



Patients With Femoroacetabular Impingement Obtain Information From Low-Quality Sources Online and Are Most Interested in Conservative Treatment and Expected Recovery

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Purpose: To investigate the type of questions patients undergoing hip arthroscopy for femoroacetabular impingement (FAI) are searching online and determine the type and quality of the online sources from the top results to each query by the “people also ask” Google algorithm. **Methods:** Three search strings pertaining to FAI were carried out through Google. The webpage information was manually collected from the “People also ask” Google algorithm. Questions were categorized using Rothwell’s classification method. Each website was assessed using *Journal of the American Medical Association* Benchmark Criteria for source quality. **Results:** A total of 286 unique questions were collected with their associated webpages. The most common questions included: “How do you treat femoroacetabular impingement and labral tears without surgery?” “What is the recovery process after hip arthroscopy and are there limitations after surgery?” and “How do you diagnose hip impingement and differentiate from other causes of hip pain?” The Rothwell Classification of questions were fact (43.4%), policy (34.3%), and value (20.6%). The most common webpage categories were Medical Practice (30.4%), Academic (25.8%), and Commercial (20.6%). The most common subcategories were Indications/Management (29.7%) and Pain (13.6%). Government websites had the highest average *Journal of the American Medical Association* score (3.42), whereas Single Surgeon Practice websites had the lowest (1.35). **Conclusions:** Commonly asked questions on Google regarding FAI and labral tears pertain to the indications and management of pathology as well as pain control and restrictions in activity. The majority of information is provided by medical practice, academic, and commercial sources, which have highly variable academic transparency. **Clinical Relevance:** By better understanding which questions patients ask online, surgeons can personalize patient education and enhance patient satisfaction and treatment outcomes after hip arthroscopy.

The sources of medical information continue to expand, and patients increasingly are using the internet with greater frequency to access information

related to their health status.¹ In addition to the information provided by physicians, patients are using videos, multimedia presentations, and other internet-

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based searches to access information about their diagnosis, prognosis, and treatment.² While patients search through internet-based platforms for information on their orthopaedic conditions, some patients will ask their surgeon questions about the data they encounter online.^{3,4}

Across specialties, patients are increasingly using online resources to gather information. Previous research has reported that in both neurosurgery and plastic surgery, patients conducted internet searches before their surgical appointments.⁵⁻⁸ As these internet searches have increased in frequency, several studies have evaluated the quality of information available to patients from large online search engines.⁹⁻¹¹ These methods have been used to analyze the questions patients have regarding shoulder arthritis, anatomic and reverse shoulder arthroplasty,¹¹⁻¹³ as well as hip and knee arthroplasty.¹⁰

Femoroacetabular impingement (FAI) represents a complex combination of static and dynamic changes in the biomechanics and anatomy of the hip joint resulting in loss of femoral head–neck offset (cam lesion), acetabular overcoverage (pincer lesion), or combined impingement. All of these anatomical variants can be associated with labral tears.¹⁴ Given the diversity of patients' medical and educational literacy, patients may not remember to ask many of their questions during an initial clinic evaluation. Previous studies have also found that 40% to 80% of medical information provided to patients is forgotten immediately after leaving the office, and nearly 50% of retained information is incorrect.¹⁵ In these situations, patients often turn to the internet and search engines for answers. It is important for hip arthroscopists to understand the type of questions and resources that patients are using online so that they can effectively anticipate these questions in the clinical setting. Currently, there is a lack of literature highlighting the type of online information patients who are undergoing FAI are searching for regarding their condition and associated medical or surgical management.

The purposes of this study were to investigate the type of questions patients undergoing hip arthroscopy for FAI are searching online and determine the type and quality of the online sources from the top results to each query by the "people also ask" Google algorithm. We hypothesized that patients searching for information online regarding FAI would look for information regarding disease management from low evidence-based quality websites.

Methods

The current study was exempt from institutional review board review at our institution. The methods for this study have been adopted from 2 previous studies, by Shen et al.¹⁰ and Sudah et al.¹¹ To avoid bias from

personalized search results based on previous web browser history, a new Google Chrome application (Google, Inc., Mountain View, CA) with no cookies or previous queries was installed before inputting the search terms. The following search strings were then individually searched in Google: "Femoroacetabular Impingement," "Hip Labral Tear," and "Hip Cam Impingement." For each of the 3 previously mentioned search queries, the "People also ask" tab was expanded by selecting the auto-generated questions in order, which leads to generation of more questions below, until approximately 100 suggested search questions appeared on the page, as previously reported to be the average number of queries needed to access online health information with a similar protocol.^{10,11} A freely available online program (Google Chrome Extension Scrapper, Version 1.7) was used to extract the approximately 100 questions from each search string, including the question asked and the associated website link providing the explanation. Questions that were clearly unrelated to the topic of FAI and associated pathology were excluded from the data set (i.e., "how do I treat my shoulder labral tear"). In addition, any repeat questions with the exact same phrasing and website link were eliminated to ensure there was not overcounting of the most-asked questions.

