Joint Diseases and Related Surgery

Jt Dis Relat Surg
2026;37(3):723-730

ORIGINAL ARTICLE

Evaluating YouTube as a source of information on limb lengthening surgery: A quality and reliability analysis

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Limb lengthening surgery has become an increasingly important area of orthopedic practice, particularly with the widespread adoption of modern techniques based on the principle of distraction osteogenesis.[1] This procedure is used to correct congenital or acquired limb shortness, to correct post-traumatic deformities, to compensate for length differences that develop after growth plate damage, and increasingly in recent years, for cosmetic purposes.[2,3] However, due to the technical complexity of the procedure, the long rehabilitation process, the high cost and the risk of complications, it is critical that patients are properly informed and make informed decisions.[1]

Currently, patients do not solely rely on physicians' consultation when seeking information about healthcare services; they also increasingly access information through the internet, social media, and online platforms.[4,5] YouTube, in

Received: September 16, 2025
Accepted: March 10, 2026
Published online: May 21, 2026

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Citation: Ergin M, Eravsar E, Citak M. Evaluating YouTube as a source of information on limb lengthening surgery: A quality and reliability analysis. Jt Dis Relat Surg 2026;37(3):723-730. doi: 10.52312/jdrs.2026.2628.

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ABSTRACT

Objectives: This study aims to evaluate the content quality and reliability of YouTube videos on limb lengthening surgery.

Materials and methods: On July 5th, 2025, a YouTube search was performed using the keywords "limb lengthening surgery" and "leg lengthening surgery." The first 100 videos were reviewed; duplicates and those without English audio were excluded, resulting in 53 videos for analysis. Basic characteristics including views, upload time, duration, comments were recorded. Videos were categorized by source as "physician," "speaker," or "patient," and by theme as "general information" or "patient testimony." Video content quality, including accuracy, reliability, and comprehensibility of information, was assessed using the DISCERN, Journal of the American Medical Association (JAMA) Benchmark Score, Global Quality Score (GQS), and a researcher-developed Limb Lengthening Scoring System (LLSS). Two orthopedic surgeons independently evaluated all videos.

Results: The median view count of the 53 videos was 48,036 (range, 1,229 to 3.734,177), and the mean number of days since upload (as of July 5th, 2025) was 1,331 ± 735 days. The mean DISCERN was 24.4 ± 6.9, median JAMA 2 (range, 1 to 2), median GQS 1.5 (range, 1 to 3.5), and mean LLSS 1.1 ± 0.9. Physician-generated videos achieved significantly higher DISCERN and GQS scores (p = 0.031 and p = 0.040, respectively) than patient-generated videos. Speaker-generated videos had higher LLSS scores than patient-generated videos (p = 0.013). General information videos scored higher than patient testimonies for DISCERN (p = 0.035) and GQS (p = 0.025). Video duration and comment count positively correlated with LLSS (p < 0.001 and p = 0.047, respectively), whereas view counts and ratios showed no significant association with quality scores.

Conclusion: YouTube videos on limb lengthening surgery are usually of low quality, with limited scientific accuracy and educational value. Physician-produced videos receive higher scores; however, their overall quality still remains limited, while patient-generated content shows the lowest reliability. These findings highlight that inaccurate or incomplete online information may influence patient expectations prior to consultation and complicate shared decision-making. Greater involvement of orthopedic surgeons and academic institutions is needed to provide clear, evidence-based, and reliable online educational content to improve patient understanding and clinical communication.

Keywords: DISCERN, Global Quality Score, health misinformation, Journal of the American Medical Association, limb lengthening surgery, online health information, patient education; video content quality, YouTube.

particular, has become one of the most preferred sources in the field of health thanks to both its audiovisual presentation competence and its global accessibility.[6] This platform provides an attractive environment for sharing surgical techniques, patient experiences, and public health information. However, it also paves the way for the dissemination of false, incomplete or misleading information due to the inadequacy of the control mechanism and the fact that most of the content is generated by non-professionals.

