The impact of the 30 most cited articles on hip arthroscopy: what is the subject matter?

Alexander von Glinski1,2,3,4*, Emre Yilmaz4, Ryan Goodmanson2,3, Clifford Pierre2,3, Sven Frieler4, Andre Shaffer1, Basem Ishak2,3, Cara Beth Lee1 and Keith Mayo1

1Hansjörg Wyss Hip and Pelvic Center, Swedish Hospital, 600 Broadway #340, Seattle, WA 98122, USA, 2Swedish Neuroscience Institute, Swedish Medical Center, 550 17th Ave #540, Seattle, WA 98122, USA, 3Seattle Science Foundation, 550 17th Ave Suite 600, Seattle, WA 98122, USA and 4Department of Trauma Surgery, BG University Hospital Bergmannsheil, Ruhr University Bochum, Bürkle-de-la-Camp-Platz 1, Bochum 44789, Germany.

*Correspondence to: A. von Glinski, E-mail: Alexvonglinski@gmail.com
Submitted 14 May 2019; Revised 19 December 2019; revised version accepted 24 December 2019

ABSTRACT
The purpose of this study was to identify the 30 most cited articles on hip arthroscopy and discuss their influence on recent surgical treatment. Due to advancements in hip arthroscopy, there is a widening spectrum of diagnostic and treatment indications. The purpose of this study was to identify the 30 most cited articles on hip arthroscopy and discuss their influence on contemporary surgical treatment. The Thomson Reuters Web of Science was used to identify the 30 most cited studies on hip arthroscopy between 1900 and 2018. These 30 articles generated 6152 citations with an average of 205.07 citations per item. Number of citations ranged from 146 to 461. Twenty-five out of the 30 papers were clinical cohort studies with a level of evidence between III and IV, encompassing 4348 patients. Four studies were reviewed (one including a technical note) and one a case report. We were able to identify the 30 most cited articles in the field of hip arthroscopy. Most articles were reported in high-impact journals, but reported small sample sizes in a retrospective setting. Prospective multi-arm cohort trials or randomized clinical trials represent opportunities for future studies.

INTRODUCTION
Hip arthroscopy was first described in cadaveric studies in 1931 and applied clinically in 1939 [1, 2]. In 1977, it was introduced as a treatment option for congenital dislocations of the hip [3] and gained more popularity with the description of the lateral approach by Glick et al. in 1987 [4, 5]. Initially the main indications for hip arthroscopy were the treatment of labral tears, removal of loose bodies, diagnosis of hip pain of unclear etiology and management of degenerative and/or pyogenic arthritis [6–8]. With the increasing recognition of femoroacetabular impingement (FAI) as a common cause of hip pain, the utilization of hip arthroscopy has increased [9–12]. One report noted an increase of 365% in the rate of hip arthroscopy between 2004 and 2009 in the United States [13]; a separate cross-sectional study of trends in the United States reported a 250% increase between 2007 and 2011 [14]. In 2011, the annual frequency of hip arthroscopy was four cases per 10 000 orthopedic patients [14]. We performed a bibliographic analysis of the literature to identify the 30 most cited articles in the current literature. These citation reviews have been conducted in various specialties and subspecialties [15–17]. In the current literature, there is one article addressing the most cited articles related to FAI [18]. The goal of this study is to identify the citation patterns and summarize these studies in hip arthroscopy.

MATERIALS AND METHODS
We searched the ‘cited reference search’ through the ISI web of knowledge (Thompson Reuters, New York, NY,
USA) to identify the 30 most cited articles. The search was performed using the term hip arthroscopy in the search bar under the title category or the topic category on 5 February 2019 including all articles from 1900 to 2018. The search has been performed independently by two study authors. We did not specify the journal specialty. Only articles written in English and German were included. The results were sorted in descending order according to the total citation count. We found 2211 articles with a Hirsch index of 102 characterizing the scientific output of this set of papers [19]. The average number of citations per item was 21.96 with 48 548 sum of times cited. Articles not dealing with hip arthroscopy were excluded. The 30 most cited articles were analyzed and integrated into a master sheet. For each, we determined the total number of citations and the average number of citations per year. The following data were then extracted from the 30 articles: article title, source journal, year of publication, authors, country of origin in accordance with the corresponding author’s address, study design, number of patients included, total number of citations and average number of citations per year. After reviewing the text of each article, articles were classified according to a general topic and we rated the level of evidence (LoE) [20]. Articles were analyzed for content and further descriptive statistics regarding citation patterns were calculated. This study did not require approval from an institutional review board as it included publicly available data.