The questions were classified based on a modified version of Rothwell's classification system using 1 of the 3 following themes: policy, fact, or value.^{10,16} Questions were further categorized into 10 topics related to FAI and hip arthroscopy: Specific Activities, Timeline for Recovery, Restrictions, Technical Details, Cost, Indications/Management, Risks/Complications, Pain, Longevity, and Evaluation of Surgery (Table 1). Similar to the methodology of previous studies, the associated website for each individual question was categorized into one of the following: Commercial, Academic, Medical Practice, Single Surgeon Practice, Government, and Social Media.^{10,11} A description and example of each website classification is illustrated in Table 2. Initial data collection was conducted by 2 independent reviewers (T.A.T and A.J.H). Discrepancies were addressed between the 2 reviewers and a third-party reviewer (B.K.) after fully and independently completing the initial data query. Interobserver reliability for question categorization and website classification was determined utilizing Cohen's kappa coefficient.

In addition, each website was scored based on information quality using the *Journal of the American Medical Association* (JAMA) Benchmark Criteria.¹⁰ One point was awarded for the presence of each of the following: authorship, attribution, currency, and disclosure (Table 3). A maximum score of 4 was possible for each website. Initial data collection for the JAMA criteria was conducted by the same 2 independent reviewers (T.A.T.

Table 1. Rothwell’s Classification System With Subcategorization Breakdown, Definitions, and Examples of Questions That Are Asked Regarding Femoroacetabular Impingement and Hip Arthroscopy Procedures

Type Subcategory	Definition/Example
Fact	Ask whether something is true, and to what extent, e.g., Where do they cut for hip arthroscopy surgery?
Specific Activities	Can I drive after hip labral repair surgery?
Timeline of Recovery	What is the average recovery time for hip arthroscopy surgery?
Technical Details	How long does an arthroscopic hip surgery take?
Restrictions	What can you not do after hip arthroscopy?
Cost	How much does femoroacetabular impingement surgery cost?
Policy	Ask whether a certain course of action should be taken to solve a problem, e.g., How can I speed up recovery after hip labral repair surgery?
Indications/Management	What happens if a torn hip labrum goes untreated?
Risks/Complications	Can you wait too long for arthroscopic femoroacetabular impingement surgery?
Value	Ask for evaluation of an idea, object, or event e.g., Is hip arthroscopy and labral repair surgery considered a major surgery?
Pain	Why is hip impingement surgery so painful?
Longevity	How long does a hip arthroscopy and labral repair last?
Evaluation of Surgery	Is surgery for femoroacetabular impingement worth it?

Table 2. Website Categorization Breakdown With Definitions of Each Website Type and Associated Examples

Website Type	Example
Academic	Webpage hosted by an academic institution or organization e.g., dukehealth.org , orthoinfo.aaos.org
Commercial	Webpage hosted by a for-profit company e.g., orthopedia.com , athletico.com
Journal	Academic journal publication, may be hosted by third-party site e.g., pubmed.com , arthroscopyjournal.com
Government	Governmental hosted webpage e.g., myhealth.alberta.ca , medlineplus.gov
Legal	Single attorney, law firm, or legal advice webpage e.g., rosenfeldinjurylawyers.com , rossfellercaesey.com
Medical Information Site	Company or organization for the purpose of medical information reviewed by medical professionals e.g., WebMD.com , healthline.com
Medical Practice	Medical or Surgical practice of physicians e.g., rothmanortho.com , orthobethesda.com
Non-medical Media Site	Websites not specializing in medical information such as general news and social media sites e.g., wikipedia.com , abcnews.com
Single Surgeon Practice	Single surgeon practice or personal webpage e.g., rachelfrankmd.com

and A.J.H.). Any discrepancies were evaluated by the third-party reviewer (B.K.) who acted as a tiebreaker.

