Original Article

Individuals Frequently Search Google With Questions About the Management of Meniscal Tears and the Indications for and Technical Details of Surgery but the Quality of the Information Is Suboptimal

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Purpose: To analyze the frequently asked questions that patients search online regarding meniscal tears and meniscal surgery and evaluate the quality of websites used to answer these common queries. **Methods:** This study used Google's People Also Ask function to extract the most common 300 questions and associated Web pages regarding meniscal tears and meniscal surgery. Questions on both meniscal tear and meniscal surgery were categorized using the Rothwell classification, and websites were evaluated with *The Journal of the American Medical Association* (JAMA) criteria. **Results:** The Rothwell classification of questions on meniscal tear/surgery was 54.0%/55% fact, 37.7%/30.0% policy, and 8.3%/15.0% value. The meniscal tear cohort asked significantly more questions related to policy ($P = .047$), whereas the meniscal surgery cohort asked significantly more questions about value ($P = .011$). Academic (31.7% and 27.3%), medical practice (23.0% and 25.3%), and single-surgeon (12.3% and 13.3%) websites were the most common types of sites encountered. The mean total JAMA score was 1.3 of 4, with journals (mean, 3.4) having the highest score. Single-surgeon practice (mean, 0.5) and legal (mean, 0) sites had the lowest JAMA scores. The most frequently encountered query in the meniscal tear cohort was "What are three signs of a meniscus tear in the knee?" In contrast, in the meniscal surgery cohort, it was a tie between "What is the fastest way to recover from meniscus surgery?" and "Should meniscus surgery be done over 65?" **Conclusions:** The quality of online information related to meniscal tears and surgery is often suboptimal based on objective measures of value. Individuals frequently search for insights into indications, management, and technical details. **Clinical Relevance:** Understanding common themes in online searches can provide valuable insights that could improve patient education. Surgeons can use this information to anticipate potential questions, establish appropriate patient expectations, and enhance informed decisions.

In today's technology-driven era, the internet has emerged as an indispensable tool for individuals seeking answers to diverse questions, including those pertaining to health and medical concerns. A substantial number of Americans rely on online searches to find information about symptoms, diagnoses, and treatments given that the Centers for Disease Control and Prevention reported that up to 58.5% of adults use the internet for medical information.[1] Although the internet offers unparalleled convenience in accessing a wealth of information, it simultaneously poses a risk of encountering information that is difficult to comprehend, inaccurate, or misleading.[2-4] As individuals increasingly turn to online resources, ensuring accuracy and maintaining accessibility become paramount for making well-informed health care decisions.

On a global scale, Google (Alphabet) has dominated the search engine landscape, accounting for more than 90% of internet searches within the past year.[5]

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Google's search algorithm incorporates a distinctive element known as the People Also Ask function, using artificial intelligence to suggest related queries or searches based on the user's initial input. Examining this feature in Google provides a compelling method for identifying a range of commonly asked questions related to a specific topic. Additionally, the provided answers and associated Web pages can offer insights into the overall credibility of the resources presented to users.

Meniscal injuries are one of the most common orthopaedic injuries; these injuries encompass varying pathologies ranging from traumatic tears in athletes to asymptomatic, degenerative tears in older adults.[6,7] These injuries can compromise joint function and are associated with long-term dysfunction, degenerative joint changes, and knee osteoarthritis.[7,8] In the United States, meniscal injuries account for 10% to 20% of all orthopaedic surgical procedures annually; however, not all tears necessitate surgery.[9,10] Despite the prevalence of meniscal injuries, patients often lack understanding of specific information on surgical indications and pain management. Patients may seek resources online; however, they may not be cognizant of or recognize the lack of accuracy of certain Web pages. Previous literature has indicated that information on the meniscus from YouTube videos (Alphabet) tends to be of low quality and reliability.[11] Reading materials online regarding meniscal injuries often exceed the average reading level of patients and, therefore, may be difficult to comprehend.[11,12] Although these existing studies shed light on available resources for patients dealing with meniscal injuries, there have not been any studies analyzing the quality of internet sources related to specific diagnostic and treatment information for meniscal injuries to date.

Given the widespread use of the internet for medical information and the common occurrence of meniscal injuries, it is imperative for physicians to be well informed about available online resources so that they provide accurate education to their patients and address misinformation their patients may have gathered online. As such, the purpose of this study was to analyze the frequently asked questions that patients search online regarding meniscal tears and meniscal surgery and evaluate the quality of websites used to answer these common queries. We hypothesized that individuals would access predominantly fact-based questions related to their pathology and treatment options, and that the quality of information accessed by both groups would be suboptimal.

