

# Analysis of YouTube content as an information source for femoroacetabular impingement rehabilitation

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## Abstract

**Received:**  
February 24, 2025

**Accepted:**  
April 12, 2025

**Published:**  
April 30, 2025

**Keywords:**  
Comprehensiveness,  
quality, reliability,  
YouTube.

This study aims to evaluate the content, reliability, and quality of YouTube videos related to the rehabilitation of Femoroacetabular Impingement (FAI). A systematic evaluation of YouTube videos was conducted, assessing video attributes and upload sources. Two physiotherapists independently classified the videos as either useful or misleading. The comprehensiveness of the videos was analyzed using a 10-item scale, reliability was assessed with the 5-point modified DISCERN (mDISCERN) scale, and overall quality was evaluated using the Global Quality Scale (GQS). A total of 74 videos were included in the analysis, of which 26 (35.1%) were categorized as useful, while 48 (64.9%) contained misleading information. The useful videos exhibited significantly higher mean scores in comprehensiveness, reliability (mDISCERN), and overall quality (GQS) compared to misleading videos ( $p < 0.05$ ). Furthermore, a significant difference in mDISCERN scores was observed between videos uploaded by health professionals and non-health professionals ( $p = 0.042$ ). However, no statistically significant differences were found in comprehensiveness ( $p = 0.245$ ) or quality ( $p = 0.068$ ) scores. This study highlights the substantial prevalence of misleading information in YouTube videos related to FAI rehabilitation. To mitigate this issue, healthcare professionals, including physiotherapists and physicians, should actively contribute by producing accurate, evidence-based video content to ensure the dissemination of reliable and high-quality information on this topic.

## Introduction

The condition known as Femoroacetabular Impingement (FAI) syndrome was initially documented in the 1990s (Ganz et al., 1991). Its structural morphology is caused by compression between the femoral head and acetabulum (Griffin et al., 2016). This phenomenon predominantly manifests in individuals aged between 20 and 45 who engage in sports and maintain an active lifestyle. The incidence of two types of FAI, Cam and Pincer, is estimated to be 37% and 67%, respectively (Frank et al., 2015). Although there are many studies on FAI syndrome, its etiology has not been fully elucidated (Grantham & Philippon, 2019).

In the treatment of FAI, surgical or conservative approaches are commonly recommended (Griffin et al., 2018). The surgical intervention is decided based on the specific impingement type (cam-pincer) exhibited by the patient, with arthroscopic procedures commonly employed for this purpose. The conservative treatment approach involves implementing a supervised rehabilitation program tailored to the specific needs and functional goals of the patient. Key factors influencing rehabilitation outcomes include individual characteristics such as body composition, posture, muscle strength, and tissue adaptation to both static and dynamic conditions throughout the degenerative process. Additionally, the development of compensatory mechanisms plays a significant role in addressing these

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Turk J Kinesiol, 11(2), 77-85. doi: 10.31459/turkjin.1645880

challenges (Anzillotti et al., 2022). Nevertheless, there is no universally accepted rehabilitation program for both conservative and post-surgical treatments (Anzillotti et al., 2022; Griffin et al., 2018).

By the conclusion of January 2024, the YouTube platform has amassed a total of over 2.7 billion accounts, with an average viewing duration of 30 minutes per visitor. Furthermore, the utilization of YouTube as a platform for accessing medical information has seen a notable uptick in recent years, gaining popularity as an effective resource (Culha et al., 2021; Güloğlu et al., 2022; Liu et al., 2019). However, due to the commercial nature of YouTube, there is a known presence of videos containing conflicting and inaccurate information alongside credible sources (Chan & Shelat, 2021; Madathil et al., 2015). The growing prevalence of YouTube has sparked interest in researching the quality and reliability of health information presented on the platform, highlighting a burgeoning need for further studies in this domain (Crutchfield et al., 2021; Culha et al., 2021; Güloğlu et al., 2022; Kocyyigit & Akyol, 2021; Liu et al., 2019).