Results

After we removed any repeat questions, a total of 286 questions were obtained from the following search strings: 86 unique questions for “femoroacetabular Impingement,” 92 unique questions for “hip labral tear,” and 108 unique questions for “hip cam impingement.” The 3 most common asked questions were the following: How do you treat femoroacetabular impingement and labral tears without surgery? What is the recovery process after hip arthroscopy and are there limitations after surgery? How do you diagnose hip impingement and differentiate from other causes of hip pain?

The most common questions based on Rothwell classification were “fact” (43.4%), followed by “policy” (34.3%), “value” (20.6%), and “other” (2.1%)

(Table 4). When we evaluated the breakdown of each question by topic, the most common questions were “Indications/Management” (29.7%), “Other” (23.1%), “Pain” (13.6%), and “Restrictions” (8.0%) (Table 5). When we evaluated the questions based on website type, the most frequently observed were “Medical Practice” (30.4%), “Academic” (25.8%), and “Commercial” (20.6%) websites (Table 6).

The mean JAMA Benchmark Criteria score for all websites was 2.15 with a standard deviation (SD) of 1.36 (Table 7). The highest mean JAMA score based on Rothwell classification was “value” 2.83 (SD = 1.17) and the lowest mean score was for “fact” 1.98 (SD = 1.29). When evaluating JAMA criteria based off website type, the highest mean scores were observed in “Government” websites 3.42 (SD = 1.07) and “Commercial” websites 3.20 (SD = 1.13), whereas the lowest scores were seen in “Medical Practice” websites 1.43 (SD = 1.11) and “Single-Surgeon” websites 1.35 (SD = 1.13)

Table 3. Journal of American Medical Association (JAMA) Benchmark Criteria for Classifying Websites Based on Quality of Information

Criteria	(Each Criterion Receives 1 Point for a Maximum of 4 Points)
Authorship	Clearly identifiable author and contributors with affiliations and relevant credentials present
Attribution	References and sources clearly listed with any copyright information disclosed
Currency	Clearly identifiable posting date of any content as well as date of any revisions
Disclosure	Website ownership clearly disclosed along with any sponsorship, advertising, underwriting, and financial support

NOTE. Definitions of each criterion are provided in the right column. One point for the presence of each of the following was determined for each website link: authorship, attribution, currency, and disclosure. A maximum score of 4 is possible for each website.

(Table 8). Cohen’s kappa coefficient for interobserver reliability showed a high level of agreement for question categorization (0.82) and for website categorization (0.90).

Discussion

This study found that patients with FAI and hip labrum disease generally obtain online information from sources with poor academic reporting, most commonly hosted by medical practices, and regarding questions about indications/management of their pathology. The key findings of this study were as follows: (1) the most common question type by Rothwell classification is fact (43.4%); (2) the most common subcategories of questions are related to indications/management (29.7%), followed by pain (13.6%) and restrictions (8.0%); (3) the most frequently asked question is “How do you treat FAI and labral tears without surgery?” (4) answers to patients’ questions are most commonly found on websites hosted by medical practices (30.4%); and (5) the overwhelming majority of websites scored relatively poorly on the JAMA benchmark criteria (average = 2.15), with government sites scoring the highest (3.42) and single-surgeon practices and medical practices scoring the lowest (1.35 and 1.43, respectively).

Table 4. Total Number of Questions and Associated Percentage Breakdown of the 3 Main (Fact, Value, Policy) Rothwell’s Classification Groups

Distribution of Questions by Rothwell’s Classification					
	Fact	Value	Policy	Other	Total
Count (%)	124 (43.4)	59 (20.6)	98 (34.3)	6 (2.1)	286

NOTE. When a question did not clearly fit into any of the 3 main categories, the “Other” option was used.

Table 5. Breakdown of Each Rothwell Subcategory With the Number of Questions in Each Category and Their Relative Percentage Presence

Distribution of Questions by Topic	
Topic	Count (%)
Cost	3 (1.0)
Evaluation of Surgery	13 (4.5)
Indications/Management	85 (29.7)
Longevity	2 (0.7)
Pain	39 (13.6)
Restrictions	23 (8.0)
Risks/Complications	14 (4.9)
Specific Activities	18 (6.3)
Technical Details	8 (2.8)
Timeline of Recovery	15 (5.2)
Other	66 (23.1)
Total	286

NOTE. When a question did not clearly fit into any of the 10 main categories, the “Other” option was used.