RESULTS

We selected 30 papers with the most citations (Table I). The sum of citation was 6152 with average number of citations of 206 per article. All articles in the top 30 list were published between 1994 and 2013, with the most, 16.7%, in 2007 (Fig. 1). The 30 articles appeared in 7 different journals (Table II). The averaged impact factor was 4.250 (min. 3.053, max. 4.433) (Table I). The articles were generated from 5 countries (United States, England, Brazil, Scotland, Switzerland) with 90% (27) written in the United States. Three authors have contributed nearly two-thirds of the articles (Table III). There were 25 clinical studies 4 review papers and 1 case report. A total of 4348 patients were included in the 22 clinical studies and 1 case report. Further 1 systematic review regarding complications and reoperations included 6134 patients [21]. Montgomery et al. (3447 cases) and Byrd et al. (20 cases) mentioned cases instead of patients [13, 22]. The primary topics covered were labral tears, FAI and complications (Table IV). A total of 22 articles were Level IV evidence (73.3%) (Table I).

DISCUSSION

This article delineates the most cited articles about hip arthroscopy, which may serve as a foundational resource for the orthopedic community. American authors predominate various medical fields and bibliometric analysis regarding orthopedic surgery confirmed this within classic orthopedic literature [16, 17, 23, 24]. Contrary to this, a recent bibliometric analysis by Cassar Gheiti et al. [25] determined the citation frequencies of the 25 most cited arthroscopic surgery-related articles and found 55% of them to originate from Europe. Using the same search terms in 61 orthopedic journals revealing a majority of citations from North America (48%) [25]. Performing an all-database analysis not limited to Orthopedic journals and found 27 (90%) of the top 30 articles from the United States which confirms the finding by Lee et al. [18] who found 26 (52%) out of the 50 articles regarding hip arthroscopy and FAI to origin from the United States.

Authors have reported a clear time effect in citation analysis of orthopedic articles with the 1980s having the most articles published [17, 24]. As a consequence, two bibliometric analyses of orthopedic literature barely cover any Arthroscopic topics and no hip arthroscopy [17, 24]. Even when considering arthroscopic surgery-related publications a bibliometric analysis found the knee to be the most common joint cited in orthopedic journals and within this analysis only 3% cited articles regarding hip arthroscopy [25]. The increasing citation counts regarding arthroscopic surgery per year by decade of publication were taken into account. These early publications started in 1980 and saw a rise until they peaked in 2008 [25]. This development was noticeable regarding hip arthroscopy in the early 1990. The rising popularity might be attributable to the description of the lateral approach by Glick et al. in 1987 [4, 5]. The increase of citation after some years of stagnation in 2004 is accompanied by a 365% increase in the rate of hip arthroscopy between 2004 and 2009 in the United States [13]. Accordingly, we only found 4 articles published before 2000.

