THE 50 MOST CITED ARTICLES IN THE BRAZILIAN MEDICAL LITERATURE ON KNEE SURGERY

OS 50 ARTIGOS MAIS CITADOS DA LITERATURA MÉDICA BRASILEIRA SOBRE CIRURGIA DO JOELHO

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ABSTRACT

Objective: To provide an analysis of the 50 most cited articles on knee surgery in the Brazilian medical literature. Methods: This is a study of systematic review and meta-analysis, level of evidence 3. It was carried out through search in the SCOPUS database to identify scientific articles published in the Brazilian medical literature. Eighty-six Brazilian journals were analyzed, and articles with ten or more citations and which had the word “joelho” or “knee” in the title, abstract or keywords were selected. Results: All articles were published as of the year 2000 in 14 journals. The Journal Clinics presented the largest number of publications, followed by Acta Ortopédica Brasileira. The main focus of the studies was on anatomy and biomechanics, mainly from Brazilian authors. Most of the authors were Brazilian, from Brazilian and public research institutions. Conclusion: Biometric analysis has been gaining ground in recent years, but its interpretation must consider various aspects related to the paramount analytical importance.

Keywords: Knee. Systematic Review. Data base.

INTRODUCTION

The knee joint is an area of wide interest in medicine, and the subject of intense debate among specialists in Orthopedics and Trauma. Since the first attempts of surgically treating osteoarthritis more than a century and a half ago, the interest in knee surgery has arisen enormously, particularly with milestones in the treatment of degenerative diseases and the introduction of arthroscopic and joint preservation surgery,1 making this articulation the focus of many human body scientific studies. Society’s growing demand and requirement for results that keep getting closer to perfection, coupled with technological innovations, have helped to drive a greater quest for knowledge. Researchers’ personal ambitions also contribute to the exponential increase of scientific studies in various areas of interest, especially in the medical literature, where authors combine the satisfaction of new discoveries with the increasing demand for scientific publications by universities, employers and societies.2 Thus, countless researches have emerged in the last decades, contributing to a better understanding of knee aspects, especially in relation to anatomy, biomechanics, treatment, surgical techniques and rehabilitation, among others.3 In view of this growth in the academic area, the researchers needed methods to efficiently track the most impacting advances and identify the existing challenges. Bibliometric science can accomplish this goal,4,5 since it can provide qualitative and quantitative publications analysis, as well as their characteristics, thus providing their academic impact within a field of research.3

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Study was conducted at the Universidade Federal de São Paulo, Department of Orthopedics and Traumatology, São Paulo, SP, Brazil.

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Bibliometric studies fall into the category of systematic reviews, representing an instantaneous analysis that provides a cross-sectional view of the current state of the object studied. They have a limited half-life due to being part of a continuous process in which high quality impact articles are constantly produced. A useful method for determining the impact of an article on the scientific community is by performing a citation analysis. Each article that is referenced by another scientific article is credited as a “citation.” This form of analysis is an important method to determine the influence of an article on scientific progress, as well as to evaluate the Impact Factor (IF) of a scientific journal. The study of citation analysis can help identify articles, research topics, and authors of influence. In the field of international research, several analyses were done to identify the most cited articles about different themes, such as: epilepsy, encephalic brain trauma, orthodontics, radiology, surgery and orthopedics, among others. However, we need to collect bibliometric data in the context of the Brazilian national literature.

The objective of this study is to provide an analysis of the 50 most cited articles of the Brazilian medical literature on knee surgery, allowing a more accurate comprehension of the qualities of the citation classics, as well as highlighting the main intellectual research marks in this field in Brazil.

### MATERIALS AND METHODS

This is a systematic, quantitative, observational and analytical cross-sectional review study. Articles were identified by a bibliometric analysis in July 2018 using SCOPUS database search tools. We chose this index because it contains the largest number of Brazilian journals. We selected 86 journals with affiliation to Brazil with “area of interest in medicine” (Table 1 and Figure 1), obtained from official information from SCOPUS. The study population consisted of a sample of scientific articles published in the Brazilian medical literature from 1946 to June 2018, regardless of the language. Each of these journals was individually examined, and the articles analyzed according to the flowchart presented below (Figure 1). Initially, the articles were arranged in descending order of citation and the ones with ten or more citations were selected. From this selection, a new search was performed with the identification of all articles that presented the word “joelho” or “knee” in the title, abstract or keywords, excluding those that did not refer to the knee joint. They were arranged in alphabetical order (Table 2) to identify duplicates and later analyzed by two independent observers who, reading the abstract, selected the articles that presented the knee as the main focus of the study. In cases of divergence in the selection process, the analysis was submitted to a third observer. This new sample was placed in the descending order, according to the number of citations.

