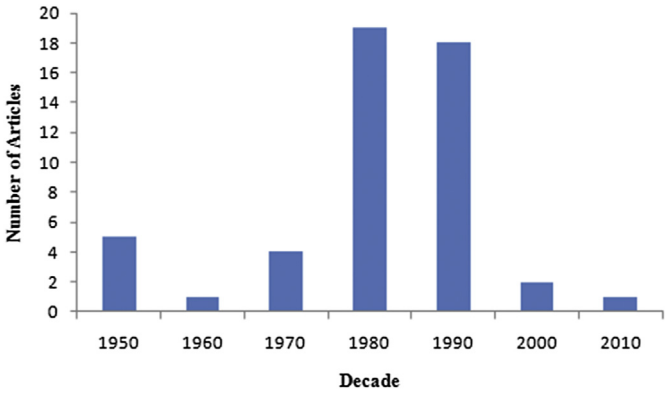

Fig. 1. Number of articles per decade of publication.

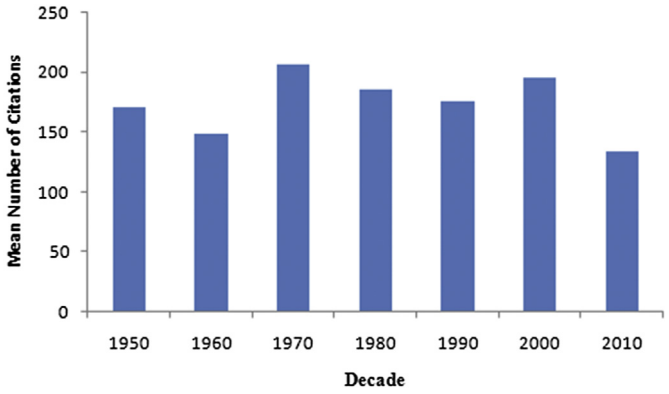

Fig. 2. Mean number of citations per decade of publication.

the field of elbow surgery [23,33]. It also presents useful information to authors regarding to the characteristics of classic papers [5,25]. Moreover, it is an useful tool for the education on residency and fellowship directors making them to be familiar with the classic articles in elbow surgery [30].

The top 50 cited articles was published between 1950 and 2010, with the 1980s representing the most productive decade. This result is consistent with the result of general orthopedic surgery [22]. The 100 most cited articles in elbow surgery were cited between 124 and 388 times. However, the number of citation is lower than some subspecialty in orthopedic surgery such as spine [26], and higher than other fields such as foot and ankle surgery [25]. It indicates that different subspecialties are different in citation rates and the size of the scientific community may be one of the possible reasons for this difference [33].

Citation density is a method to provide the relative importance of an article regardless of the duration since publication. Although it is possible that papers with higher citation density are not included in this study, this method help to identify classic papers with the most absolute citations. Our results shows that all the top-three articles according to citation density report the treatment of tennis elbow and two of them discuss the using of platelet-rich plasma. This indicates that articles on the treatment of tennis elbow, especially using platelet-rich plasma, have the potentially relative impact regardless of year of publication.

In total, five countries contributed to the top 50 list of highest cited articles in elbow surgery. The United States has contributed the majority of the most cited papers in top 50 list. It is no surprise that United States leads the rankings, which also had been found in many fields of medicine such as respiratory system [7], anesthesiology [14], general surgery [20], radiology [18], and orthopedics [22]. This result strengthens the great influence of United States on elbow surgery. It can be attributed to the large size of the community in elbow surgery and sufficient financial support [5,18]. Additionally, previous studies have pointed out that there is a tendency for the authors from United States to cite local articles [5,34].

All the top 50 articles was published in English. It demonstrates that English appears to be the most frequently used literary language in elbow surgery. Additionally, the 50 most cited papers were

Table 3
Countries of origin of articles.

Country	No. of articles
United States	38
Canada	5
United Kingdom	5
Germany	1
The Netherlands	1

Table 4
Top institutions of origin of articles.

Institution	No. of articles
Mayo Clinic and Mayo Foundation	18
Johns Hopkins University School of Medicine	3
Massachusetts General Hospital	2

Table 5
Authors with more than one first-name article.

First author	No. of articles
Morrey BF	9
Regan W	3
Broberg MA	2
Hotchkiss RN	2
Nirschl RP	2
O'Driscoll SW	2

Table 2
Journals of publication.

