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YouTube as a source of education on piriformis injection: a content, quality, and reliability analysis

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Abstract

Background Piriformis injection is commonly used to diagnose and relieve piriformis syndrome.YouTube has become a frequently accessed platform for healthcare professionals seeking procedural information.However, the lack of studies on the quality and reliability of medical content on YouTube raises major concerns, suggesting that the platform cannot be trusted as a source of medical information, particularly in terms of reliability and content quality. This study aims to assess the educational value and quality of YouTube videos on piriformis injections and is the first to specifically evaluate these aspects.

Methods A keyword search for "piriformis injection" was conducted on YouTube in December 2024, ensuring search history was cleared before the review.The top 100 videos were screened, and data including subscriber count, views, likes, dislikes, comments, video duration, upload date, like ratio, view ratio, video power index, injection guidance method, and video source were collected. Two pain medicine specialists independently evaluated the videos using the modified DISCERN, JAMA benchmark criteria, and Global Quality Scale (GQS) to assess reliability and quality.

Results Of the 100 screened videos, 24 met the inclusion criteria for analysis. Notably, none of the videos attained maximum scores across all three evaluation criteria. According to the modified DISCERN score, 58% of the videos had low reliability, while 50% had low quality according to the GQS score. Video scores were consistent across different sources. Positive correlations were observed between the number of views, likes, dislikes, and comments. Additionally, strong correlations were identified between GQS, DISCERN, and JAMA scores.

Conclusion The educational value of YouTube videos cannot be evaluated based on a single factor, such as the source of the video or its popularity metrics. Relying on YouTube as the sole source can likely lead to misinformation, so cross-verifying the information in these videos is vital. While YouTube can be a supplementary resource, it should not replace primary educational materials. Therefore, healthcare professionals and organizations should be encouraged to produce high-quality, peer-reviewed educational content to ensure the quality of information available on such platforms.

Keywords Piriformis injection, YouTube, Quality, Online medical education

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Introduction

The piriformis muscle, situated deep within the buttock region, is essential for stabilizing and facilitating hip movement [1, 2]. This muscle dysfunction can lead to piriformis syndrome, a condition characterized by sciatic nerve compression, resulting in pain radiating from the hip to the lower extremity [3]. Although piriformis syndrome accounts for 17% of all sciatica cases, its diagnosis remains challenging due to overlapping symptoms with other musculoskeletal and neurological disorders [4]. The diagnosis is made after other causes of sciatic pain are excluded through physical examination and imaging methods [1, 5]. Excluding a variety of conditions, such as radiculopathy, lumbar spinal stenosis, sacroiliac joint pain, hip joint pain, facet joint pain, greater trochanteric pain syndrome, and tendon and fascia-related pain in the hip muscles, is essential, as these conditions often share overlapping symptoms [5, 6].

Diagnostic methods, including physical examination tests (e.g., Freiberg, Pace, Beatty, and Fair tests) and imaging techniques such as ultrasound, MRI, CT, and neurophysiological tests, are used to aid diagnosis and exclusion. However, none of these methods are specific enough. The absence of specific diagnostic tests, coupled with the presence of numerous conditions mentioned above that exhibit overlapping symptoms, complicates the diagnosis of piriformis syndrome. A reliable diagnostic approach is the reduction of pain following an injection into the tender piriformis muscle [5, 6]. Piriformis injections are widely used for both diagnostic and treatment purposes in managing piriformis syndrome [5]. Therefore, it is crucial for healthcare professionals to fully understand these injections and have access to reliable medical sources to perform them correctly. These injections, typically guided by imaging modalities (such as ultrasound or fluoroscopy), allow for the precise delivery of corticosteroids, local anesthetics, or botulinum toxin to alleviate inflammation and relax muscle spasms [5, 6].