The majority of questions posed by patients with FAI online are classified as fact (aiming to answer if something is true, and if so, to what extent) by Rothwell (43.4%). This indicates patients are interested in obtaining objective information on their diagnosis and treatment options. The fact subcategories pertain to specific activities, the timeline of recovery, restrictions, cost, and technical details. Restrictions themselves composed 8.0% of all total questions. These results show patients are concerned about how FAI or labral tear and potential surgical intervention will affect their day-to-day lives and other practical minutiae. Arthroscopic labral repair continues to rapidly evolve since its introduction in 1986 by Suzuki et al.¹⁷ There is variability in published surgical techniques and rehabilitation protocols, which can result in patient uncertainty.¹⁸ Patients may discover information that does not apply to their condition or is incorrect, which leads to time spent in clinic clarifying misconceptions that could be otherwise be spent explaining pertinent material. It is

Table 6. Breakdown of Each Website Type With the Number of Questions in Each Category and Their Relative Percentage Presence

Distribution of Questions by Website Type	
Topic	Count (%)
Commercial	59 (20.6)
Academic	74 (25.8)
Medical Practice	87 (30.4)
Single-Surgeon Practice	26 (9.1)
Government	19 (6.6)
Social Media	6 (2.1)
Other	15 (5.2)
Total	286

NOTE. When a website did not clearly fit into any of the 6 main categories, the “Other” option was used.

Table 7. *Journal of American Medical Association (JAMA)*
Benchmark Criteria Scores Based on Rothwell's Classification Type

JAMA Benchmark Scores by Rothwell's Classification	
	JAMA Score
Total websites	2.15 (1.36)
Rothwell's Classification	
Fact	1.98 (1.29)
Value	2.83 (1.17)
Policy	2.40 (1.30)
Other	2.02 (1.59)

NOTE. One point for the presence of each of the following was determined for each website link: authorship, attribution, currency, and disclosure. A maximum score of 4 could be attained for each website. Scores listed are presented as a mean (standard deviation). When a question did not clearly fit into any of the 3 main categories, the "Other" option was used.

important for hip arthroscopists to provide patients with detailed restrictions and rehabilitation protocols following a diagnosis of FAI/labral to negate the need for patients to search online for answers, particularly given the mismatch between patient expectations of postoperative rehabilitation and their actual therapy protocol.¹⁹ This is especially important for patients undergoing arthroscopic labral repair, as it has been shown that greater preoperative expectations are correlated with improved patient-reported outcomes at 1-year postoperatively.²⁰

The question category most frequently asked by patients was indications/management (29.7%). Two of the 3 most asked questions pertained to diagnosing ("How do you diagnose hip impingement and differentiate it from other causes of hip pain?") and managing FAI/labral tears ("How do you treat femoroacetabular impingement and labral tears without surgery?"). FAI can be a difficult diagnosis for patients to comprehend, given its complexity and

Table 8. *Journal of American Medical Association (JAMA)*
Benchmark Criteria Scores Based on Website Type

JAMA Benchmark Scores by Website Type	
Topic	JAMA Score
Commercial	3.20 (1.13)
Academic	2.03 (1.30)
Medical Practice	1.43 (1.11)
Single-Surgeon Practice	1.35 (1.13)
Government	3.42 (1.07)
Social Media	2.83 (0.75)
Other	2.33 (0.82)

NOTE. One point for the presence of each of the following was determined for each website link: authorship, attribution, currency, and disclosure. A maximum score of 4 could be attained for each website. Scores listed are presented as a mean (standard deviation). When a website did not clearly fit into any of the 6 main categories, the "Other" option was used.

frequency in asymptomatic patient populations, with estimates of an incidence between 10% and 20%.²¹ In addition, hip pain often can be confused with lower back pain, sacroiliac joint pain, pelvic floor dysfunction, and buttock or gluteal pain.²² The Warwick Agreement was created in 2016 as an international consensus agreement on the diagnosis and management of FAI; however, there still exists variation in the management of this pathology, which further disorients patients.²³ This is highlighted in the disparity between more established arthroplasty procedures and FAI. Recent studies found indications/management to be searched only 11%, 12%, and 19% of the time in patients undergoing shoulder, knee, and hip arthroplasty, respectively.^{10,11}

The most commonly asked question online in this study, "How do you treat femoroacetabular impingement and labral tears without surgery?" attempts to address a nuanced decision of when to proceed with surgical intervention. As arthroscopic techniques evolve, the indications for surgery continue to change. Nonoperative management, including rest, activity modification, anti-inflammatory medications, corticosteroid injections, and physical therapy, is appropriate as a first-line treatment for patients with mild pathology and no mechanical symptoms. Providers should be prepared to discuss conservative treatment modalities or provide patients with educational material, or they face a high risk of patients searching online for answers to these questions and perpetuating confusion.