There is an increasing number of studies examining the content quality analysis of YouTube videos related to different orthopedic procedures. Some of the research topics covered include videos on Bankart lesions,[7] rotator cuff tears,[8] superior labrum anterior and posterior lesions,[9] reverse shoulder arthroplasty,[10] anterior cruciate ligament tears,[11] femoroacetabular impingement,[11] carpal tunnel syndrome,[12] and hallux valgus.[13] A consistent finding across these studies is that YouTube content is usually of insufficient quality and limited informational value. Despite the increasing number of studies evaluating YouTube content for various health conditions, limb lengthening surgery represents an important case due to its combination of functional and aesthetic implications. Orthopedic procedures often prioritize function, yet limb length is a highly visible physical trait with social and psychological significance. Height-related perceptions on social media, including associations with attractiveness and social success, can drive individuals, even those with normal stature, to seek complex procedures such as limb lengthening. Unlike common cosmetic surgeries, these interventions carry significant technical challenges, prolonged rehabilitation, and higher risk of complications. Consequently, misinformation or exaggerated representations online may lead to unrealistic expectations, psychological distress, or unsafe decision-making, making the assessment of YouTube video content quality and reliability particularly important in this context.

In the present study, we aimed to systematically evaluate the video content quality, reliability, and educational value of limb lengthening surgery videos published on YouTube. We also sought to determine whether video quality is influenced by the source of information and the thematic characteristics of the content, in order to identify the type of information to which patients are exposed in online environments and to provide insights into how clinicians should address such content during the patient education process.

MATERIALS AND METHODS

This study was based on publicly accessible YouTube videos on limb lengthening and did not involve human or animal subjects; therefore, Institutional Review Board (IRB) approval was not required. On July 5th, 2025, searches for "limb lengthening surgery" and "leg lengthening surgery" were performed on YouTube using Google Chrome's Incognito mode to minimize personalization bias. The first 50 English-titled videos from each search were reviewed, excluding YouTube Shorts and those under 60 sec. Among the 100 initially selected videos, 38 were excluded due to duplication, and nine were excluded for not having English audio. In total, 53 videos were analyzed (Figure 1). The search terms were selected to represent the common, non-technical phrases that individuals are likely to use when searching for information about this procedure on YouTube. Alternative keywords were explored during the preliminary search process; however, these searches produced largely overlapping video results. For this reason, two broadly used terms were retained to avoid duplication and to approximate real-world search behavior. Only the first 50 videos for each term were included, as users typically focus on results displayed on the initial pages. This strategy was intended to mirror the content most viewers are likely to encounter. Videos shorter than 60 sec

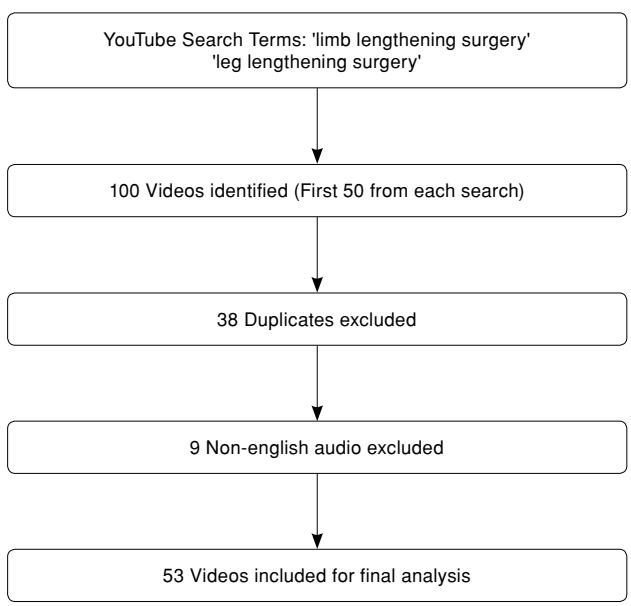


FIGURE 1. Flowchart of video selection process.

were excluded, as the evaluation tools applied in this study require a certain level of detail and structure to allow meaningful assessment. Very short videos would not allow adequate evaluation within the framework of these scoring systems.