Methods

Predetermined searches were queried using the publicly available Google Chrome extension SEO Minion (Axeman Technology Solutions). A newly installed Google Chrome browser was downloaded to mitigate the potential for previous searches influencing current results, in accordance with published methodology.[13] Previous Google applications and caches, as well as Google-related files, were deleted before the initialization of any searches. Google searches were conducted based on 2 categories: meniscal tear and meniscal surgery. For the meniscal tear category, the terms "meniscus tear," "meniscus injury," and "torn meniscus" were independently searched in Google. For the meniscal surgery category, the terms "meniscus repair," "meniscus surgery," and "meniscectomy" were independently searched in Google.

For each of the searched terms, the Google Chrome extension automatically expanded the People Also Ask tab to provide a set number of unique questions that were related to the initial search. With every unique question, there is also an associated answer, copied directly from a website source. To avoid having the People Also Ask tab provide the same question more than once, we set the Chrome extension to collect 300 unique questions while also keeping the count of reappearing questions. Therefore, for each of the searched terms, there were 300 unique People Also Ask questions, 300 associated websites, and a count of the number of times each question appeared. For each category (meniscal tear and meniscal surgery), there were 900 total questions consisting of 3 independent—but similar—sets of 300 questions for the 3 related search terms. The final set of questions consisted of 2 lists of the 300 questions with the highest counts of appearance (1 list for the meniscal tear group and 1 list for the meniscal surgery group).

Every People Also Ask question that was populated was classified as to whether it pertained to surgical details or nonsurgical details. Each question was also classified using the Rothwell classification and subclassification methodology, which has been used in previous studies.[14] The Rothwell classification divides questions into 3 groups: fact, policy, and value.[15] The Rothwell subclassification divides questions into a variety of different groups, including specific activities, timeline of recovery, restrictions, technical details, cost, indications/management, risks/complications, pain, longevity, and evaluation of surgery. A summary of the different Rothwell classifications and subclassifications, along with pertinent examples of each, is provided in Table 1.

Each People Also Ask question's associated Web page was categorized into different groups: academic, commercial, journal, government, legal, medical information, medical practice, nonmedical media, or single-surgeon practice. Definitions of each of these categories are provided in Table 2. In addition, the academic quality of each Web page was assessed using *The Journal of the American Medical Association* (JAMA) criteria. The JAMA criteria rate Web pages using a 4-point scale,

Table 1. Description and Examples of Each Type of Rothwell Classification and Subclassification

Classification	Subclassification	Description/Example Query
Fact		Ask whether something is true and to what extent
	Specific activities	"Can I drive after meniscus surgery?"
	Timeline of recovery	"What is the average recovery time after meniscus surgery?"
	Technical details	"How long does meniscus surgery take?"
	Restrictions	"What can you not do after meniscus surgery?"
	Cost	"How much does meniscus surgery cost?"
Policy		Ask whether a certain course of action should be taken to solve a problem
	Indications/management	"What happens if a meniscus tear goes untreated?"
	Risks/complications	"Can you wait too long for meniscus surgery?"
Value		Ask for evaluation of an idea, object, or event
	Pain	"Why is meniscus surgery so painful?"
	Longevity	"How long does meniscus surgery last?"
	Evaluation of surgery	"Is meniscus surgery worth it?"

adding together 4 different criteria with 1 point possible for each: authorship, attribution, currency, and disclosure.[16] These criteria have been similarly applied in prior literature to evaluate the academic quality of online resources.[17,18]

To assess each question's relevance to the study's topic, each question was reviewed to confirm that it was related to the meniscus. It was also confirmed that the associated Web pages pertained to the topic of this study. All classifications, scores, and categorizations were conducted by 2 independent reviewers (J.S. and C.M.). Any discrepancies between the 2 reviewers were reviewed by a third reviewer (A.H.) to determine the categorization.

Interobserver reliability for question classification and website categorization was analyzed using the Cohen κ coefficient.[19] Continuous variables were indicated as means ± standard deviations with ranges. Categorical variables were presented as relative frequencies with percentages. The Pearson χ^2 test was used to analyze nominal data. A P value of .05 denotes statistical significance.