Another 1 of the 3 most common questions from this study is "what is the recovery process after hip arthroscopy and are there limitations after surgery?" The goals of arthroscopic labral repair are to relieve pain, maintain hip joint function, restore the suction seal of the hip, and prevent the development of early-onset osteoarthritis.²⁴ Providers have varied postoperative rehabilitation protocols; consequently, we recommend surgeons procure materials detailing their rehabilitation protocol for patients to reference when questions arise.¹⁸ A source of increasingly frequent medical distortion are online patient message boards and social media. Discussion between patients online is common. Yet, FAI/labral tears possess a spectrum of disease/treatment. Patients may have similar but distinct pathology, which may lead to unrealistic expectations that may derail a patient-specific treatment plan. Pain was the second most popular search category in this study (13.6%), which is unsurprising, given impingement and labral tearing. The management of postoperative pain following hip arthroscopy is not standardized, and a study found up to 16% of providers have had to readmit a patient in the 30-day postoperative period for pain control at least once in the past year. In the same investigation, the only pain protocol that reached clinical agreement was the use of

oral anti-inflammatory medications postoperatively.²⁵ Discussing expectations preoperatively is important, as adequate pain expectations have been correlated with improved postoperative outcomes.²⁶

The types of websites most encountered were from medical practices (30.4%), followed by academic groups (25.8%). These 2 website types performed poorly on the JAMA benchmark criteria analysis, scoring 1.43 and 2.03, respectively (of 4.0). The JAMA criteria were developed as tool to reflect the scientific transparency of a source and include one point each for inclusion of authorship, attribution, currency, and disclosure.²⁷ Of individuals seeking answers to health questions online between the ages of 15 and 30 years, approximately 80% considered the information they discovered to be reliable.²⁸ If incomplete or incorrect information is deemed credible by patients, an awkward conversation may occur during which the surgeon must delicately correct the patient.²⁹ This conversation can put strain or mistrust in the provider–patient relationship, yet it must be had to clarify misconceptions and allow patients to make informed medical decisions. A commonly encountered hurdle in relaying complex medical knowledge to patients online is in either low-quality of available materials, or high-quality materials with complicated terminology.^{30,31} The results of this study show that >65% of websites found by patients searching online about FAI are hosted by groups composed partly of physicians. Patients continue to use online resources at an increasing rate and are placing more trust in these resources than before; therefore, providers must ensure the content they and their practices provide online are high quality and written for a medically lay audience.

The average JAMA score in this study was of average quality (2.15), which is similar to what has been reported in the adult reconstruction literature.¹⁰ The sites with the lowest JAMA scores were single-surgeon practices (1.35), medical practices (1.43), and academic (2.03). This shines a light on the lack of academic reporting provided by physicians on their own sites. Social media sources scored higher on the JAMA criteria (2.83), despite the common perception of social media as a source of inaccurate information and its infrequent use (2.1% of all websites in this study). Commercial, for-profit sources, which accounted for 20.6% of the websites retrieved, scored 3.20 while government sources scored the highest (3.42). It may be that nonmedical websites are motivated to provide their sources of information to validate their claims and data, whereas physicians and other medical pages do not feel the need to support their claims. Knowing the academic quality of a source allows surgeons to direct patients to accurate, easily digestible information. Still, studies continue to show that online health information is generally of low quality, and patients should defer to

their provider for important medical questions.^{30,32,33} Future studies in this sphere should evaluate website content in further depth and examine best practices to improve the academic quality of online resources available to this patient population.

Limitations

Limitations inherent to a study of this methodology include the use of the JAMA benchmark criteria as an assessment of online information quality. The criteria are a proxy of transparency and publishing practices and not of content accuracy and therefore an indirect measure of webpage quality, although they have been used in previous studies of similar methodology.¹⁰ An assumption in this study is that the “people also ask” algorithm is generated based on searches conducted by real patients with FAI or labral tears. It is impossible to confirm who has conducted the searches by which the algorithm is generated. This does provide the study with the added benefit of subject anonymity as opposed to in-person surveys conducted to assess patient questions. A final limitation of this study is the use of Rothwell’s classification to determine question type. The classification was primarily designed to understand questions asked in small groups, yet previously deemed appropriate for use in classifying online questions.^{10,11,34}

Conclusions

Commonly asked questions on Google regarding FAI and labral tears pertain to the indications and management of pathology as well as pain control and restrictions in activity. The majority of information is provided by medical practice, academic, and commercial sources, which have highly variable academic transparency.

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