In light of the absence of a universally accepted rehabilitation protocol for FAI, coupled with the widespread utilization of YouTube as an educational tool by patients, it is imperative to evaluate the reliability and quality of video content to ensure access to accurate information. Upon reviewing the available literature, it was noted that while YouTube videos related to FAI were assessed for their quality and reliability, evaluations for FAI rehabilitation videos were lacking. This study aimed to address the lack in the literature by assessing the comprehensiveness, reliability, quality, and substance of the most popular English-language YouTube videos about FAI rehabilitation.

## Methods

The current research employed a descriptive model to assess the content, comprehensiveness, usefulness, reliability, and quality of YouTube videos (www.youtube.com) related to FAI rehabilitation available on the platform. Initially, an analysis was conducted on the terminology utilized in frequently accessed video content pertaining to the subject in order to identify appropriate search terms. Based on the findings of the initial search, the terms “femoroacetabular impingement exercise”, “femoroacetabular impingement rehabilitation”, “femoroacetabular impingement physical therapy”,

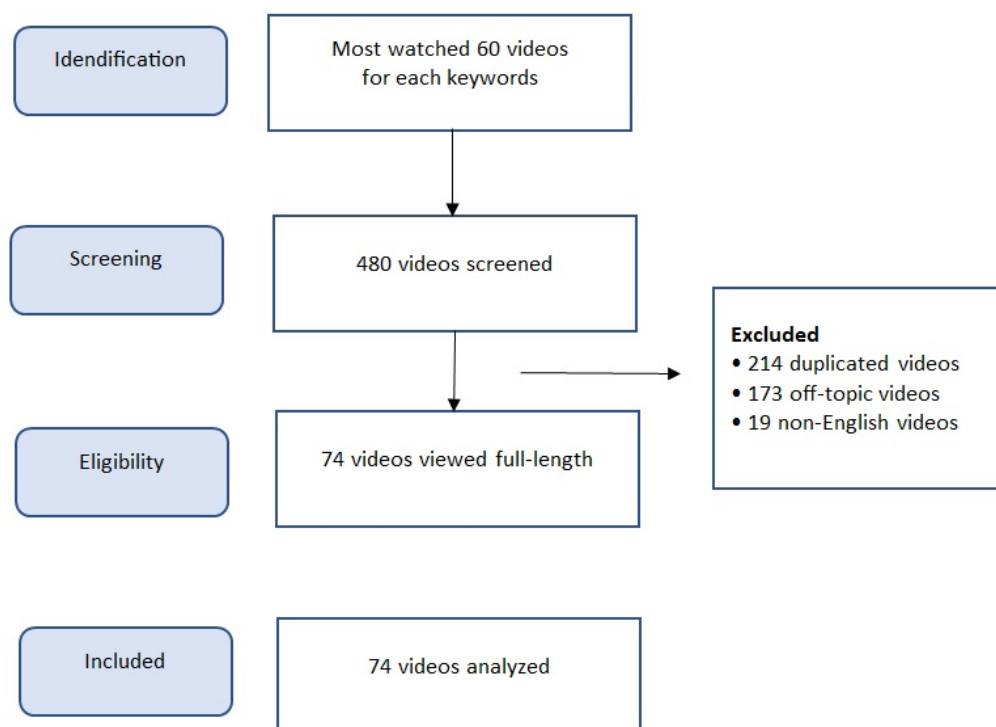
“femoroacetabular impingement physiotherapy”, “hip impingement exercise”, “hip impingement rehabilitation”, “hip impingement physical therapy”, and “hip impingement physiotherapy” were selected. The search was conducted on January 5, 2024, and the videos were ranked according to the number of views. When examining the behavioral patterns of internet users, it becomes evident that a significant proportion, specifically 90%, tend to predominantly focus on the content presented within the initial three pages of search engine results (Dutta et al., 2020). In this regard, solely the initial three pages (comprising 20 videos per page) pertaining to each search keyword were included for analysis. Consequently, a collective sum of 480 videos, with 60 videos corresponding to each of the eight selected keywords, were systematically reviewed.

