

# Assessing the Readability of Online Information About Hip Arthroscopy

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**Purpose:** To investigate the current readability of online information pertaining to hip arthroscopy. **Methods:** The terms “hip arthroscopy” and “hip scope” were entered into the advanced search functions of Google, Yahoo!, and Bing on March 25, 2017, and results from the first 3 pages were analyzed. Results were required to be unique, accessible websites with information about hip arthroscopy conveyed primarily via analyzable text. Two reviewers applied inclusion criteria to the initial 97 results, discussing to reach consensus in cases of disagreement. Overall, 60 unique results were reviewed with 48 meeting inclusion criteria. Websites were categorized as physician-sponsored, academic, commercial, governmental and nonprofit organization (NPO), or unspecified. Readability was measured via 6 different indices: the Flesch-Kincaid grade level (FKGL), Flesch Reading Ease (FRE), Gunning Fog Score, SMOG Index, Coleman-Liau Index (CLI), and Automated Readability Index (ARI) along with an average grade level and readability classification score. **Results:** Forty-eight unique websites were assessed for readability, with physician-sponsored webpages composing the majority (47.92%) followed by academic sources (35.42%). The webpages’ average grade level, incorporating information from all 6 metrics, was  $12.79 \pm 1.98$ . **Conclusions:** The current readability of online information pertaining to hip arthroscopy is at an inappropriately high reading level compared with the sixth-grade level recommended by the American Medical Association and National Institutes of Health, thus introducing significant barriers to understanding for many patients. Online materials should be edited to reduce word and sentence length and complexity, use simpler terms, and minimize use of passive voice to facilitate patient knowledge acquisition and understanding of online information about hip arthroscopy. **Clinical Relevance:** This study shows that the current readability of online information on hip arthroscopy exceeds the suggested sixth-grade reading level. It also emphasizes the need for simplifying written materials and offers specific suggestions on doing so to increase accessibility of information for patients.

**H**ip arthroscopy is becoming a progressively prevalent procedure for the treatment of both intra- and extra-articular hip pathology with utilization rising by more than 600% from 2006 to 2010.<sup>1,2</sup> It is an increasingly common procedure in sports medicine that can address pathologies such as femoroacetabular

impingement (FAI), acetabular labral tears, chondral defects, hip capsular laxity or instability, ligamentum teres defects, coxa saltans, adhesive capsulitis, septic arthritis, and trauma in select situations.<sup>3-5</sup> Hip arthroscopy is a useful alternative to open hip procedures as it results in better postoperative outcomes, less morbidity, and faster recovery and return to activity for patients.<sup>6</sup> Moreover, hip arthroscopy has a lower complication rate than open procedures.<sup>7-9</sup>

Given the intervention’s rising popularity, patients are turning to resources outside the clinical setting for education. Because of the wide accessibility of online materials, the Internet continues to be a common source of information for patients to fill knowledge gaps as well as to alleviate fears about their injuries and this operative procedure. Almost half of adult Internet users have reported looking online for information about a specific medical treatment or procedure, and 77% of those looking for information started at a search engine.<sup>10</sup> In fact, data from Google Trends reveal a rise in Internet searches for “hip pain” (Fig 1) and “hip

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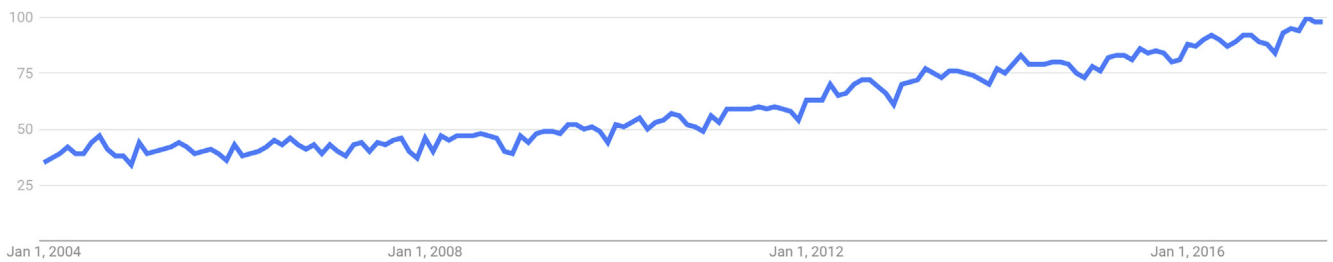
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**Fig 1.** Google trends for 2004–June 21, 2017, for “hip pain.” The x-axis represents time, whereas the y-axis indicates the relative popularity of the search term at the corresponding time.