The most cited article was by Philippin et al. [26] reporting the outcome of hip arthroscopy for FAI with associated chondrolabral dysfunction. They showed good results at short-term follow-up and were able to define certain factors related to higher satisfaction and better outcomes: preoperative Harris hip score (HHS) [27], repair for labral pathology (rather than debridement) and a pre-operative joint space ≥2 mm [26]. First described as ‘the impingement of the femoral neck on the anterior acetabulum margin’ in 1935 by Smith-Peterson, FAI is now a recognized source of hip pain and dysfunction [9]. With
| Title                                                                 | Authors (year)                                      | Level of evidence | Total citations | Average per year | Sample size |
|----------------------------------------------------------------------|----------------------------------------------------|-------------------|-----------------|------------------|-------------|
| Outcomes following hip arthroscopy for femoroacetabular impingement with associated chondrolabral dysfunction | Philippon et al. (2009) [26]                        | IV                | 461             | 49               | 112         |
| The role of labral lesions to development of early degenerative hip disease | McCarthy et al. (2001) [30]                        | III               | 324             | 17.05            | 436         |
| Prospective analysis of hip arthroscopy with 2-year follow-up        | Byrd and Jones (2000) [27]                         | IV                | 317             | 15.85            | 35          |
| Femoroacetabular impingement in 45 professional athletes: associated pathologies and return to sport following arthroscopic decompression | Philippon et al. (2007)                            | IV                | 272             | 20.92            | 45          |
| Arthroscopic labral repair in the hip: surgical technique and review of the literature | Kelly et al. (2005) [31]                           | V                 | 244             | 16.27            | –           |
| Arthroscopic debridement versus refixation of the acetabular labrum associated with femoroacetabular impingement | Larson et al. (2009) [35]                          | IV                | 227             | 20.64            | 34          |
| Arthroscopic management of femoroacetabular impingement—osteoplasty technique and literature review | Philippon et al. (2007) [10]                        | V                 | 227             | 17.46            | –           |
| Hip arthroscopy for acetabular labral tears                           | Farjo et al. (1999) [33]                           | IV                | 219             | 10.43            | 28          |
| Revision hip arthroscopy                                             | Philippon et al. (2007)                            | IV                | 209             | 16.08            | 37          |
| Diagnostic accuracy of clinical assessment, magnetic resonance imaging, magnetic resonance arthrography and intra-articular injection in hip arthroscopy patients | Byrd and Jones (2004)                              | IV                | 209             | 13.06            | 40          |
| Arthroscopic management of femoroacetabular impingement: early outcomes measures | Larson et al. (2008)                               | IV                | 208             | 17.33            | 96          |
| Hip arthroscopy: current indications, treatment options, and management issues | Kelly et al. (2003) [29]                           | IV                | 203             | 11.94            | –           |
| Clinical presentation of patients with tears of the acetabular labrum | Burnett et al. (2006) [32]                         | IV                | 197             | 14.07            | 66          |
| Hip arthroscopy: complications in 1054 cases                         | Clarke et al. (2003) [40]                          | IV                | 197             | 11.59            | 1054        |
| Hip arthroscopy utilizing the supine position                         | Byrd (1994) [22]                                   | V                 | 196             | 7.54             | 20 cases    |