The growth of social media has introduced new educational opportunities, including in medicine. In recent times, YouTube has gained significant popularity among healthcare professionals, especially fellows and residents during their training seeking information about medical procedures. Its accessibility and ease of use make it an appealing educational resource. With more than 7 billion videos available for free, social media provides a quick and accessible alternative to conventional written resources [7–12]. However, the platform's open-access structure allows users to upload medical content unrestricted, and, to the best of our knowledge, there is no established review process to ensure accuracy. Numerous studies have evaluated the quality of videos covering several surgical and interventional techniques, with the majority reporting that the content is of insufficient quality [9–12]. While the reliability and content quality of YouTube videos on tunneled central venous catheter insertion and sacroiliac joint injections were inadequate, those uploaded by academic professionals and physicians on knee and hip arthroplasties were of fair to good quality.

The growing reliance on online platforms for medical education, especially among healthcare professionals, along with their accessibility, free information, and increasing popularity, highlights the need to evaluate the quality and reliability of the information presented. The literature indicates that YouTube videos often lack sufficient content for many interventional procedures. Learning interventional procedures and surgical techniques from low-quality videos may result in incomplete or incorrect understanding, leading to misdiagnosis, improper treatment, adverse outcomes, complications, potential malpractice, and, in some cases, even death. Therefore, it is crucial to evaluate whether YouTube videos provide high-quality, evidence-based content. To the best of our knowledge, this is the first study to specifically evaluate the educational value and quality of piriformis injection videos on YouTube, making it original, with the aim of informing healthcare professionals about the video's content quality, reliability, and educational value. The goal of this study is to determine the quality and reliability of YouTube videos using JAMA, DISCERN, and GQS, and to inform our colleagues. To assess the quality of scientific data, JAMA is used based on authorship, attribution, currency, and disclosure. GQS is used to evaluate the content quality of videos, while DISCERN is used to determine the reliability of the videos.

Methods

Video selection

The present study was carried out in December 2024 by searching the term "piriformis injection" on YouTube (www.youtube.com). To minimize bias, the search history was cleared before searching. The top hundred videos were selected based on relevance. Videos were selected if they were in English, while exclusion criteria encompassed duplicate videos, those lacking visuals of the injection procedure, and videos without audio or subtitles.

Video features

Various video metrics were recorded, including the number of subscribers, likes, views, video duration, comments, and dislikes. The like ratio was computed using the formula: [(likes × 100) / (likes + dislikes)], while the view ratio was calculated as the total number of views divided by the number of days since the video was uploaded. The video power index was also calculated as the product of the view ratio and the like ratio, and time

elapsed since upload and the source of the videos were recorded [13]. Sources were categorized into physicians, health organizations, and other health-related channels. Information was also documented regarding the guidance method used during the injection (e.g., ultrasound, fluoroscopy, or stimulator devices).

Assessment of video quality and reliability

The videos were analyzed for quality and reliability using the Global Quality Scale (GQS), the modified DISCERN instrument, and the Journal of the American Medical Association (JAMA) benchmark criteria. Two pain medicine specialists, Y.O. and M.O., independently conducted video searches and evaluated the videos using these scoring systems. They assessed the rating scales separately. Y.O. and M.O. are both specialists in Physical Medicine & Rehabilitation (PM&R) and Pain Medicine, with over 10 years of clinical experience. M.O. is also an associate professor. They have been performing piriformis injections for more than a decade.

- **Modified DISCERN**: This scale consists of five yes-or-no questions, where each "yes" response earns 1 point, resulting in a maximum possible score of 5. Higher scores indicate greater reliability, with scores of 3 or above reflecting highly reliable information.
- **JAMA Benchmark Criteria**: Videos were evaluated based on 4 elements: authorship, attribution, currency, and disclosure. Each element scored 1 point, with a total score of 4. A score of 3 or higher was deemed high quality [7].
- **Global Quality Scale (GQS)**: The videos were evaluated for overall quality using a 5-point Likert scale. Scores of 1–2 indicated low quality, a score of 3 represented moderate quality, and scores of 4–5 were classified as high quality [14].

Ethical consideration

This study did not involve human or animal participants. Therefore, ethical approval or clinical trial registration was not necessary, as no patient data were used, and all videos analyzed were publicly accessible on the social media platform YouTube (www.youtube.com). As such, adherence to the Declaration of Helsinki was not applicable to this study.