Journal	No. of articles	Impact factor
Journal of Bone and Joint Surgery-American Volume	25	4.309
Clinical Orthopaedics and Related Research	7	2.882
American Journal of Sports Medicine	6	4.699
Journal of Bone and Joint Surgery-British Volume	6	2.801
Journal of Hand Surgery-American Volume	2	1.655
British Journal of Surgery	1	5.210
Clinics In Sports Medicine	1	2.583
Journal of Orthopaedic & Sports Physical Therapy	1	2.376
Journal of Orthopaedic Research	1	2.972

Table 6
Study type of clinical articles.

Study type	No. of articles
Randomized controlled trial	2
Nonrandomized controlled trial	0
Cohort study	6
Case–control study	0
Case series	20
Case report	1
Review article	4
Expert opinion	2

published in nine journals. The most productive journal was *Journal of Bone And Joint Surgery-American Volume* with half of articles in the top 50 list. Some previous study demonstrated that the impact factor of the journal was the strongest indicator for citations and most of the top cited articles were published in journals with high impact factors [5,6,35]. However, it has not been proved in this study. This result suggests that citations in the most cited list is not definitely affected by the impact factor of the journals, which was also found in other studies [9,26].

Certain institutions and authors have a good publication record in elbow surgery. The Mayo Clinic and Mayo Foundation, and Morrey BF have a great priority in this field. Fracture is the most popular topic in the top 50 list. It highlights the importance of the fracture within the subspecialty. Of the top 50 cited article, it showed that clinical study was the most popular topic. This finding is consistent with many studies in the field of medicine [21,22,24,26,36,37]. In addition, similar with the previous bibliometric studies, only a small portion of high level of evidence was identified in the top cited articles [26,29,30], while most of the articles that we identified were level IV evidence. This result suggests that level of evidence is not definitely a positive factor for the total number of citations. The possible reason is that novel ideas and treatments are often initially published as observational studies, and still catch attention by the surgeons or researchers [26,29,30].

There are several limitations in the present study. First, although a well-defined method has been used to identify the 50 most cited papers, important and influential articles with lower citations were not included. Second, we used search terms and multiple pertinent categories to gain the elbow-related journals. These 181 journals could not include all the articles in the field of elbow surgery, so elbow papers in basic science and other general medical journals

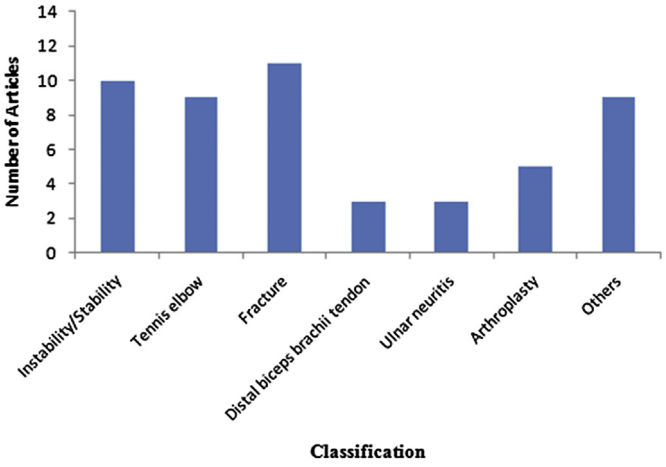

Fig. 3. Classification of articles.

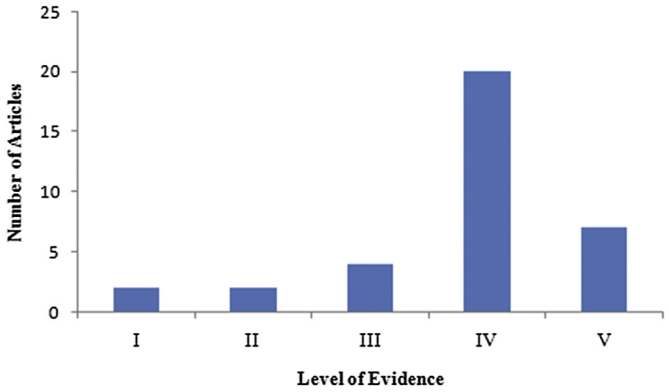

Fig. 4. Level of evidence of clinical articles.

may not be evaluated. Third, a number of factors may influence the overall number of citations. This citation analysis could not evaluated self-citation, citations in lectures and textbooks, and web-based literature [22,30,38]. Similarly, authors may be possible to cite papers from the journal in which they hope to publish their study [39]. Fourth, the overall number of citations used as a measure of impact preferentially favors older articles that over time have accumulated a large number of citations. Fifth, there is a "snowball effect" to citations due to there is a tendency for complying with a paradigm in a scientific community [40]. It indicates that some authors are more possible to cite certain articles, simply due to they have previously received numerous citations rather than for their value.