(continued)
| Title                                                                 | Authors (year) | Level of evidence | Total citations | Average per year | Sample size |
|----------------------------------------------------------------------|----------------|-------------------|----------------|-----------------|-------------|
| Arthroscopic debridement versus refixation of the acetabular labrum associated with femoroacetabular impingement: mean 3.5-year follow-up | Larson et al. (2012) [34] | III              | 190            | 23.75           | 42          |
| Arthroscopic femoroplasty in the management of cam-type femoroacetabular impingement | Byrd et al. (2009) | IV                | 185            | 16.82           | 200         |
| Radiologic and intra-operative findings in revision hip arthroscopy | Heyworth et al. (2007) | IV                | 185            | 14.23           | 23          |
| Acute iatrogenic dislocation following hip impingement arthroscopic surgery | Matsuda (2009) | V                 | 181            | 16.45           | 1           |
| Arthroscopic labral repair and treatment of femoroacetabular impingement in professional hockey players | Philippon et al. (2010) | IV                | 170            | 17              | 28          |
| Clinical presentation of femoroacetabular impingement | Philippon et al. (2007) | IV                | 166            | 12.77           | 301         |
| Open surgical dislocation versus arthroscopy for femoroacetabular impingement: a comparison of clinical outcomes | Botser et al. (2011) | III               | 157            | 17.44           | –           |
| Trends in hip arthroscopy utilization in the United States | Bozic et al. (2013) [12] | IV                | 153            | 21.86           | 1574        |
| Trends and demographics in hip arthroscopy in the United States | Montgomery et al. (2013) [13] | IV                | 153            | 21.86           | 3447 cases  |
| Hip arthroscopy in the presence of dysplasia | Byrd and Jones (2003) [28] | IV                | 153            | 9               | 48          |
| The acetabular labral tear: an arthroscopic classification | Lage et al. (1996) | IV                | 153            | 6.38            | 37          |
| Complications and reoperations during and after hip arthroscopy: a systematic review of 92 Studies and more than 6,000 Patients | Harris et al. (2013) [21] | II               | 152            | 21.71           | 6134 (systematic review) |
| Prospective analysis of hip arthroscopy with 10-year follow-up | Byrd et al. (2010) | IV                | 149            | 14.9            | 50          |
| The ligamentum teres of the hip: an arthroscopic classification of its pathology | Gray and Villar (1997) | IV                | 149            | 6.48            | 20          |
| Traumatic rupture of the ligamentum teres as a source of hip pain | Byrd and Jones (2004) | V                 | 146            | 9.13            | 41          |
improved understanding of FAI as a potential cause of premature osteoarthritis along with evolution in hip arthroscopy equipment and techniques, FAI has become a primary indication for the procedure since the early 2000s [13, 27–29]. This is reflected in FAI being the second most common topic in the 30 papers, and a specific focus. The second most cited paper written by McCarthy et al. won the Otto E. Aufranc Award. Using a cadaver and retrospective clinical approach, they related the presence of labral lesions to early degenerative hip disease by noting an association in the location of damage [30]. Labral tears were the most frequent topic in our analysis. Some authors describe labral tears as the leading reason for hip arthroscopy, occurring in 90% of the cases [31]. Burnett et al. [32] described groin pain (92%) and activity-related pain (91%) as the main clinical findings associated with intraoperatively confirmed labral tears. In contrast, Farjo et al. [33] failed to identify a common clinical presentation to

Table II. Journals

| Journals                                           | Impact factor | Number of articles |
|----------------------------------------------------|---------------|--------------------|
| Arthroscopy: the Journal of Arthroscopy and Related Surgery | 4.433          | 11                 |
| American Journal of Sports Medicine               | 6.057          | 7                  |
| Clinical Orthopedics and Related Research          | 4.091          | 4                  |
| Arthroscopy                                       | 4.292          | 4                  |
| Knee Surgery, Traumatology and Arthroscopy         | 3.053          | 2                  |
| Journal of Arthroplasty                           | 3.524          | 1                  |
| Journal of Bone and Joint Surgery British Volume   | 4.301          | 1                  |

Table III. Top three authors

| Authors             | Number of authorships |
|---------------------|-----------------------|
| Byrd and Jones      | 7                     |
| Philippon et al.    | 7                     |
| Jones et al.        | 6                     |

Table IV. Top three major topics

| Topic                   | No. of papers |
|-------------------------|--------------|
| Labral repair           | 10           |
| FAI                     | 9            |
| Complications and revisions | 5         |
help in the diagnosis of acetabular labral tears. Furthermore, they described the anterior located radial flap tear type as the most common location for labral damage, leading to their recommendation for a posterior portal in order to visualize the anterior joint [33]. They also confirmed that pre-existing arthritis is associated with less optimal outcomes [33]. Several studies compared the results between re-fixation and debridement of a torn labrum [34, 35]. In a cohort study using HHS, visual analog scale and Short Form 12 as outcome measures, Larson et al. [34] reported better results with re-fixation. A finding that was echoed in a 10-year follow-up study by Byrd and Jones [36].

The role of hip arthroscopy in acetabular dysplasia continues to be a topic of controversy [37]. Two studies in this list addressed the topic. In a retrospective study of 48 patients, Byrd et al. concluded that dysplasia was not a ‘harbinger’ for poor results. However, the criteria for dysplasia was based on a single measure: the lateral center-edge angle [38]. Pooling data from two institutions, Parvizi et al. retrospectively reviewed the results of hip arthroscopy in patients with dysplasia defined by radiographic parameters that included the acetabular index, Tonnis angle, lateralization index and disruption of Shenton’s line. They found patients had significant improvement in functional scores at 6 weeks post-surgery, but scores deteriorated with time, decreasing to 76 points (super simplified hip score) at 2 years. The authors concluded that hip arthroscopy should be reserved for patients with no deformity or in patients where the deformity can be treated with arthroscopy [39].