Videos deemed irrelevant, non-English-speaking, or exhibiting substandard video quality were excluded from the analysis. In the study, videos consisting of multiple episodes were treated as a singular entity for analytical purposes. The screening methodology employed and exclusion criteria applied were in alignment with established methodologies in prior research pertaining to this subject matter (Chang & Park, 2021; Culha et al., 2021; Ertem et al., 2023). Among the videos that were excluded from the analysis, 214 were found to be duplicates, 173 were deemed irrelevant, and 19 were identified as non-English content. Following the application of exclusion criteria, the research was carried out on the remaining 74 videos, as illustrated in Figure 1. The URLs for all eligible and included videos were documented for analysis.

## Evaluation of the Videos

Two experienced physiotherapists (US, SBÖ) specializing in orthopedic rehabilitation and hip pathologies independently evaluated all of the videos for features, usefulness, comprehensiveness, reliability, and quality. Any discrepancies among the authors were resolved through consensus with the involvement of the third author.

**Video parameters and sources:** For each video, the following parameters were recorded: (1) video duration, (2) total days posted on YouTube, (3) views, (4) likes, (5) dislikes, (6) number of subscribers, and (7) number of comments. The sources of the videos were categorized into distinct groups, such as (1) physiotherapists, (2) independent users, (3) physicians, (4) other health professionals, (5) trainers, and (6) unknown.



**Figure 1.** Flowchart of the study.

**Table 1**

Comprehensiveness, reliability, and quality assessment tools of YouTube videos for FAI rehabilitation.

**Comprehensiveness (0.5 point per each covered in the video)**

1. Explain the importance of fai rehabilitation exercises
2. Describe the timing of exercise after surgery
3. Describe posture exercises
4. Describe stretching exercises
5. Describe range of motion exercises
6. Describe strengthening exercises (core strengthening etc)
7. Describe activity modification
8. Explain the duration, frequency, technique, breath control and pain limits of exercises
9. Mention situations that necessitate the interruption of the exercise programme
10. Signify the importance of undertaking regular training

**Reliability (mDISCERN)**

1. Are the explanations given in the video clear and understandable?
2. Are useful reference sources given? (publication cited, from valid studies)
3. Is the information in the video balanced and neutral?
4. Are additional sources of information given from which the reviewer can benefit?
5. Does the video evaluate areas that are controversial or uncertain?

**Quality (Global quality scale)**

1. Poor quality, poor flow, most information missing, not helpful for patients
2. Generally poor, some information given but of limited use to patients
3. Moderate quality, some important information is adequately discussed
4. Good quality good flow, most relevant information is covered, useful for patients
5. Excellent quality and excellent flow, very useful for patients

**Assessment of usefulness:** The evaluated videos were classified as useful or misleading. The useful videos featured scientifically sound advice, whereas misleading videos contained inadequate or unproven information. The Kappa coefficient was employed to

assess the inter-rater reliability between the two independent observers.

**Assessment of comprehensiveness:** To evaluate the videos' thoroughness, a 10-item assessment tool was created encompassing essential subjects related to FAI rehabilitation, as identified

through literature review and expert consultation (MacLeod et al., 2015; Nepple et al., 2013). Regardless of sequence, each item was rated 0.5 points Table 1.

**Assessment of reliability:** The assessment of video reliability was conducted utilizing the modified DISCERN (mDISCERN) tool, originally introduced by Charnock et al. This tool consists of five questions, demonstrating a reliability score of 3 or above, suggesting a high level of reliability as per the findings presented in Table 1 (Charnock et al., 1999).

**Assessment of quality:** Educational quality was assessed using the Global Quality Scale (GQS) tool, comprising five criteria designed to evaluate the educational merit of online resources. The superior academic quality is associated with the higher score, wherein a maximum score of 5 signifies an excellent information flow (Bernard et al., 2007) (Table 1).

### Ethics Statement

Given that the research incorporated publicly accessible YouTube videos and did not involve the use of patient data or materials, the need for institutional review board or ethics committee approval did not arise (Chang & Park, 2021; Ertem et al., 2023). All authors endorsed the study content and provided explicit consent for submission.