5. Conclusion

This study presents a detailed list and analysis of the 50 most cited articles in elbow. The top cited papers on the list were all published in English, and were mainly clinical study with level IV evidence. Most of the articles were published in *Journal of Bone and Joint Surgery-American Volume* and originated from United States. The present study may help to find out the important information on the classic articles. This top citation list provides useful insights into the history and development of elbow surgery as a specialty and function as a basis for further studies.

Ethical approval

None required.

Funding

None.

Author contribution

Study conception and design: Shao-jin Wang, Zhi-wei Jia.
Acquisition of data: Yan-qing Huo, Zhi-wei Jia, Xiao-han Pan.
Analysis and interpretation of data: Yan-qing Huo, Zhi-wei Jia, Qing-bo Li.
Drafting the manuscript: Yan-qing Huo, Zhi-wei Jia.
Critical revision of manuscript: Xi-qian Wang, Xie-jia Jiao.

Conflicts of interest

None.

Guarantor

Shao-jin Wang and Zhi-wei Jia.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.ijsu.2015.03.020.

References

[1] E. Garfield, Citation analysis as a tool in journal evaluation, Science 178 (4060) (1972) 471–479.
[2] J. Cheek, B. Garnham, J. Quan, What's in a number? Issues in providing evidence of impact and quality of research(ers), Qual. Health Res. 16 (3) (2006) 423–435.
[3] S.E. Gisvold, Citation analysis and journal impact factors – is the tail wagging the dog? Acta Anaesthesiol. Scand. 43 (10) (1999) 971–973.
[4] P. To, C.T. Atkinson, D.H. Lee, et al., The most cited articles in hand surgery over the past 20-plus years: a modern-day reading list, J. Hand Surg. Am. 38 (5) (2013) 983–987.
[5] J.C. Kelly, R.W. Glynn, D.E. O'Briain, et al., The 100 classic papers of orthopaedic surgery: a bibliometric analysis, J. Bone Joint Surg. Br. 92 (10) (2010) 1338–1343.
[6] F. Tas, An analysis of the most-cited research papers on oncology: which journals have they been published in? Tumour Biol. 35 (5) (2014) 4645–4649.
[7] W.W. Tam, E.L. Wong, F.C. Wong, et al., Citation classics: Top 50 cited articles in 'respiratory system', Respirology 18 (1) (2013) 71–81.
[8] A. Baltussen, C.H. Kindler, Citation classics in critical care medicine, Intensive Care Med. 30 (5) (2004) 902–910.
[9] Y.L. Tsai, C.C. Lee, S.C. Chen, et al., Top-cited articles in emergency medicine, Am. J. Emerg. Med. 24 (6) (2006) 647–654.
[10] B. Shadgan, M. Roig, B. Hajghanbari, et al., Top-cited articles in rehabilitation, Arch. Phys. Med. Rehabil. 91 (5) (2010) 806–815.
[11] D.H. Coelho, L.W. Edelmayer, J.E. Fenton, A century of citation classics in otolaryngology-head and neck surgery journals revisited, Laryngoscope 124 (6) (2014) 1358–1362.
[12] N. Ohba, K. Nakao, Y. Isashiki, et al., The 100 most frequently cited articles in ophthalmology journals, Arch. Ophthalmol. 125 (7) (2007) 952–960.
[13] J.S. Brandt, A.C. Downing, D.L. Howard, et al., Citation classics in obstetrics and gynecology: the 100 most frequently cited journal articles in the last 50 years, Am. J. Obstet. Gynecol. 203 (4) (2010) 355.e1–355.e7.
[14] A. Baltussen, C.H. Kindler, Citation classics in anesthetic journals, Anesth. Analg. 98 (2) (2004) 443–451 table of contents.
[15] R.S. Stern, K.A. Arndt, Top-cited dermatology authors publishing in 5 "high-impact" general medical journals, Arch. Dermatol. 136 (3) (2000) 357–361.
[16] J.E. Ollerton, M. Sugrue, Citation classics in trauma, J. Trauma 58 (2) (2005) 364–369.