Results

The 300 most frequent People Also Ask questions for each group (meniscal tear and meniscal surgery) were analyzed and compared. The most common Rothwell classification was "fact" for both cohorts, with similar proportions of questions for the meniscal tear group (54.0%) and the meniscal surgery group (55.0%, $P = .806$). The meniscal tear cohort asked significantly more questions related to the classification of "policy" (37.7%) than the meniscal surgery cohort (30.0%, $P = .047$). The meniscal surgery cohort had significantly more questions classified as "value" (15.0%) than the meniscal tear cohort (8.3%, $P = .011$). The most common Rothwell subclassification was "indications/management" for both groups, representing 32.7% of questions for the tear group compared with 21.7% for the surgery group ($P = .002$). The meniscal surgery group had significantly more questions subclassified as "evaluation of surgery" (9.7%) than the meniscal tear group (5.3%, $P = .044$). A full summary of Rothwell classifications and subclassifications is depicted in Table 3.

The most frequently asked question regarding meniscal tear was "What are three signs of a meniscus tear in the knee?," which was encountered 17 times (5.7%) (Table 4). The most frequently asked questions regarding meniscal surgery were "What is the fastest way to recover from meniscus surgery?" and "Should meniscus surgery be done over 65?," which were both

Table 2. Description and Examples of Each Type of Website Classification

Classification	Description	Example
Academic	Web page hosted by academic institution or organization	hopkinsmedicine.org, orthoinfo.aaos.org
Commercial	Web page hosted by for-profit company	foothillstherapy.com, optivusphysicaltherapy.com
Journal	Academic journal publication; may be hosted by third-party site	pubmed.com, sciencedirect.com
Government	Governmental hosted Web page	myhealth.alberta.ca, medlineplus.gov
Legal	Single attorney, law firm, or legal advice Web page	rosenfeldinjurylawyers.com, rossfellercasey.com
Medical information	Company or organization for purpose of medical information reviewed by medical professionals	WebMD.com, healthline.com
Medical practice	Medical or surgical practice of physicians	austinshouldersurgery.com, orthobethesda.com
Nonmedical media	Web page not specializing in medical information such as general news or social media site	wikipedia.com, abcnews.com
Single-surgeon practice	Single-surgeon practice or personal Web page	gomeramd.com, hyderabadshoulderclinic.com

Table 3. Rothwell Subclassification Counts and Percentages Comparing Meniscal Tear and Meniscal Surgery Questions

Rothwell Classification	Meniscal Tear (n = 300), n (%)	Meniscal Surgery (n = 300), n (%)	*P* Value
Fact	162 (54.0)	165 (55.0)	.806
Timeline of recovery	31 (10.3)	41 (13.7)	.209
Specific activities	43 (14.3)	39 (13.0)	.634
Technical details	75 (25.0)	65 (21.7)	.334
Restrictions	13 (4.3)	19 (6.3)	.276
Cost	0 (0.0)	1 (0.3)	NA
Policy	113 (37.7)	90 (30.0)	.047*
Indications/management	98 (32.7)	65 (21.7)	.002*
Risks/complications	15 (5.0)	25 (8.3)	.102
Value	25 (8.3)	45 (15.0)	.011*
Pain	7 (2.3)	14 (4.7)	.120
Evaluation of surgery	16 (5.3)	29 (9.7)	.044*
Longevity	2 (0.7)	2 (0.7)	>.999

NA, not applicable.
*Statistically significant ($P < .05$).

encountered 13 times (4.3%) (Table 4). For the meniscal tear group and meniscal surgery group, 81.0% and 79.0% of the questions, respectively, explicitly mentioned the meniscus in the People Also Ask question stem. For the meniscal tear cohort, 82.3% of Web pages pertained explicitly to the meniscus; for the surgery cohort, 81.7%. For the tear cohort, 22.7% of questions related to surgery. For the surgery cohort, only 46.7% of questions related to surgery.

The most common categorization of Web pages was "academic" for both cohorts, representing 31.7% of Web pages for the meniscal tear group and 27.3% for the surgery group ($P = .224$). The meniscal surgery cohort had significantly more websites classified as "journal" (5.7%) compared with the meniscal tear cohort (1.7%) ($P = .010$). The 3 most common classifications of Web pages for both the tear and surgery cohorts were "academic," "medical practice," and "single-surgeon practice." A full summary of website categorizations is presented in Table 5.