Two review articles in the top 30 deal with complications of hip arthroscopy. Clarke et al. [40] reported an overall complication rate of 1.4% in 1054 cases. Harris et al. [21] conducted a systematic review of 92 studies including 6134 patients. They found a 7.5% incidence of minor and 0.58% incidence of major complications, with iatrogenic labral injuries being the most common [21]. One article in the top 30 was a case report of iatrogenic anterior hip dislocation in a female patient who had undergone arthroscopic acetabular rim trim, labral debridement and femoral head–neck osteoplasty for symptomatic cam- and pincer-impingement after hip arthroscopy. A common issue raised by many of the authors in these 30 articles is the need for a validated outcome instrument that is applicable for non-arthroplasty patients. None of the 30 papers specifically addressed functional outcome tools [41].

The most common topic in arthroscopic surgery-related citations was cartilage lesions and its treatment which could be found in both orthopedic literature and in a general database search. All topics covered by the 25 most cited articles in hip arthroscopy were published orthopedic-related journal [25]. Articles that are related to topics of interest, in our case labral repair, will tend to be cited more frequently than others resulting in higher citations as seen in our study and has been described by other bibliometric analysis [18, 25]. Furthermore, with labral repair being the most frequent topic, 22 articles (80%) were published in only 3 journals are specific for arthroscopic techniques with labral repair as most common and highly specific topic. The top 30 articles are condensed in 7 journals while 22 of them (73%) are published in journals focusing on arthroscopic surgery. Nevertheless and despite a broader inclusion criteria Kelly et al. [17] found the most cited 100 articles regarding orthopedic surgery in 7 journals, with 58 (58%) in 1 journal.

While Cassar Gheit et al. did not specify the LoE found in the articles, Lefaivre et al. described Level IV clinical studies as the most common study regarding orthopedics [24, 25]. Lee et al. share similar findings regarding the field of FAI, and we found Level IV studies to be the most frequent one regarding the field of hip arthroscopy [18, 24]. Despite a considerable progression in the quality of research in orthopedics in the last decades there is only one Level 1 study among the most cited works in orthopedics [24]. There was an increasing number of publications as well as citations in the early 2000s. The same increase in term of citations was witnessed in arthroscopy in general and might be attributable to the increase in Internet use over this period as part of this development [25]. Nevertheless, while the most cited articles in general orthopedics originate from the 1980s the most cited articles regarding hip arthroscopy was published in 2009 [26]. In 2013, Montgomery et al. reviewed the national database of orthopedic insurance records Harris et al. published a Level 2 systematic review implementing the so-called ‘Big Data’ and higher LoE in the field of hip arthroscopy [13, 21]. Nevertheless, there is a need for higher LoE in future research regarding the field of hip arthroscopy [42]. A more frequent use of larger databases as seen in other medical fields might provide useful insights especially with more detailed coding in form of International Classification of Disease system (ICD-10) [43, 44]. However, we do not conclude that this lower LoE decreases the significance of these articles. We believe that given the relatively early stage and recent widespread of the utilization of hip arthroscopy, such LoE is not surprising.

LIMITATIONS

Citation analysis as a technique has been critiqued in the past as a form of assessing article influence. The most salient point of this critique focuses on whether number of
citations is an accurate correlate of influence especially with regard to self-citations. However, citation analysis is generally considered to be the best analogue for widespread influence [45]. Further limitations are the possible intrinsic bias created by the authors intent to publish a certain journal and therefore cite it. Additionally, most bibliometric analysis is biased by language, many of which only consider English language. Moreover, bibliometric analysis are cross-sectional studies at one point in time. Facing a continuously updated citation count we can exclusively draw conclusions based on the citation counts of these articles at that particular time [16, 17, 24].