Statistical analysis

Statistical analysis of the study was performed using SPSS 27.0.1 software (IBM Corp., Armonk, NY). Categorical variables were described using frequencies and percentages, while continuous variables were reported as median (interquartile range). The normality of continuous numerical variables was assessed using the Shapiro-Wilk test. However, most of the scale values were found to deviate from normal distribution. For this reason, the Mann-Whitney U test was used for two independent group comparisons, and the Kruskal-Wallis test was used for multiple groups. To identify relations between numerical variables Spearman's Rho correlation analysis was used. The concordance between raters was measured using the kappa coefficient. Statistical significance was set at a p-value of less than 0.05.

Results

A total of 100 videos were reviewed, of which 76 were excluded for the following reasons: 55 were irrelevant to the topic, 8 did not include the complete procedure, 7 were duplicates, 2 were non-English, and 4 lacked audio/subtitles. Ultimately, 24 videos were included in the analysis [Figure 1].

The majority of the videos (66.6%) were uploaded by physicians. The median values of the video metrics were as follows: views 8,815, subscribers 4,340, likes 33, dislikes 0, duration 118 s, comments 2, uploaded 96 months ago, view ratio 4.13, like ratio 100, and video power index 413.81. The inter-rater reliability, assessed using Cohen's kappa, was 0.879 for DISCERN, 0.904 for JAMA, and 0.941 for GQS. The median scores for DISCERN, JAMA, and GQS were 2, 2, and 2.5, respectively. Based on the DISCERN classification, 42% of the videos were deemed

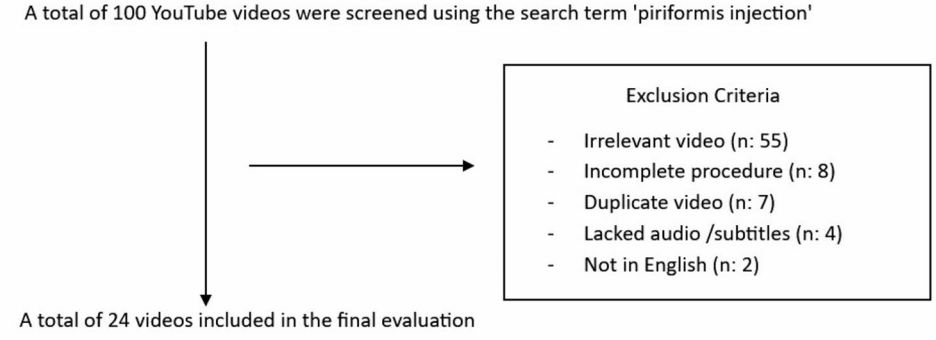

Fig. 1 Video selection Flow Chart

highly reliable. According to the GQS classification, 21% were categorized as high quality, while 29% were rated as moderate quality [Table 1].

A notable difference was identified between the ultrasound and fluoroscopy groups regarding the number of subscribers ($p = 0.034$) [Table 2]. However, no notable differences were observed across video source categories (physicians, health organizations, and other health channels) concerning video metrics or quality scores [Table 3].

Table 4 outlines the correlations between video features and quality scores. Spearman's correlation analysis revealed a strong positive association between the number of likes, dislikes, and comments. Moreover, a strong positive correlation was observed between the DISCERN, JAMA, and GQS scores [Table 4].

Discussion

The current research evaluated the quality, reliability, and educational content value of 24 YouTube videos related to piriformis injections. Based on the DISCERN score, 42% of the videos were classified as "high reliability," while based on the GQS score, 50% were considered moderate to high quality. These findings indicate a significant gap in the availability of high-quality, reliable content on piriformis injections, emphasizing the need for healthcare professionals and reputable organizations to produce more evidence-based educational materials in this area.