arthroscopy” (Fig 2) since 2012, reflecting the public’s increased desire to become more educated about this relatively new procedure.<sup>11,12</sup>

The American Medical Association (AMA) and National Institutes of Health (NIH) currently suggest that healthcare materials be written at or below a sixth-grade reading level, equivalent to 6 years of schooling.<sup>13-15</sup> This is informed by the fact that 21% of all US adults read at or below the fifth-grade level, with roughly an additional 30% reading between a sixth- and eighth-grade level.<sup>16</sup> It is important for clinicians to be aware of the readability, and thus accessibility, of information available to patients as it will directly affect one’s ability to advise and address patient concerns. Studies examining both general and subspecialty orthopaedic information available to patients on the Internet have found materials with reading levels far exceeding the aforementioned recommendations, typically requiring at least a ninth-grade education.<sup>16-34</sup> The purpose of this study is to investigate the current readability of online information pertaining to hip arthroscopy. We hypothesize that online information currently available to the general public exceeds reading levels recommended by the AMA and NIH.

## Methods

### Search Terms and Website Categorization

In a study design similar to prior investigations,<sup>23,24,28,29</sup> advanced search tools were used to query the exact phrases “hip arthroscopy” and “hip scope” from 3 Internet search engines, Google, Yahoo!, and Bing, on March 25, 2017. The given search engines were included in our study as nearly 80% of searches in the United States are carried

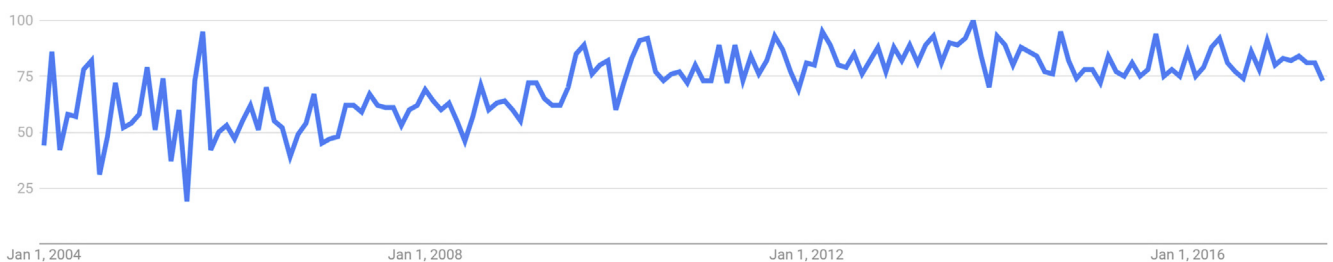
out using Google, with 95% of all remaining searches performed through Bing and Yahoo!<sup>35</sup> Uniform resource locators (URLs) from the first 3 pages of results for each search engine were recorded as prior studies on Internet usage have found that more than 90% of users do not search past the first page of results.<sup>36-38</sup> Based on the identity of the organization or individual hosting each, included websites were categorized by one investigator (M.P.M.) as either physician-sponsored, academic, commercial, governmental and nonprofit organization (NPO), or unspecified, similar to a paper investigating the quality and content of Internet information on hip arthroscopy.<sup>39</sup>

### Inclusion and Exclusion

The first 3 pages of query results yielded 30 websites each for Google and Yahoo! and 37 for Bing. In total, 37 websites were excluded as duplicates, and the remaining 60 websites were manually reviewed by 2 reviewers (M.P.M., H.W.S.) (Fig 3). Twelve additional websites were further excluded, with 7 removed from analysis because of an absence of information pertaining to hip arthroscopy, 3 for providing only a video or form of multimedia without text to be analyzed, 1 for providing only a lecture presentation, and 1 due to an expired security certificate preventing access. All linked text on webpages containing information relevant to hip arthroscopy was recorded and reviewed. On pages containing information on multiple topics, only information pertinent to hip arthroscopy was selected for further analysis.

### Readability Analysis

Relevant text from each of the remaining 48 websites was copied and recorded. Following Flesch-Kincaid



**Fig 2.** Google trends for 2004–June 21, 2017, for “hip arthroscopy.” The x-axis represents time, whereas the y-axis indicates the relative popularity of the search term at the corresponding time.

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