CONCLUSION
We identified the 30 most cited articles on hip arthroscopy, which are relatively contemporary compared to other classic orthopedic publications and reflects the recent emergence and rapid growth of the procedure. These articles offer a foundation for clinicians who are seeking resources to expand their knowledge on the topic.

CONFLICT OF INTEREST STATEMENT
The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

REFERENCES
1. Burman MS. Arthroscopy or the direct visualization of joints: an experimental cadaver study. Clin Orthop Relat Res 1931; 390: 5–9.
2. Takagi K. The classic. Arthroscopy. Kenji Takagi. J. Jap. Orthop. Assoc., 1939. Clin Orthop Relat Res 1982; 167: 6–8.
3. Roy DR. The use of hip arthroscopy in the management of the pediatric hip. J Hip Preserv Surg 2016; 3: 97–107.
4. Villar RN. Hip arthroscopy. Br J Hosp Med 1992; 47: 763–6.
5. Glick JM. Hip arthroscopy using the lateral approach. Instr Course Lect 1988; 37: 223–31.
6. Conn KS, Villar RN. [Labrum lesions from the viewpoint of arthroscopic hip surgery]. Oct Die Labrumalsen aus der Sicht eines arthroskopischen Hufschurgen. Orthopade 1998; 27: 699–703.
7. Okada Y, Awaya G, Ikeda T et al. Arthroscopic surgery for synovial chondromatosis of the hip. J Bone Joint Surg Br 1989; 71: 198–9.
8. de Sa D, Cargnelli S, Catapano M et al. Efficacy of hip arthroscopy for the management of septic arthritis: a systematic review. Arthroscopy 2015; 31: 1358–70.
9. Ganz R, Parvizi J, Beck M et al. Femoroacetabular impingement: a cause for osteoarthritis of the hip. Clin Orthop Relat Res 2003; 417: 112–20.
10. Philippon MJ, Stubbs AJ, Schenker ML et al. Arthroscopic management of femoroacetabular impingement: osteoplasty technique and literature review. Am J Sports Med 2007; 35: 1571–80.
11. Philippon MJ, Schenker ML. Arthroscopy for the treatment of femoroacetabular impingement in the athlete. Clin Sports Med 2006; 25: 299–308.
12. Bozic KJ, Chan V, Valone FH et al. Trends in hip arthroscopy utilization in the United States. J Arthroplasty 2013; 28: 140–3.
13. Montgomery SR, Ngo SS, Hobson T et al. Trends and demographics in hip arthroscopy in the United States. Arthroscopy 2013; 29: 661–5.
14. Sing DC, Feeley BT, Tay B et al. Age-related trends in hip arthroscopy: a large cross-sectional analysis. Arthroscopy 2015; 31: 2307–13.e2.
15. Steinberger J, Skovrlj B, Caridi JM, Cho SK. The top 100 classic papers in lumbar spine surgery. Spine (Phila Pa 1976) 2015; 40: 740–7.
16. Kavanagh RG, Kelly JC, Kelly PM, Moore DP. The 100 classic papers of pediatric orthopaedic surgery: a bibliometric analysis. J Bone Joint Surg Am 2013; 95: e134.
17. Kelly JC, Glynn RW, O’Brien DE et al. The 100 classic papers of orthopaedic surgery: a bibliometric analysis. J Bone Joint Surg Br 2010; 92: 1338–43.
18. Lee S, Shin J, Haro M et al. Fifty most cited articles for femoroacetabular impingement and hip arthroscopy. Front Surg 2015; 2: 41.
19. Hirsch JE. An index to quantify an individual’s scientific research output. Proc Natl Acad Sci USA 2005; 102: 16569–72.
20. Wright JG, Swiontkowski MF, Heckman JD. Introducing levels of evidence to the journal. J Bone Joint Surg Am 2003; 85-A: 1–3.
21. Harris JD, McCormick FM, Abrams GD et al. Complications and reoperations during and after hip arthroscopy: a systematic review of 92 studies and more than 6,000 patients. Arthroscopy 2013; 29: 589–95.
22. Byrd JW. Hip arthroscopy utilizing the supine position. Arthroscopy 1994; 10: 275–80.
23. Nayar SK, Dein EJ, Spiker AM et al. The top 100 cited articles in clinical orthopedic spine medicine. Am J Orthop (Belle Mead NJ) 2015; 44: E252–61.
24. Lefaivre KA, Shadgan B, O’Brien PJ. 100 most cited articles in arthroscopic orthopaedic surgery. Arthroscopy 2012; 28: 548–64.
25. Philippon MJ, Briggs KK, Yen YM, Kuppersmith DA. Outcomes following hip arthroscopy for femoroacetabular impingement with associated chondrolabral dysfunction minimum two-year follow-up. J Bone Joint Surg Br 2009; 91B: 16–23.
26. Byrd JW, Jones KS. Prospective analysis of hip arthroscopy with 2-year follow-up. Arthroscopy 2000; 16: 578–87.
27. Byrd JWT, Jones KS. Hip arthroscopy in the presence of dysplasia. Arthroscopy 2003; 19: 1055–60.
28. Kelly BT, Williams RJ, Philippon MJ. Hip arthroscopy: current indications, treatment options, and management issues. Am J Sports Med 2003; 31: 1020–37.
29. McCarthy JC, Noble PC, Schuck MR et al. The Otto E. Aufranc Award: the role of labral lesions to development of early degenerative hip disease. Clin Orthop Relat Res 2001; 393: 25–37.
31. Kelly BT, Weiland DE, Schenker ML, Philippon MJ. Arthroscopic labral repair in the hip: surgical technique and review of the literature. *Arthroscopy* 2005; 21: 1496–504.