### Data Analysis

The data was analyzed using the SPSS version 27.0 (SPSS Inc., Chicago, IL, USA). The descriptive statistics were presented as medians (minimum-maximum), counts, and percentages. The Shapiro-Wilk test was performed to assess the distribution of the data. Categorical variables were assessed through the utilization of statistical tests, including the Pearson chi-square, Fisher exact chi-square, or Fisher-Freeman-Halton tests for comparison. The Kappa value was utilized to determine the degree of agreement between two distinct observers, while the Mann-Whitney U test was employed to investigate

group disparities. Statistical significance was considered at a predetermined threshold of  $p < 0.05$ .

## Results

An analysis was conducted on the contents of 74 videos examined in the study, revealing that 26 videos (35.1%) were deemed useful while 48 videos (64.9%) were identified as containing misleading information. The interrater agreement, as quantified by Kappa scores, between two autonomous physiotherapists who conducted evaluations of the videos, was determined to be 0.94. The attributes of the videos under consideration, including their duration, time since publication, count of likes, dislikes, subscribers, and comments, are detailed in Table 2. Although a statistically significant difference was found in the duration of the videos between the categories of useful and misleading videos ( $p = 0.011$ ), no significant differences were observed in other parameters ( $p > 0.05$ ).

The analysis of video content revealed distinct differences in quality between videos considered useful and those found to be misleading. In particular, useful videos exhibited higher scores across various evaluation metrics compared to misleading videos. Specifically, useful videos scored a mean comprehensiveness score of  $2.73 \pm 0.51$ , mDISCERN score of  $2.96 \pm 1.03$ , and a mean GQS score of  $3.57 \pm 0.70$ . Conversely, misleading videos displayed lower scores, with a comprehensiveness score of  $1.41 \pm 0.48$ , mDISCERN score of  $2.18 \pm 0.98$ , and mean GQS score of  $2.29 \pm 0.84$  (Table 3). Statistical analysis further confirmed the significant disparity between the two groups, as useful videos recorded notably higher scores in comprehensiveness ( $p < 0.001$ ), mDISCERN ( $p < 0.001$ ), and GQS ( $p = 0.007$ ) metrics compared to misleading videos. The links to the useful videos are given in Appendix A.

**Table 2**  
Characteristics of YouTube videos.

|                              | Useful Videos (n: 26)   | Misleading Videos (n: 48) | <i>p</i>     |
|------------------------------|-------------------------|---------------------------|--------------|
| Duration (sec.)              | 731.69 ± 337.15         | 564.70 ± 398.21           | <b>0.011</b> |
| Total days posted on YouTube | 1393.88 ± 729.87        | 1542.75 ± 1063.58         | 0.901        |
| Number of views              | 286676.07 ± 552695.09   | 369313.81 ± 717368.23     | 0.675        |
| Number of likes              | 7899.00 ± 16553.26      | 6584.31 ± 11770.29        | 0.599        |
| Number of dislikes           | 91.42 ± 175.32          | 122.41 ± 250.50           | 0.928        |
| Number of subscribers        | 1527976.92 ± 2831970.69 | 745532.85 ± 1116409.14    | 0.368        |
| Number of comments           | 332.53 ± 601.35         | 242.83 ± 350.23           | 0.482        |

**Table 3**

Analysis of useful and misleading videos based on comprehensiveness, quality, reliability, and sources.

|                                | Useful videos (n: 26) | Misleading videos (n: 48) | <i>p</i>         |
|--------------------------------|-----------------------|---------------------------|------------------|
| Comprehensiveness Score        | 2.73 ± 0.51           | 1.41 ± 0.48               | <b>&lt;0.001</b> |
| mDISCERN Score                 | 2.96 ± 1.03           | 2.18 ± 0.98               | <b>&lt;0.001</b> |
| GQS score                      | 3.57 ± 0.70           | 2.29 ± 0.84               | <b>0.007</b>     |
| Source of upload, <i>n</i> (%) |                       |                           |                  |
| Physiotherapists               | 17 (65.4)             | 14 (29.2)                 | <b>0.001</b>     |
| Independent users              | 1 (3.8)               | 20 (41.7)                 |                  |
| Physicians                     | 2 (7.7)               | 5 (10.4)                  |                  |
| Other health professional      | 1 (3.8)               | 6 (12.5)                  |                  |
| Trainer                        | 5 (19.2)              | 2 (4.2)                   |                  |
| Unknown                        | -                     | 1 (2.1)                   |                  |