In today's digital era, healthcare professionals increasingly rely on online platforms for information, supplementing traditional sources, such as textbooks and scientific articles. Interventional pain management procedures are often more effectively learned through visual aids, such as videos or illustrations. YouTube has become a valuable resource for healthcare professionals, especially those in the early stages of their careers, seeking to understand minimally invasive techniques like piriformis injections. The findings of this study highlight the variability in the quality of piriformis injection videos and underscore the importance of critical evaluation before relying on online resources for clinical training. While the videos studied provide useful visual aids, their reliability and educational value are inconsistent, highlighting the

Table 1 Youtube video characteristics

			***N* (%)**
Video Source	Physician		16 (66.6)
	Health organization		6 (25)
	Other health channels (hospital, medical device)		2 (8.4)
Injection technique	Ultrasound		19 (79.2)
	Fluoroscopy		4 (16.6)
	Stimulator device		1 (4.2)
Discern score	≥ 3		10 (42)
	< 3		14 (58)
JAMA	≥ 3		4 (17)
	< 3		20 (83)
GQS	≥ 4		5 (21)
	= 3		7 (29)
	< 3		12 (50)
Video features	**Median (25th -75th percentiles)**		**Min - Max**
Views	8815 (3750–39435)		83–1,858,942
Subscribers	4340 (1377–9350)		55–37,800
Likes	33 (13.5–130.5)		0–1000
Dislikes	0 (0-8.5)		0–62
Duration (s)	118 (87–283.25)		36–457
Comments	2 (0–11.5)		0–46
Uploaded time (m)	96 (56.5–128.25)		30–184
View ratio	4.13 (1.3–12.3)		0.06–1290.9
Like ratio	100 (94.5–100)		87.4–100
Video power index	413.81 (145.8–1145.2)		11.3–5492.7
Video scores			
Discern	2 (2–2)	1–4	
JAMA	2 (2–2)	1–3	
GQS	2.5 (2–3)	1–5	

JAMA: Journal of American Medical Association, **GQS**: Global Quality Scale. Continuous data are presented as median (25th -75th percentiles). **View ratio =** (Number of views) / (uploaded time (day)). **Like ratio =** (number of likes × 100) / (number of likes + number of dislikes). **Video power index =** (View ratio) x (Like ratio)

Table 2 Video features of fluoroscopy or ultrasound-guided injections

	Ultrasound	Fluoroscopy	*P*
Views	9900 (369–1858942)	2382 (83 -28500)	0.074
Subscriber	4340 (584–37800)	383 (55–8950)	0.034*
Likes	40 (1–1000)	15.5 (0–98)	0.210
Dislikes	0 (0–62)	0 (0–6)	0.412
Duration (s)	120 (36–398)	91 (69–108)	0.123
Comments	4 (0 – 46)	0 (0–21)	0.378
Uploaded time (m)	96 (30–184)	96 (48–97)	0.714
View ratio	5.10 (0.11–1290.93)	0.82 (0.06–9.90)	0.089
Like ratio	100 (87.46–100)	100 (94.23–100)	0.765
Video power index	434.78 (11.39–5492.78)	138.88 (26.25–932.49)	0.315
Video scores			
Discern	2 (1–4)	2 (1–3)	0.265
JAMA	2 (1–3)	2 (1–2)	0.250
GQS	3 (1–5)	2.5 (1–3)	0.419

JAMA: Journal of American Medical Association, **GQS**: Global Quality Scale. Continuous data are presented as median (min-max). **View ratio =** (Number of views) / (uploaded time (day)). **Like ratio =** (number of likes × 100) / (number of likes + number of dislikes). **Video power index =** (View ratio) x (Like ratio)