| Table 1. List of journals of the Brazilian medical literature with area of interest in “Medicine” searched in the SCOPUS database. |
|---|
| Journals | Acta Cirurgica Brasileira | Jornal Brasileiro de Nefrologia | Revista Brasileira de Medicina do Trabalho |
| Acta Ortopedica Brasileira | Jornal Brasileiro de Patologia e Medicina Laboratorial | Revista Brasileira de Neurologia e Psiquiatria |
| Acta Scientiarum – Health Sciences | Jornal Brasileiro de Pneumologia | Revista Brasileira de Oftalmologia |
| Adolescencia e Saude | Jornal Brasileiro de Psiquiatria | Revista Brasileira de Ortopedia |
| Agora | Jornal Brasileiro de Reproducao Assistida | Revista Brasileira de Otorrinolaringologia |
| Anais Brasileiros de Dermatologia | Jornal de Pediatria | Revista Brasileira de Plantas Medicinais |
| Arquivos Brasileiros de Cardiologia | Jornal Vascular Brasileiro | Revista Brasileira da Resuscitacao e Reumatologia |
| Arquivos brasileiros de cirurgia digestiva: ABCD = Brazilian archives of digestive surgery | Journal of Morphological Sciences | Revista Brasileira de Saude Materno Infantil |
| Arquivos Brasileiros de Oftalmologia | Journal of Physical Education(Maringa) | Revista Brasileira de Terapia Intensiva |
| Arquivos de Gastroenterologia | Medicina (Brazil) | Revista da Associacao Medica Brasileira |
| Arquivos de Neuro-Psicatria | Memorias do Instituto Oswaldo Cruz | Revista da Sociedade Brasileira de Medicina Tropical |
| Brazilian Journal of Anesthesiology (Elsevier) | Motriz. Revista de Eduacao Fisica | Revista de Nutricao |
| Brazilian Journal of Cardiovascular Surgery | O Mundo da Saude | Revista de Psiquiatria Clinica |
| Brazilian Journal of Infectious Diseases | Pesquisa Brasileira em Odontopediatria e Clinica Integrada | Revista de Saude Publica |
| Brazilian Journal of Medical and Biological Research | Pesquisa Odontologica Brasileira = Brazilian oral research | Revista do Colegio Brasileiro de Cirurgios |
| Brazilian Journal of Physical Therapy | Physis (Rio de Janeiro, Brazil) | Revista do Instituto de Medicina Tropical de Sao Paulo |
| Cadernos de Saude Publica | Psiquiatria Biologica | Revista Gaucha de Enfermagem / EENUFURGS |
| Ciencia e Saude Coletiva | Radiologia Brasileira | Revista Latinoamericana de Psicopatologia Fundamental |
| Clinics | Revista Ambienta e Agua | Revista Paulina de Pediatria |
| CoDAS | Revista Brasileira de Anestesiologia | Sao Paulo Medical Journal |
| Columna / Columna | Revista Brasileira de Cardiologia Invasiva | Saúde e Sociedade |
| Dementia e Neuropsicologia | Revista Brasileira de Cineantropometria e Desempenho Humano | Scientia Medica |
| Einstein (Sao Paulo, Brazil) | Revista Brasileira de Enfermagem | Sleep Science |
| GED – Gastroenterology Endoscopy Digestive | Revista Brasileira de Epidemiologia | Surgical and Cosmetic Dermatology |
| Genetics and Molecular Research | Revista Brasileira de Ginecologia e Obstetricia | Tempo Psicanalitico |
| Historia, Ciencias, Saude – Manguinhos | Revista Brasileira de Hematologia e Hemoterapia | Trends in Psychiatry and Psychotherapy |
| International Braz J Urol | Revista Brasileira de Medicina | |
| International Journal of High Dilution Research | Revista Brasileira de Medicina do Esporte | |

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and the first fifty were selected (Table 2). All authors of this research signed the Informed Consent Form and the work was submitted to the Ethics and Research Committee of Unifesp – Hospital São Paulo.

RESULTS
Each of these articles was analyzed individually according to the authors’ most relevant information, such as academic affiliation of the main author, year of publication, main focus of the study, number of citations, and the journal of publication.

Among the 89 journals, *Clinics* was the main medium of publication, being responsible for 19 indexes from different studies, followed by Acta Ortopédica Brasileira with 7.