**Table 4**

Analysis of videos by source of uploads.

|                              | Health professionals (n: 45) | Non-health professionals (n: 29) | <i>p</i>     |
|------------------------------|------------------------------|----------------------------------|--------------|
| Comprehensiveness score      | 1.96 ± 0.88                  | 1.74 ± 0.63                      | 0.245        |
| mDISCERN score               | 2.68 ± 1.12                  | 2.10 ± 0.85                      | <b>0.042</b> |
| GQS score                    | 2.91 ± 1.04                  | 2.48 ± 0.91                      | 0.068        |
| Duration (sec.)              | 634.53 ± 398.86              | 606.06 ± 365.99                  | 0.978        |
| Total days posted on YouTube | 1297.64 ± 857.47             | 1789.62 ± 1039.21                | 0.055        |
| Number of views              | 426088.55 ± 745815.38        | 207126.06 ± 486198.07            | 0.361        |
| Number of likes              | 8376.06 ± 14790.50           | 4982.68 ± 11279.43               | 0.249        |
| Number of dislikes           | 146.97 ± 278.33              | 56.51 ± 80.43                    | 0.645        |
| Number of subscribers        | 1349644.73 ± 2400049.11      | 509619.44 ± 354124.83            | 0.956        |
| Number of comments           | 331.00 ± 520.07              | 186.44 ± 308.91                  | 0.273        |

Furthermore, the analysis of the videos was based on their sources, revealing that the majority of useful videos were disseminated by physiotherapists (65.4%), whereas misleading content predominantly originated from independent users (41.7%) (Table 3). Based on the source of the videos, it was determined that there were no statistically significant variances in the mean scores for comprehensiveness, GQS means, or video characteristics. Nevertheless, statistically significant variances were noted concerning mDISCERN mean scores ( $p=0.042$ , Table 4).

## Discussion

The advent of the Internet, informatics, and technology has established this platform as a primary source of health information for patients and their families. YouTube is a widely used video-sharing platform that provides users with free access. It boasts a significant user base, with over one billion individuals utilizing the platform for viewing and sharing video content (Culha et al., 2021). YouTube is often regarded as a primary resource for individuals seeking information on a variety of treatment options for different medical conditions (Ertem et al., 2023). Hence, it is imperative to thoroughly evaluate the

reliability and quality of health-related videos accessible on YouTube. The present study undertook an assessment of the content, comprehensiveness, reliability, and quality pertaining to YouTube videos focusing on rehabilitation for Femoroacetabular Impingement (FAI).

The research encompasses a total of 74 videos, collectively amassing 25,180,641 views, underscoring the widespread utilization of YouTube as a primary platform for engaging in FAI rehabilitation. Upon analysis, it was ascertained that 26 of the videos provided useful information, whereas 48 videos presented misleading content. The viewership rates for the former and the latter were recorded at 29.6% and 71.4%, respectively. This distribution suggests that over two-thirds of the video content accessed by users may contain misleading information, leading to challenges in obtaining accurate and reliable information on FAI rehabilitation. The outcomes align with prior research on the efficacy of exercise videos post breast cancer surgery and self-breast examination training videos (Güloğlu et al., 2022; Rittberg et al., 2016), while deviating from the results observed in studies focusing on pelvic floor and rheumatoid arthritis exercise videos (Culha et al., 2021; Singh et al.,



2012). It is postulated that such disparities may stem from variations in underlying pathologies and the sources of the videos utilized in the respective studies.

Our research findings revealed that while misleading videos garnered many views, there was a distinct preference for useful videos as indicated by higher levels of likes, dislikes, comments, and subscriber counts. Previous studies have yielded varying results; however, a consistent observation was made that useful videos tended to attract higher levels of engagement in the form of comments and likes (Chang & Park, 2021; Culha et al., 2021; Ertem et al., 2023; Güloğlu et al., 2022). Misleading videos' proliferation is believed to correlate with their higher viewership rates. Conversely, the prevalence of likes and comments on useful videos suggests that discerning viewers are capable of identifying valuable content, reflecting an escalating demand for relevant information among the audience.