For each video, data were collected on the title, number of views, number of days since upload (as of July 5th, 2025), view ratio (number of views/number of days since upload), video duration (in sec), and number of comments. In addition, the presenters and the topics covered were recorded. According to the presenters' qualifications, video sources were classified into three categories: physicians, speakers, and patients. Individuals providing narration or speaking, other than the physician or patient, were designated as speakers. Video themes were further categorized into two groups: general information and patient testimony. In some videos, multiple individuals were found to contribute to the content. To systematically classify the video source, the dominant contributor who guided the narrative and provided the most comprehensive information regarding the surgical was identified. This determination was made by consensus among the authors. Accordingly, a video was categorized as patient testimony, if the main focus of the content was based on a patient's experience, even if a physician or speaker also appeared in the video. To assess video content quality, DISCERN, the Journal of the American Medical Association (JAMA) Benchmark Score, the Global Quality Score (GQS), and a researcher-developed Limb Lengthening Scoring System (LLSS) were employed. Evaluations were performed independently by two orthopedic surgeons, and interobserver reliability was determined using the intraclass correlation coefficient (ICC). The average scores from both evaluators were used for subsequent analyses.

The DISCERN scoring system comprises 16 questions, each rated on a scale from 1 to 5, with higher scores reflecting superior quality. The JAMA Benchmark Score evaluates four criteria: authorship, attribution, currency, and disclosure and each is scored from 0 to 1, with a maximum score of 4 indicating a highly credible source (Table I). The GQS is a five-point scale used to assess the overall content quality, where a score of 5 denotes highest-quality content (Table II). The LLSS developed by the study authors based on previous studies.[14-19] Information considered essential for patient understanding were identified, including indications, contraindications, cost, treatment alternatives, and complications. These domains were, then, converted into five checklist items aimed at assessing the presence of fundamental limb lengthening information within each video. The LLSS was intentionally designed as a simple, binary scoring tool to allow for rapid and consistent application by independent reviewers, with possible scores ranging from 0 to 5 (Table I).

TABLE I

JAMA and LLSS scores

The Journal of the American Medical Association (JAMA) Score

Criteria	1: Information provided 0: No information
1. Authorship: Author and contributor credentials and their affiliations should be provided.	
2. Attribution: Clearly lists all copyright information and states references and sources for content.	
3. Currency: Initial date of posted content and subsequent updates to content should be provided.	
4. Disclosure: Conflicts of interest, funding, sponsorship, advertising, support, and video ownership should be fully disclosed.	

Limb Lengthening Scoring System (LLSS)

Questions	1: Information provided 0: No information
1. Is information provided about the indications for LLS?	
2. Is information provided about situations in which LLS should not be performed?	
3. Is information provided about the cost of LLS?	
4. Is information provided about treatment options?	
5. Is information provided about complications?	

Statistical analysis

Statistical analysis was performed using the IBM SPSS version 22.0 software (IBM Corp., Armonk, NY, USA). Descriptive data were presented in mean ± standard deviation (SD), median (min-max) or number and frequency, where applicable. Normality assumptions were assessed using the Shapiro-Wilk and Levene tests. For variables that did not meet normality assumptions, non-parametric tests were applied, including the Kruskal-Wallis test and Mann-Whitney U test. For normally distributed variables, parametric tests such as one-way analysis of variance (ANOVA) and independent samples t-test were used and, in cases of statistically significant results, post-hoc comparisons were carried out with Bonferroni-adjusted *p*-values. Following video scoring, correlations among the scores and between video characteristics were analyzed using the Spearman's rho test. Interobserver agreement for DISCERN, JAMA, GQS, and LLSS scores was evaluated using the ICC (model: two-way fixed, type: absolute agreement). Correlation values were interpreted as follows: poor (0.00-0.20), fair (0.21-0.40), moderate (0.41-0.60), good (0.61-0.80), and excellent (0.81-1.00). A p value of < 0.05 was considered statistically significant.

RESULTS

The median view count of the 53 videos was 48,036 (range, 1,229 to 3.734,177), and the mean number of days since upload (as of July 5th, 2025) was 1,331 ± 735 days. The median view ratio was 33.74 (range, 1.09 to 2458.31), the mean duration was 391 ± 415 sec, and the median number of comments was 212 (range, 3 to 13,498). Since comments were disabled for four videos, comment analyzes were conducted on 49 videos. The ICC for interobserver reliability was found to be 0.78 for DISCERN, 0.80 for JAMA, 0.77 for GQS, and 0.84 for LLSS scores, indicating good-excellent reliability. The mean scores for evaluating the content quality and adequacy of the videos were as follows: DISCERN: 24.4 ± 6.9 and LSSS: 1.1 ± 0.9. The median scores were as follows: JAMA: 2 (range, 1 to 2) and GQS Score: 1.5 (range, 1 to 3.5). Video duration ($p < 0.001$, rho = 0.480) and the number of comments ($p = 0.047$, rho = 0.285) were both positively correlated with LLSS. However, no significant correlation was found between other video characteristics and scores ($p > 0.05$).