The main focus varied considerably among all the fields of research, with a higher prevalence on anatomy and biomechanics, totaling 11 articles, followed by biomolecular studies (9) and studies on prevention and rehabilitation (8).

Although we identified a total of 211 different authors, only twenty of them were published more than once. In the specific analysis about the first author, only four were published at least twice from a total of 46 different first authors, all Brazilian.

Finally, we analyzed the institutions related to the articles considering only the first author’s academic affiliation. The Universidade de São Paulo (USP), with 18 articles, stood out as the most predominant, followed by the Universidade Federal de São Paulo (Unifesp), with 8 articles.

DISCUSSION
The amount of citations has become an important instrument for the assessment of an article and, besides being valuable to measure its own impact in the academic context, it also contributes to the analysis of the publication vehicle and of its authors. However, its data should not be analyzed in isolation and the social and temporal context in which it is inserted should be considered.

In this study, it is important to highlight that all the fifty most cited articles were published after the year 2000, which lets us infer that studies with higher quality and importance began to arise from then on. This was the moment of intense global technological transformations, with changes in the form of communication, driven by the spread of ever faster and more effective communication networks, such as the internet. This event contributed to the greater access to knowledge, reflecting the increase of research done in the scientific world. This pattern of publication dates found in our study resembles the findings of the international literature, except for the so-called “classic articles” that correspond to the ones that became important milestones in the medical literature on the subject studied, which have had a fundamental relevance since its production, being more present in international studies than in our country.

Although there are a large number of different authors, totaling 211, it is noted that only twenty of them (9.47%) were present in more than one occasion, which may indicate difficulties on the part of Brazilian authors in the production of works or, more likely, they have directly chosen to publish in international journals. Thus their research is not found in the national literature.

All articles were present in 14 of the 86 journals surveyed (16.27%), reflecting the greater searching tendency, with a specific focus on surgical, genetic and musculoskeletal system subjects. Although not only linked to orthopedics and traumatology, the journal *Clinics* was predominant in this study, which shows its high capacity of scientific production in the national territory, occupying the fourth position in the biometric analysis of citations in the CiteScore ranking. Acta Ortopédica Brasileira appears as the second most prevalent in publications, possibly because it is specifically devoted to studies with an interest in orthopedics and traumatology.

Interestingly, 34 articles (68%) are from research institutions located in the state of São Paulo, highlighting their academic importance in the national territory. USP and Unifesp, both public educational institutions, stood out as the most prevalent academic institution. All three articles published in the journal Genetics and Molecular Research had as their main focus the study classified as “biomolecular” and, differently from the pattern found in this study, there were no Brazilian first authors, two of them were Chinese and one was Thai. Although they are all foreigners, the superficial analysis may bring misinterpretations. In recent years studies of this nature have been widely developed all over the world, due to the interest in new discoveries abounding intensively, even in Brazil, although through eventual investment restrictions that we face constantly. The absence of articles by Brazilian authors with this focus leads us to infer that such articles are probably intended for publication in the international literature, rather than their nonexistence.

Still under this perspective, it is possible to observe that all foreign works were published after 2011 and focused almost exclusively on biomolecular research. These data suggest that researchers from other countries find opportunities in Brazil for publication that they sometimes do not find around the world, either because our journals actually have academic value or because they simply did not find space in international journals, which are very demanding.

CONCLUSION
We conclude that the biometric analysis has been gaining ground in recent years, as a means of evaluating scientific studies; however, this study did not aim to analyze the quality of articles and first authors, since many relevant articles are probably published in the international literature, an issue not addressed by this study.
### Table 2. List of the 50 most cited articles:

| Title                                                                 | Citations |
|-----------------------------------------------------------------------|-----------|
| Questionário específico para sintomas do joelho Lysholm Knee Scoring Scale – tradução e validação para a língua portuguesa | 42        |
| Changes in joint kinematics in children with cerebral palsy while walking with and without a floor reaction ankle-foot orthosis | 40        |
| Tradução e Validação Cultural do Questionário Algofuncional de Lequesne para Osteoartrite de Joelhos e Quadris para a Língua Portuguesa | 40        |
| Isokinetic assessment of the hip muscles in patients with osteoarthritides of the knee | 34        |
| Metric measurements and attachment levels of the medial patellofemoral ligament | 33        |
| Comparison of two methods of femoral tunnel preparation in single-bundle anterior cruciate ligament reconstruction. A prospective randomized study | 21        |
| Diacerein versus glucosamine in a rat model of osteoarthritis | 20        |
| Epidemiological study on tibial plateau fractures at a level 1 trauma center | 20        |
| Anserine syndrome | 19        |
| Avaliação do ligamento anterolateral do joelho por meio de exame de ressonância magnética | 19        |
| Electromyographic activity evaluation of the patella muscles during squat isometric exercise in individuals with patellofemoral pain syndrome | 19        |
| Anterior cruciate ligament reconstruction with double bundle versus single bundle | 18        |
| Muscle strength and exercise intensity adaptation to resistance training in older women with knee osteoarthritis and total knee arthroplasty | 18        |
| The influence of tourniquet use and operative time on the incidence of deep vein thrombosis in total knee arthroplasty | 17        |
| Association of the IL-6 -174G/C gene polymorphism with knee osteoarthritides in a Thai population | 16        |
| Biomechanical and histological evaluation of hydrogel implants in articular cartilage | 16        |
| Efeito de exercícios terapêuticos no equilíbrio de mulheres com osteoartrite do joelho Uma revisão sistemática | 16        |
| Manual for guided home exercises for osteoarthritis of the knee | 16        |
| Study of human acellular amniotic membrane loading bone marrow mesenchymal stem cells in repair of articular cartilage defect in rabbits | 16        |
| The effects of stretching on the flexibility, muscle performance and functionality of institutionalized older women | 16        |
| Anatomical study on the anterolateral ligament of the knee | 15        |
| Isokinetic dynamometry in elderly women undergoing total knee arthroplasty | 15        |
| Positioning of the femoral tunnel for arthroscopic reconstruction of the anterior cruciate ligament | 15        |
| Qualidade de vida após artroplastia total do joelho/ revisão sistemática | 15        |
| An in vitro biomechanical comparison of anterior cruciate ligament reconstruction Single bundle versus anatomical double bundle techniques | 14        |
| Current concepts in osteoarthritis | 14        |
| Effectiveness of radiation synovectomy with samaritum 153 particulate hydroxyapatite in rheumatoid arthritis patients with knee synovitis | 14        |
| Influence of patellofemoral pain syndrome on plantar pressure in the foot rollover process during gait | 14        |
| Knee extensor torque of men with early degrees of Osteoarthritis is associated with pain, stiffness and function | 13        |
| Oral administration of curcumin (Curcuma longa) can attenuate the neutrophil inflammatory response in zymosan-induced arthritis in rats | 13        |
| Avaliação muscular isocinética da articulação do joelho em atletas das seleções brasileiras infantil e juvenil de voleibol masculino | 12        |
| Comparative study on anterior cruciate ligament reconstruction Determination of isometric points with and without navigation | 12        |
| Correlation between magnetic resonance imaging and physical exam in assessment of injuries to posterolateral corner of the knee | 12        |
| Economic impact of treatment for surgical site infections in cases of total knee arthroplasty in a tertiary public hospital in Brazil | 12        |
| Eficácia Analgésica do Uso de Dose Alta de Morfina Intra articular em Pacientes Submetidos a Artroplastia Total de Joelho | 12        |
| Isokinetic Evaluation of Knee Extensor and Flexor Muscles in Professional Soccer Players | 12        |
| Translation and validation of the knee society score – KSS for Brazilian Portuguese | 12        |
| Análise biomecânica das articulações do quadril e joelho durante a marcha em participantes idosos | 11        |
| Early osteoarthritis and reduced quality of life after retirement in former professional soccer players | 11        |
| Energy expenditure during cane assisted gait in patients with knee osteoarthritis | 11        |
| Implantation of platelet-rich fibrin and cartilage granules facilitates cartilage repair in the injured rabbit knee Preliminary report | 11        |
| Increased serum ADAMTS 4 in knee osteoarthritides A potential indicator for the diagnosis of osteoarthritis in early stages | 11        |
| Isokinetic torque peak and hamstrings quadriceps ratios in endurance athletes with anterior cruciate ligament laxity | 11        |
| Knee joint dysfunctions that influence gait in cerebrovascular injury | 11        |
| Knee pain and associated occupational factors | 11        |
| Measurement of tibial slope angle after medial opening wedge high tibial osteotomy/ Case series | 11        |
| Physical activity and its association with quality of life in patients with osteoarthritis | 11        |
| Protective effects of tumor necrosis factor-α blockade by adalimumab on articular cartilage and subchondral bone in a rat model of osteoarthritis | 11        |
| Treatment of infections following total knee arthroplasty 2 Year follow up outcomes | 11        |
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