The results of the video analysis indicated that the comprehensibility, reliability, and quality of the useful videos were found to be moderate. Notably, the useful videos offered more comprehensive, dependable, and superior information compared to misleading videos. These outcomes were largely in line with expectations and further corroborated by existing literature studies encompassing various disease and application videos (Culha et al., 2021; Güloğlu et al., 2022; Singh et al., 2012).

Upon analysis based on the sources of publication, it was observed that a majority of the useful videos were published by physiotherapists, contrasted with the misleading videos, which were predominantly shared by independent users. Previous research has identified a trend where educational video content containing accurate information is predominantly created by academic institutions, professional associations, medical practitioners, and physical therapists. Conversely, videos disseminating misleading information tend to originate from independent sources (Langford et al., 2021; Onder & Zengin, 2021). The phenomenon of health professionals creating useful videos aligns with existing scholarly literature and represents a predictable outcome.

Upon analysis of video sources, it was determined that videos created by health professionals, such as physiotherapists and doctors, exhibited higher levels of reliability compared to those produced by non-health professionals, such as independent users, coaches, and unknown sources. However, both categories of videos displayed similar levels of scope and quality. The

creation of useful videos by coaches has been found to be impactful in achieving this outcome. Our findings are consistent with existing literature (Culha et al., 2021), although some studies have reported divergent results (Liu et al., 2019). These variances could potentially be linked to disparities in the content covered in the videos.

## Limitations

The limitations of this study include restricting the analysis to YouTube videos exclusively in English, thereby excluding content in other languages. Furthermore, the study did not utilize a standardized rating system to evaluate the reliability of potentially misleading information. Moreover, the constantly evolving dynamic structure of YouTube may lead to fluctuations over time in engagement metrics such as views, likes, and comments. In future research, engagement patterns could be investigated through longitudinal study designs, enabling a more comprehensive understanding of viewer trends.

## Conclusion

The findings of this study indicate that only one-third of YouTube videos related to FAI rehabilitation offer useful information, with patients demonstrating a preference for videos containing such informative content. Notably, the most useful videos were produced by physiotherapists, exhibiting moderate levels of reliability, accuracy, and quality. These findings underscore the inadequacy of YouTube's current video regulation system in ensuring the quality of health-related content. Consequently, it is essential to implement supplementary measures to enable healthcare professionals to provide more effective guidance to patients. The first of these measures could involve the production of reliable and verified educational videos on FAI rehabilitation by academic institutions. Another important step would be to enhance the visual design and presentation of these videos, while incorporating relevant keywords and accurate tags in their titles and descriptions to improve their accessibility. In addition, actively responding to viewer comments could foster engagement and increase the overall impact of the videos. Furthermore, it is strongly recommended that the YouTube platform optimize its algorithms to prioritize high-quality health-related content and collaborate with professional healthcare institutions.

## Authors' Contribution

Data curation: US, SBÖ Formal analysis: US, Investigation: US, SBÖ, EA, ZH, Methodology: US, Project administration: US, SBÖ, EA, ZH, Resources: US, SBÖ, Software: US, Supervision: US, SBÖ, Validation: US, SBÖ, Visualization: SBÖ, Writing – original draft: US, SBÖ, Writing – review & editing: US, ZH, EA.

## Ethical Approval

The present study demonstrates a methodological approach that does not involve human participants or animals, thereby obviating the necessity for ethics committee approval. Instead, the evaluation was centered on publicly available videos accessible to anyone, ensuring transparency and ethical compliance within the research process.

## Funding

The authors declare that the study received no funding.

## Conflict of Interest

The authors hereby declare that there was no conflict of interest in conducting this research.

## Data Sharing Statement

Data sharing will be provided when requested from the authors.

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**Appendix A.** The links of useful videos.

1. <https://www.youtube.com/watch?v=FVIZSNQUPIw>
2. <https://www.youtube.com/watch?v=bebDFSk-e70>
3. <https://www.youtube.com/watch?v=ATQcSDuumL8>
4. <https://www.youtube.com/watch?v=ulHaddxEoyE>
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