Regarding the video source, 12 videos were presented by physicians, 34 by speakers, and seven by patients. According to one-way ANOVA analysis, a significant difference was found in DISCERN scores according to the video source ($p = 0.026$). Post-hoc Bonferroni analysis revealed that this difference was due to the difference between physicians and patients, with videos provided by physicians having higher DISCERN scores ($p = 0.031$). One-way ANOVA analyses

TABLE II
The global quality score (GQS) criteria

Grading	Description of quality
1	Poor quality; unlikely to be of use for patient education
2	Poor quality; limited use to patients as some information is present
3	Suboptimal quality and flow; somewhat useful to patients; important topics missing, some information is present
4	Good quality and flow; useful to patients as most important topics covered
5	Excellent quality and flow; highly useful to patients

TABLE III
Comparison of scores by video source

	Doctors (n = 12)			Speakers (n = 34)			Patients (n = 7)			
	Mean ± SD	Median	Range	Mean ± SD	Median	Range	Mean ± SD	Median	Range	*p**
DISCERN	28.5 ± 8.7			23.8 ± 6.3			20.2 ± 2.5			0.026
JAMA		2.0	1.5-2.0		2.0	1.0-2.0		2.0	1.0-2.0	0.130
GQS		1.75	1.0-3.5		1.5	1.0-3.5		1.0	1.0-1.5	0.046
LLSS	1.1 ± 1.0			1.3 ± 0.8			0.3 ± 0.5			0.016

SD, standard deviation; JAMA, Journal of the American Medical Association; GQS, Global Quality Score; LLSS, Limb Lengthening Scoring System.

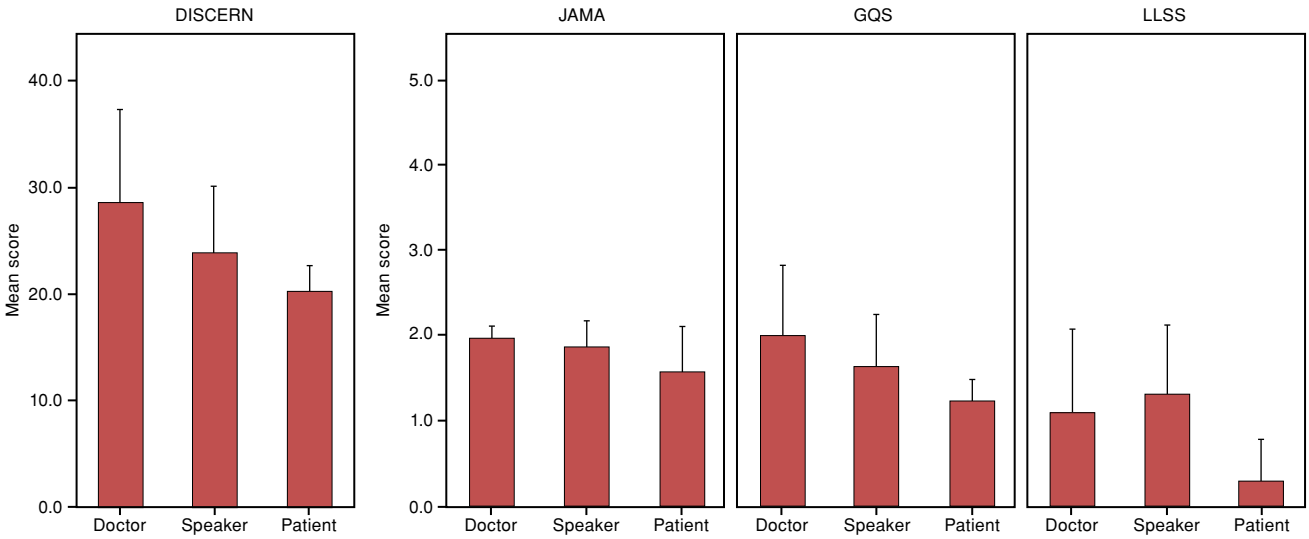


FIGURE 2. Graphs showing DISCERN, JAMA, GQS, and LLSS scores according to video source.
JAMA, Journal of the American Medical Association; GQS, Global Quality Score; LLSS, Limb Lengthening Scoring System.