[17] E.L. Wong, W.W. Tam, F.C. Wong, et al., Citation classics in nursing journals: the top 50 most frequently cited articles from 1956 to 2011, Nurs. Res. 62 (5) (2013) 344–351.
[18] M. Pagni, N.R. Khan, H.L. Cohen, et al., Highly cited works in radiology: the top 100 cited articles in radiologic journals, Acad. Radiol. 21 (8) (2014) 1056–1066.
[19] G.J. Nason, F. Tareen, A. Mortell, The top 100 cited articles in urology: An update, Can. Urol. Assoc. J. 7 (1–2) (2013) E16–E24.
[20] R. Paladugu, M. Schein, S. Gardezi, et al., One hundred citation classics in general surgical journals, World J. Surg. 26 (9) (2002) 1099–1105.
[21] F.A. Ponce, A.M. Lozano, Highly cited works in neurosurgery. Part I: the 100 top-cited papers in neurosurgical journals, J. Neurosurg. 112 (2) (2010) 223–232.
[22] K.A. Lefaivre, B. Shadgan, P.J. O'Brien, 100 most cited articles in orthopaedic surgery, Clin. Orthop. Relat. Res. 469 (5) (2011) 1487–1497.
[23] R.G. Kavanagh, J.C. Kelly, P.M. Kelly, et al., The 100 classic papers of pediatric orthopaedic surgery: a bibliometric analysis, J. Bone Joint Surg. Am. 95 (18) (2013) e134.
[24] K. Baldwin, S. Namdari, D. Donegan, et al., 100 most cited articles in fracture surgery, Am. J. Orthop. Belle Mead N.J. 42 (12) (2013) 547–552.
[25] M. Bayley, F. Brooks, A. Tong, et al., The 100 most cited papers in foot and ankle surgery, Foot Edinb. 24 (1) (2014) 11–16.
[26] M.R. Murray, T. Wang, G.D. Schroeder, et al., The 100 most cited spine articles, Eur. Spine J. 21 (10) (2012) 2059–2069.
[27] C.W. Joyce, J.C. Kelly, S.M. Carroll, The 100 top-cited classic papers in hand surgery, J. Plast. Surg. Hand Surg. 48 (4) (2013) 227–233.
[28] L.A. Holzer, G. Holzer, The 50 highest cited papers in hip and knee arthroplasty, J. Arthroplasty 29 (3) (2014) 453–457.
[29] A.J. Cassar Gheiti, R.E. Downey, D.P. Byrne, et al., The 25 most cited articles in arthroscopic orthopaedic surgery, Arthroscopy 28 (4) (2012) 548–564.
[30] S. Namdari, K. Baldwin, K. Kovatch, et al., Fifty most cited articles in orthopedic shoulder surgery, J. Shoulder Elbow Surg. 21 (12) (2012) 1796–1802.
[31] J.G. Wright, M.F. Swiontkowski, J.D. Heckman, Introducing levels of evidence to the journal, J. Bone Joint Surg. Am. 85-A (1) (2003) 1–3.
[32] P.E. Shrout, J.L. Fleiss, Intraclass correlations: uses in assessing rater reliability, Psychol. Bull. 86 (2) (1979) 420–428.
[33] D.Y. Yoon, E.J. Yun, Y.J. Ku, et al., Citation classics in radiology journals: the 100 top-cited articles, 1945–2012, AJR. Am. J. Roentgenol. 201 (3) (2013) 471–481.
[34] F.M. Campbell, National bias: a comparison of citation practices by health professionals, Bull. Med. Libr. Assoc. 78 (4) (1990) 376–382.
[35] M. Callaham, R.L. Wears, E. Weber, Journal prestige, publication bias, and other characteristics associated with citation of published studies in peer-reviewed journals, JAMA 287 (21) (2002) 2847–2850.
[36] F.L. Heldwein, E.L. Rhoden, A. Morgentaler, Classics of urology: a half century history of the most frequently cited articles (1955–2009), Urology 75 (6) (2010) 1261–1268.
[37] M.P. Loonen, J.J. Hage, M. Kon, Plastic surgery classics: characteristics of 50 top-cited articles in four plastic surgery journals since 1946, Plast. Reconstr. Surg. 121 (5) (2008) 320e–327e.
[38] J.E. Dumont, The bias of citations, Trends Biochem. Sci. 14 (8) (1989) 327–328.
[39] P.O. Seglen, Why the impact factor of journals should not be used for evaluating research, BMJ 314 (7079) (1997) 498–502.
[40] T.S. Kuhn, Historical structure of scientific discovery, Science 136 (3518) (1962) 760–764.