Table 3 Comparison of the video features according to the sources

	Physician	Health organization	Other health channels	*P*
Views	9357.5 (83–1858942)	16,020 (764–98000)	3933.5 (3667–4200)	0.573
Subscriber	6410 (55–37800)	2890 (704–15600)	720.5 (111–1330)	0.220
Likes	36.5 (0–1000)	42 (16–251)	9 (9–9)	0.499
Dislikes	0 (0–62)	0 (0–36)	0 (0–0)	0.721
Duration (s)	118 (67–398)	157 (36–288)	247 (37–457)	0.896
Comments	2 (0–46)	5 (0–15)	0 (0–0)	0.555
Uploaded time (m)	90 (30–184)	120 (38–166)	117 (84–150)	0.235
View ratio	4.13 (0.06–1290)	5.46 (0.26–19.68)	1.24 (0.81–1.67)	0.455
Like ratio	100 (92.61–100)	100 (87.46–100)	100 (100–100)	0.734
Video power index	392.85 (11.39–5492.78)	546.03 (26.25–1721.03)	166.67 (166.67 – 166.67)	0.721
Video scores				
Discern	2.5 (1–4)	2 (1–3)	2.5 (1–4)	0.215
JAMA	2 (1–3)	2 (1–2)	2 (1–3)	0.268
GQS	3 (1–5)	2 (1–3)	2.5 (1–4)	0.463

JAMA: Journal of American Medical Association, **GQS**: Global Quality Scale. Continuous data are presented as median (min-max). **View ratio =** (Number of views) / (uploaded time (day)). **Like ratio =** (number of likes × 100) / (number of likes + number of dislikes). **Video power index =** (View ratio) x (Like ratio)

need for a structured approach to identifying trustworthy piriformis injection content.

The present study observed strong correlations among the DISCERN, JAMA, and GQS scores, which is consistent with previous research, further demonstrating that a multi-faceted approach is necessary to assess video quality, content, and reliability [8, 15]. However, no video achieved a perfect score across all three evaluation systems, highlighting inconsistencies in educational standards for piriformis injection videos and emphasizing the need for higher-quality video production. As in earlier studies [15, 16], no link was identified between video popularity (views or likes) and quality. This reinforces the notion that metrics such as views or likes are poor indicators of a video's educational value [17]. Popularity does not necessarily equate to quality. The popularity of YouTube videos is influenced by a combination of algorithmic factors, presentation appeal, and user behavior, rather than purely by the accuracy or reliability of the content [18, 19].

YouTube's algorithm plays a significant role in determining video popularity, with factors such as watch time, click-through rate, user engagement (likes, comments, shares, subscriptions), and consistency (regular uploads) all contributing to rankings. Presentation style also impacts popularity; eye-catching titles and thumbnails, compelling pacing, and storytelling tend to attract more viewers. However, user behavior often introduces a paradox: clickbait-style videos or those with attractive visuals but low information may outperform evidence-based, high-quality educational content. Confirmation bias and social proof further amplify this effect, as users

Table 4 Relationships between video features and all scores

		Likes	Dislikes	Duration	Comments	Discern	JAMA	GQS	Uploaded time (m)
Views	rho	0.887	0.841	0.335	0.641	0.289	0.344	0.316	0.216
	p	**< 0.001***	**< 0.001***	0.110	**0.001***	0.171	0.100	0.132	0.310
Likes	rho		0.820	0.387	0.741	0.257	0.206	0.291	0.115
	p		**< 0.001***	0.083	**< 0.001***	0.260	0.370	0.201	0.618
Dislikes	rho			0.415	0.613	0.144	0.135	0.148	0.265
	p			0.061	**0.003***	0.535	0.561	0.521	0.246
Duration	rho				0.286	-0.023	-0.193	0.019	0.295
	p				0.197	0.916	0.366	0.930	0.162
Comments	rho					0.159	0.185	0.365	-0.109
	p					0.480	0.410	0.095	0.630
Discern	rho						0.854	0.817	-0.387
	p						**< 0.001***	**< 0.001***	0.062
JAMA	rho							0.811	-0.272
	p							**< 0.001***	0.199
GQS	rho								-0.345
	p								0.098

JAMA: Journal of American Medical Association, **GQS**: Global Quality Scale

are more likely to engage with content that aligns with their beliefs or that is already popular [18, 19]. While quality content can gain popularity, high popularity does not necessarily indicate high quality, particularly in fields such as medicine and science, where misleading content may overshadow reliable sources. Additionally, while certain studies have suggested a connection between video length and quality, no such association was found in this analysis [20, 21]. Moreover, in our study, no correlation was found between other metrics and the GQS, DISCERN, or JAMA scores. This highlights the inadequacy of relying on video metrics (views, likes, subscriber count, dislikes, duration, length, comments, and upload time) as indicators of quality and reliability, which is crucial for professionals seeking reliable educational content. This reinforces the study's goal of providing a clearer understanding of the actual quality of piriformis injection videos, emphasizing the importance of focusing on content quality rather than superficial metrics.