revealed a significant difference in LLSS scores based on the video source (p = 0.016). According to the post-hoc Bonferroni analysis, this difference was due to the difference between the speakers and the patients, and the videos provided by the speakers had higher LLSS scores (p = 0.013). The Kruskal-Wallis analyses revealed significant differences in GQS scores based on the video source (p = 0.046). Post-hoc Bonferroni analyses showed that this difference was due to differences between patients and physicians, and that videos provided by physicians achieved higher scores (p = 0.040). In Kruskal-Wallis analyses, no significant difference was found in JAMA scores according to the video source (p = 0.130) (Table III, Figure 2).

In terms of the themes of the videos, 35 provided general information and 18 focused on patient testimony. In comparisons made according to video theme, general information videos achieved higher DISCERN (p = 0.035) and higher GQS (p = 0.025) scores compared to patient testimony. However, no significant difference was found between the two groups in terms of JAMA (p=0.222) and LLSS (p = 0.468) scores.

DISCUSSION

In the present study, we systematically evaluated the content quality and reliability of YouTube videos on limb lengthening surgery. Our study results showed that the content on the platform was usually of low quality. These findings suggest that much of the content patients encounter in their online search for information lacks scientific accuracy and educational adequacy. This highlights the need for clinicians to actively address and guide patients regarding the limitations of online video platforms when providing preoperative counseling and shared decision-making. In addition, it emphasizes the importance of improving the quality of publicly available educational materials through greater involvement of healthcare professionals and professional societies in digital content creation.

In the current study, the DISCERN, JAMA, GQS, and LLSS scores of the videos in this study revealed that the content had significant deficiencies. Therefore, the information available on YouTube regarding limb lengthening surgery is usually insufficient and cannot be considered a reliable source for patients. These findings are parallel with the results reported in previous studies conducted in different fields of orthopedic surgery.[7,8,10-13,20-22] However, although there are many YouTube-based orthopedic studies, limb lengthening surgery presents a distinct case. While most orthopedic procedures focus on restoring function, limb length carries visible social and psychological implications. Height-related perceptions on social media may motivate even individuals of normal stature to pursue this complex surgery. Unlike common cosmetic procedures, limb lengthening involves substantial technical demands, prolonged rehabilitation, and higher risk of complications. Therefore, misleading or exaggerated online content can create unrealistic expectations and

unsafe decisions, highlighting the need to assess the quality and reliability of YouTube videos on this topic. Accordingly, the low-quality level revealed in our study should be considered not only as a general digital information problem, but also as a potential risk area that could affect clinical outcomes, indicating that more reliable, referenced and professional content should be produced on this subject.

One of the key findings of the study was that video content quality varied significantly according to the source of the videos. Physician-created content scored higher than patient- and speaker-generated videos in both DISCERN and GQS scores. This finding indicates that materials produced by professional healthcare workers are more informative. In addition, LLSS scores were higher for speaker videos than for patient videos. However, even when the source of information in the videos was a physician or a speaker, the relatively low average scores indicate a general lack of quality. Therefore, YouTube still remains a suboptimal source of information for individuals seeking reliable information on this topic. It is critical that academic institutions and experts take a more active role in this field to ensure patients have access to accurate information. Of note, general information videos received higher DISCERN and GQS scores compared to patient testimonials in our study. This finding suggests that while patient testimonials are emotionally more appealing, they are insufficient from a scientific and educational perspective. This situation poses a serious risk, particularly for individuals with low health literacy. Misleading patient narratives can make treatment expectations unrealistic and adversely impact the surgical decision-making process.

