The 50 most cited articles in ankle surgery

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Abstract

This paper aims to establish a ranking of the 50 most cited research articles pertaining to ankle surgery in the field of orthopaedics. In addition, the demographic features such as the date of publications, location of primary author and country of the publisher were all analysed. Studies similar to these have been completed in other subspecialties, however we were not able to find studies relevant to ankle surgery. The Web of Science Cor Collection Database was utilised to identify the target articles. The most cited article was cited 394 times and the least was cited 120 times, and the majority of articles were published in the United States of America. This research will benefit the scientific community in identifying popular research topics, identifying lacking fields and identifying key hubs in the field of ankle surgery.

Introduction

The vast majority of research projects begin with a literature review to ascertain the current knowledge on a topic, gauge relevance and identify research questions. With the movement of science into a digital age, there has been a degree of improvement in the structure of digital libraries, providing a user-centred and pragmatic way to access the information of interest.[1] Bibliometrics enables us to quantitatively analyse the large amount of research currently available in the Orthopaedic field, particularly in ankle surgery, which is our focus of this project, and identify key relationships between citations. By ranking articles by citations, country of origin, institution and other indicators, we are able to gain a snapshot of the most cited articles, which can be interpreted as their importance in the field.[2] In addition, by analysing the demographical data, key institutions and journals can be highlighted by relevance for particular fields. This will further pragmatize the information available to the general population, creating a more user-centred and accessible format for scientific research in this digital age. By primarily ranking the articles by the number of citations we are able to ascertain the popularity of an article within the scientific community. Furthermore, by refining the results by a particular field, orthopaedics, we are able to gauge the amount of interest garnered within a target population and this may in turn provide a snapshot of the key articles within this subspecialty. We have identified that this has been a method utilised in a number of subspecialties such as wrist surgery and shoulder surgery.[3,4] However, we have no identified a paper analysing the most cited articles in ankle surgery that employ this methodology.

Materials and Methods

This bibliometric analysis aimed to identify and analyse the key papers in the field of ankle surgery, by identifying the most cited articles.

In April 2020, the Web of Science Core Collection Database (Clarivate Analytics) was searched for articles with the key terms 'ankle AND surgery' within the field of orthopaedics. This initial search returned 5288 publications, and the top 50 publications were chosen when ranked by number of citations. The inclusion criteria for the bibliometric analysis required that each analysed paper had to refer to an ankle surgical intervention, either in its title or its abstract. This was detailed by the first two authors, whilst the third author would arbitrate, if required, for any incongruities in the inclusion.

Results

Of the 5288 publications, the top 100 cited articles were chosen, 6 of the top cited articles did not meet the inclusion criteria and were hence removed to produce the 50 most cited articles (Table 1).[5-54] The most cited article was a systematic review titled *Intermediate and long-term outcomes of total ankle arthroplasty and ankle arthrodesis - A systematic review of the literature*,[5] which was cited 394 times as of 10/04/2020. The most cited article found at this time interval was *Intermediate and long-term outcomes of total ankle arthroplasty and ankle arthrodesis - A systematic review of the literature* by Haddad *et al.*,[5] which was cited 394 times since publication. The vast majority of the articles found were published in the United States of America (92%, n=46), with only 4 other articles, which were published in the United Kingdom, depicted in Figure 1. However, there was a greater variety in the location affiliated to the primary author, which is highlighted in Figure 2. Just under half of the articles (n=23) were published in the United States of America, followed by Sweden (n=5) and from Switzerland (n=4). The journals in which the most cited articles is tabulated in Figure 3, it demonstrates the most cited journals were *Journal of Bone and Joint Surgery-American Volume* and *American Journal of Sports Medicine* (both n=12). All of the journals that published the cited articles had a focus on orthopaedics on in general, with only *Foot and Ankle International* having a sole focus on the ankle and lower limb. Of the 50 results attained, the articles had a range of publication year from 1993-2013 with the median date of publication being 2004.

Discussion and Conclusions

Musculoskeletal illnesses are a disease burden that is continuing to grow worldwide, causing disability and death, particularly with ageing populations.[55] This represents an increasing burden in societal and economic challenges that our current and future population will encounter. Hence, to combat the growing burden of disease research must be completed in the fields or

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Key words: Bibliometric analysis; ankle surgery; orthopaedics; arthroplasty.

Contributions: SL, completed the manuscript writing, data collection and analysis; DZ,completed manuscript writing and data interpretation; AZ, completed manuscript writing, editing and literary searches.