Platforms such as YouTube have become essential for the rapid dissemination of technical information related to surgical and interventional procedures. However, a systematic review of 14 studies revealed that 85% of these videos are of low quality [22]. This underscores the difficulty of finding reliable and high-quality educational content. The current study highlights the importance of using multiple factors to assess video quality rather than relying on a single criterion. As YouTube continues to grow in popularity, it is vital to prioritize videos that are both credible and educational when using them as supplementary resources.

In this regard, implementing structured peer review for YouTube videos could significantly enhance their educational value and ensure the accuracy of medical information. Healthcare professionals, medical institutions, and professional organizations could collaborate to establish a peer review system for YouTube content, in which experts assess videos based on established medical guidelines and evidence-based practices. Such a framework could involve expert review and certification of videos, potentially through a verification system integrated into YouTube itself. By doing so, videos that meet high educational standards could be clearly marked for viewers, improving the reliability of content.

In addition to expert review, crowdsourced peer review could also be an effective tool. Platforms like ResearchGate or professional networks could allow healthcare professionals to review, comment on, and rate videos based on their content's quality. Transparency would be crucial, as video creators could disclose their qualifications and the peer review process followed to assure viewers of the video's trustworthiness.

Despite the increasing use of online platforms, hands-on mentorship and direct feedback remain indispensable not only for refining clinical skills but also for guiding trainees in critically assessing online content. Through personalized guidance, effective mentorship empowers trainees to distinguish between high-quality, evidence-based material and unreliable sources while seamlessly integrating digital content with traditional teaching methods. This integrated approach transforms trainees from passive consumers into active, critically engaged learners, enabling them to reinforce theoretical knowledge through practical, hands-on experience and ultimately achieve a more comprehensive educational process. This study highlights the need to prioritize peer-reviewed, high-quality videos on platforms like YouTube,

ensuring healthcare professionals and patients alike can rely on trustworthy and educational content.

Although research into the educational value and reliability of YouTube videos is expanding, to the best of our knowledge, this study is the first to specifically assess the quality of videos related to piriformis injections.

Limitations

This study has a few limitations in representativeness and generalizability due to the sample size and search methods; nevertheless, the sample size of 100 videos is adequate for focused, qualitative analysis, given the detailed evaluation criteria and expert participation. The study was limited to only English-language videos and a relatively small sample size after exclusions. Considering the limited availability of piriformis injection videos on YouTube and the tendency of users to prioritize the first few search results, analyzing 100 videos is reasonable. Furthermore, most videos beyond the 40th result were either irrelevant or duplicates. Given that English is commonly used as the scientific language in medical education, and considering that previous studies on the quality and validity of YouTube videos have often followed a similar methodology by including only English-language videos, this approach is deemed reasonable. As the number of videos increases in the future, further research should expand the sample size and incorporate non-English videos to enhance the generalizability of the findings.

Conclusions

Medical education can benefit from YouTube videos, but identifying high-quality videos remains a challenge. Metrics like the uploading source or the number of views alone are insufficient to assess video quality. Healthcare professionals should remain cautious, as videos may contain unreliable or incomplete information. To address this, high-quality, peer-reviewed videos should be produced by healthcare professionals and reputable organizations to serve as reliable educational tools. Videos should ideally complement traditional educational resources instead of acting as primary sources.

Abbreviations

GQS	Global Quality Scale
JAMA	the Journal of the American Medical Association
P-value	Probability Value
SPSS	Statistical Package for the Social Sciences

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Author contributions

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

There were no human or animal participants in this study. Ethical committee approval or clinical trial registration was not required for this study because no patient data were utilized, and all videos were available for public use on the social media website www.youtube.com. As such, adherence to the Declaration of Helsinki was not applicable to this study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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