32. Burnett RS, Della Rocca GJ, Prather H et al. Clinical presentation of patients with tears of the acetabular labrum. *J Bone Joint Surg Am* 2006; 88: 1448–57.

33. Farjo LA, Glick JM, Sampson TG. Hip arthroscopy for acetabular labral tears. *Arthroscopy* 1999; 15: 132–7.

34. Larson CM, Giveans MR, Stone RM. Arthroscopic debridement versus refixation of the acetabular labrum associated with femoroacetabular impingement: mean 3.5-year follow-up. *Am J Sports Med* 2012; 40: 1015–21.

35. Larson CM, Giveans MR. Arthroscopic debridement versus refixation of the acetabular labrum associated with femoroacetabular impingement. *Arthroscopy* 2009; 25: 369–76.

36. Byrd JWT, Jones KS. Hip arthroscopy for labral pathology: prospective analysis with 10-year follow-up. *Arthroscopy* 2009; 25: 365–8.

37. Wyatt MC, Beck M. The management of the painful borderline dysplastic hip. *J Hip Preserv Surg* 2018; 5: 105–12.

38. Massie WK, Howorth MB. Congenital dislocation of the hip. Part I. Method of grading results. *J Bone Joint Surg Am* 1950; 32: 519–31.

39. Parvizi J, Bican O, Bender B et al. Arthroscopy for labral tears in patients with developmental dysplasia of the hip: a cautionary note. *J Arthroplasty* 2009; 24: 110–3.

40. Clarke MT, Arora A, Villar BN. Hip arthroscopy: complications in 1054 cases. *Clin Orthop Relat Res* 2003; 406: 84–8.

41. Martin RL, Philippon MJ. Evidence of validity for the hip outcome score in hip arthroscopy. *Arthroscopy* 2007; 23: 822–6.

42. Smith KM, Gerrie BJ, McCulloch PC et al. Arthroscopic hip preservation surgery practice patterns: an international survey. *J Hip Preserv Surg* 2017; 4: 18–29.

43. Kurtz SM, Lau EC, Ong KL et al. Which clinical and patient factors influence the national economic burden of hospital readmissions after total joint arthroplasty? *Clin Orthop Relat Res* 2017; 475: 2926–37.

44. Urih KL, Qin Y, Li BY et al. Predictors and cost of readmission in total knee arthroplasty. *J Arthroplasty* 2018; 33: 2759–63.

45. Smith LC. Library Trend Citation Analysis, ed., 1981, pp. 83–105.