Conflict of interest: The authors declare no potential conflict of interest.

Funding: None.

Received for publication: 21 April 2020.
Accepted for publication: 24 October 2020.

Orthopedic Reviews 2020;12:8593
doi:10.4081/or.2020.8593

orthopaedics and allied specialties to understand the normal physiology and underlying pathologies that can guide clinical practice. This will require a cohesive input from the understanding the molecular pathogenesis of disease to the surgical interventions that may innovate treatment.

Hence by completing literature analysis we are able to appreciate where research is condensed in the field. Furthermore, this may enable to identify areas in which research is lacking, enabling bodies to focus research effects in areas of need and interest by gauging the number of citations an article achieves. Whilst, an article which has been citated a large number of times, this may not be directly correlated to the quality of an article,[56] it will highlight the popularity of the article within the scientific community.

By identifying the location of authors and articles which are cited extensively, it may be key in identifying areas which have a particular focus on a subject of interest.[57] For example, in this literary analysis, we identified that the majority of the articles were published in the United States of America, which has also been other papers as being at the forefront of the orthopaedic research. However, when analysing the location of affiliations of the primary author we see a greater variance in countries, which may provide more detailed information on the hubs of ankle research.

Substantial research has been completed on the citations of key articles in orthopaedics and associated subspecialties. Papers were identified on the subsets of hand, shoulder and wrist surgery, though we weren't able to find a paper on ankle surgery, hence we identified the topic area as imperative.

Whilst this type of research is useful in interpreting the impact of certain articles and the demographics associated. However, it does have its pitfalls. For instance, newly published articles which may be pivotal in understanding areas of clinical significance or may challenge pre-existing hypotheses in scientific literature. However, we conclude that bibliometric analyses are integral in a rapidly changing scientific world, where there is an increasing demand, particularly in orthopaedics where the global population faces a growing burden of disease.

Table 1. The 50 most cited articles which relate to ankle surgery in the field of orthopaedics, with author, publication year and the citations.

Rank	Authors	Publication year	Citations
1	Haddad *et al.*	2007	394
2	Sanchez *et al.*	2007	362
3	Wood & Deakin	2003	261
4	Khan	2005	260
5	Coughlin & Shurnan	2003	224
6	Astephen *et al.*	2008	218
7	Knecht *et al.*	2004	218
8	Chuckpalwong *et al.*	2008	209
9	Anderson *et al.*	2003	205
10	Bell *et al.*	2002	202
11	Saltzman *et al.*	2009	199
12	Corry *et al.*	1998	196
13	Teeny & Wiss	1993	194
14	Hintermann *et al.*	2004	190
15	Hangody *et al.*	2001	184
16	Doets *et al.*	2006	182
17	Darrow *et al.*	2009	176
18	Loomer *et al.*	1993	169
19	Abidi *et al.*	1998	164
20	Nilsson-Helander *et al.*	2010	162
21	Giannini *et al.*	2009	159
22	SooHoo *et al.*	2007	152
23	Valderrabano *et al.*	2004	152
24	Maffulli *et al.*	2003	152
25	Saxena & Eakin	2007	151
26	Thomas	2006	147
27	SooHoo *et al.*	2003	145
28	Mandelbaum *et al.*	1995	144
29	Henricson *et al.*	2007	142
30	Sadoghi *et al.*	2013	140
31	Blauth *et al.*	2001	140
32	DiGiovanni *et al.*	2000	140
33	O'Loughlin *et al.*	2010	137
34	Ferkel & Scranton	1993	136
35	Ippolito *et al.*	2003	135
36	Minami *et al.*	2000	135
37	Button & Pinney	2004	134
38	Schepull *et al.*	2011	133
39	Kofoed	2004	128
40	van Dijk *et al.*	1997	128
41	Myerson *et al.*	2004	127
42	Borowski *et al.*	2008	126
43	Rodeo *et al.*	1993	126
44	Pagenstert *et al.*	2007	125
45	Eneroth *et al.*	1997	123
46	Giannini *et al.*	2008	121
47	Bibbo *et al.*	2004	121
48	Ferkel *et al.*	1996	121
49	Valderrabano *et al.*	2007	120
50	Egol *et al.*	2006	120