Our results showed a positive correlation between video length, number of comments, and LLSS scores. It is not surprising that longer videos tend to receive higher LLSS scores, as a longer duration allows more opportunity to present detailed and structured information. In contrast, we did not find a positive relationship between LLSS scores and view count or view ratio. This may indicate that viewers do not necessarily distinguish between high- and low-quality educational content, and that videos with limited informational value can attract attention similar to more comprehensive ones. Previous studies have reported similar findings, noting that view-related metrics are not reliable indicators of content quality and that inaccurate or misleading information can also gain substantial visibility.[23,24]

Based on our study findings, we can speculate that YouTube is far from being a reliable source of information in the field of limb lengthening surgery. This situation points to a significant gap in terms of both patient safety and accurate information. The increase in applications, particularly for aesthetic purposes, can lead to serious disappointments and ethical problems in the expectations of misguided patients. Therefore, it is of great importance for orthopedic surgeons and academic institutions to produce scientifically accurate, up-to-date, and referenced content on platforms such as YouTube. This is particularly critical for limb lengthening surgery, where managing patient expectations about the lengthy and arduous rehabilitation process, the potential for significant complications, and the psychosocial challenges associated with height change is paramount to avoiding psychological distress and dissatisfaction.

The major strength of this study is its systematic evaluation of limb lengthening surgery videos on YouTube using multidimensional quality measures (DISCERN, JAMA, GQS, and LLSS). A topic not previously examined in the literature was approached with an original methodology, and the robustness of the results was supported by high interobserver reliability scores (ICC 0.77-0.84). Additionally, focusing not only on the number of views, but also on different variables such as video sources, themes and user interactions has expanded the scope of the study. Nevertheless, this study has certain limitations that should be acknowledged. First, the fact that only English videos were examined led to the exclusion of content produced in different languages, limiting the generalizability of the results on a global scale. Second, the constantly evolving and personalized nature of YouTube's algorithm may limit reproducibility, as searches conducted across timeframes may yield different results. Additionally, only the first 100 videos were evaluated, which prevented representation of the much broader range of content available on the platform and limited the sample size. Another limitation is the inherently dynamic nature of YouTube, as observed in many social media-based studies. Content evolves over time, with videos potentially being removed and new ones being added. Certain platform features may introduce additional bias. Although searches were performed in incognito mode to reduce personalization, algorithmic influence cannot be fully removed. Search results can vary by location, user activity,

and ongoing changes in recommendation systems. Another limitation to this study is the exclusion of YouTube Shorts. Although Shorts represent a substantial portion of the platform's content, their short duration does not allow for the structured medical information required for evaluation using DISCERN, JAMA, GQS, and LLSS. Including these videos would likely have introduced a format-related bias and produced uniformly low scores driven by time constraints rather than true content quality. Another limitation relates to the LLSS score. This scoring system is a non-validated tool developed specifically for this study to assess limb lengthening related content. It was designed as a binary checklist, focusing on the presence or absence of key informational domains rather than the depth or quality of their explanation. Although this approach allowed for rapid and consistent assessment, it may fail to distinguish between superficial and detailed coverage of the same topic. Future studies may expand upon this initial framework by developing more granular, evidence-based scoring systems capable of capturing finer distinctions in clinical accuracy and educational depth. Finally, the results obtained reflect only online content; therefore, it is not possible to directly demonstrate the impact of the findings on actual clinical decision processes or patient outcomes.

In conclusion, our study results suggest that YouTube videos on limb lengthening surgery are usually of low quality, with notable shortcomings in scientific accuracy and educational value. Although videos produced by physicians can receive relatively higher scores, their overall quality is still limited. Patient-generated videos show the lowest reliability levels. These findings are relevant to clinical practice. Inaccurate or incomplete online information may influence patients before consultation, potentially affecting expectations and making shared decision-making more challenging. For orthopedic surgeons, the results highlight the need for greater engagement in digital health communication. Providing clear, evidence-based, and balanced online information may help improve patient understanding and support more productive clinical discussions. As online platforms continue to shape health-related decisions, greater involvement from academic centers and professional societies may help ensure that reliable information is more accessible to patients.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions: M.E., E.E.: Participated in the design of the study, participated in the interpretation of the results and writing of the manuscript; M.C.: Has supervised and edited the manuscript. All authors reviewed the manuscript. All authors assume full responsibility for the content of the manuscript.

Conflict of Interest: The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding: The authors received no financial support for the research and/or authorship of this article.

AI Disclosure: The authors declare that artificial intelligence (AI) tools were not used, or were used solely for language editing, and had no role in data analysis, interpretation, or the formulation of conclusions. All scientific content, data interpretation, and conclusions are the sole responsibility of the authors. The authors further confirm that AI tools were not used to generate, fabricate, or 'hallucinate' references, and that all references have been carefully verified for accuracy.

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