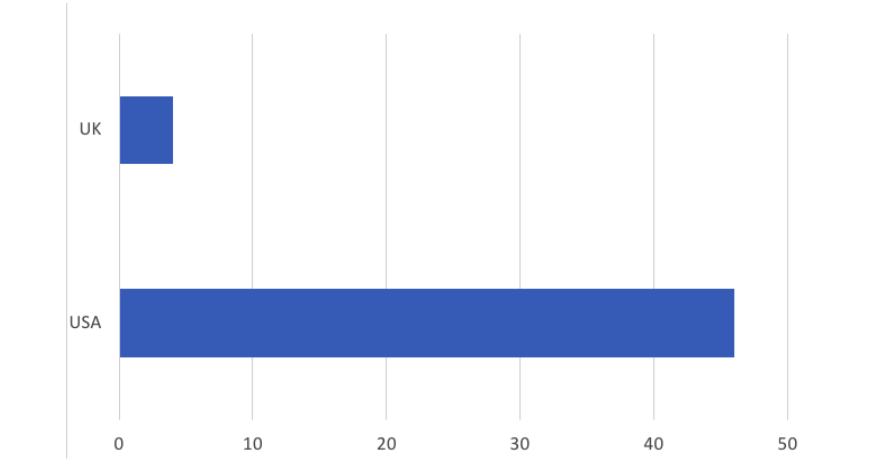

Figure 1. The country of address for publishers of the journal.

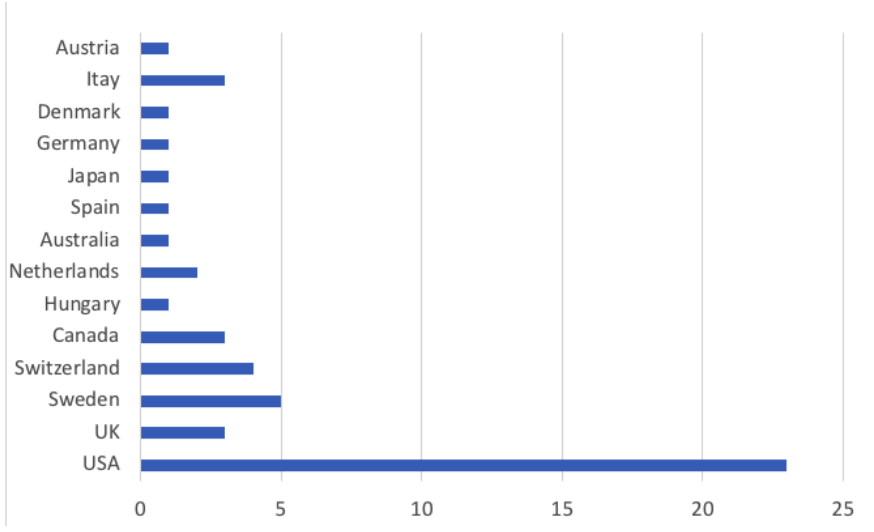

Figure 2. Demonstrating the distribution of different countries of address for the first author.

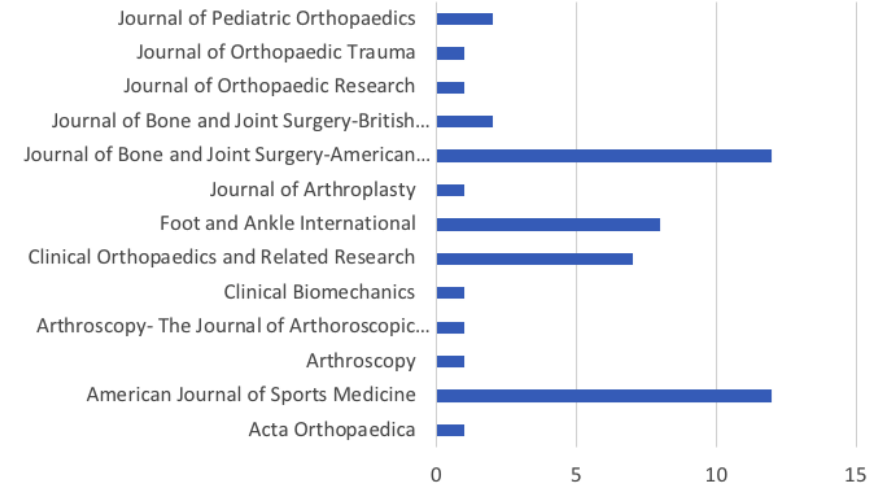

Figure 3. The different journals in which the 50 most cited articles in ankle surgery were published.

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