The mean JAMA score for the websites was 1.3 ± 1.1. The website classification of "journal" had the highest mean JAMA score, at 3.4 ± 0.6 (Table 5). Websites classified as "medical information" sites had a mean JAMA score of 2.8 ± 0.6, and the mean JAMA score for websites classified as "government" sites was 2.1 ± 0.6. Websites classified as "single-surgeon practice" and "legal" sites received the lowest JAMA scores, at 0.5 ± 0.8 and 0 ± 0, respectively. By use of the currently accepted criteria for the Cohen κ coefficient, the interrater reliability was good for the Rothwell classification (0.66), Rothwell subclassification (0.67), and JAMA criteria (0.67) and excellent for website classification (0.84).

Discussion

The key findings of this study on the most commonly searched questions regarding meniscal tears and surgery include the following: Fact-based questions, such as technical details of surgery and timeline of recovery, are the most searched category of questions in both the meniscal tear and surgery cohorts. The most frequently visited websites for information on meniscal injuries include academic sites, medical practice sites, and individual-surgeon websites. On the basis of the JAMA criteria, medical journals received the highest score.

Table 4. Most Frequently Encountered Queries for Meniscal Tear and Meniscal Surgery Questions

	Count	Frequency, %
Meniscal tear (n = 300)		
What are three signs of a meniscus tear in the knee?	17	5.7
How do they do the test for a torn meniscus?	9	3.0
Should you stay off a torn meniscus?	9	3.0
What are two signs and symptoms of a meniscus tear?	8	2.7
Do meniscus tears happen suddenly?	6	2.0
Meniscal surgery (n = 300)		
What is the fastest way to recover from meniscus surgery?	13	4.3
Should meniscus surgery be done over 65?	13	4.3
Can I go up and down stairs after meniscus surgery?	12	4.0
What are the side effects of meniscus surgery?	10	3.3
Will my knee ever be the same after meniscus surgery?	9	3.0

NA, not applicable.

Table 5. Website Classification Counts and Percentages for Meniscal Tear and Meniscal Surgery Questions With Associated JAMA Scores

Website Classification	Meniscal Tear (n = 300), n (%)	Meniscal Surgery (n = 300), n (%)	*P* Value	JAMA Score, Mean ± SD
Academic (n = 117)	95 (31.7)	82 (27.3)	.244	1.1 ± 1.0
Commercial (n = 49)	26 (8.7)	23 (7.7)	.655	1.4 ± 1.2
Government (n = 55)	26 (8.7)	29 (9.7)	.671	2.1 ± 0.6
Journal (n = 22)	5 (1.7)	17 (5.7)	.010*	3.4 ± 0.6
Legal (n = 1)	0 (0.0)	1 (0.3)	NA	0 ± 0
Medical information (n = 62)	35 (11.7)	27 (9.0)	.283	2.8 ± 0.6
Medical practice (n = 145)	69 (23.0)	76 (25.3)	.504	0.6 ± 0.7
Nonmedical media (n = 12)	7 (2.3)	5 (1.7)	.560	1.3 ± 0.5
Single-surgeon practice (n = 77)	37 (12.3)	40 (13.3)	.714	0.5 ± 0.8

JAMA, *The Journal of the American Medical Association*; NA, not applicable; SD, standard deviation.
*Statistically significant ($P < .05$).

However, most of the Web pages found via Google searches showed poor academic reliability.

In both the meniscal tear and meniscal surgery groups, most of the questions were focused on obtaining factual information. The 3 most popular "fact" categories in both cohorts were technical details, specific activities, and timeline of recovery. This points to patients' interest in gaining a comprehensive understanding of their condition, the implications of their injuries on daily life, and what treatment options exist. In the meniscal surgery group, the prevalence of searches regarding technical details suggests a desire for clarity about the surgical process and procedures, which is not surprising given that prior research has found that orthopaedic surgery often causes patient anxiety.[20] However, clear preoperative information can significantly reduce this anxiety.[21] The interest in technical details underscores that surgeons should address all procedure-related questions from meniscal injury patients, particularly surgical candidates, and not be dissuaded from discussing technical details. The ongoing interest in the recovery timeline and specific activities across cohorts suggests a collective curiosity about the rehabilitation process and limitations of these injuries. Although meniscal surgery has shown positive long-term outcomes, there is a subset of patients with meniscal tears that respond positively to nonoperative modalities.[22-24] Van der Graaff et al.[25] suggested that arthroscopic partial meniscectomy may not be cost-effective for patients younger than 45 years with isolated traumatic meniscal tears compared with physical therapy as a primary intervention. Nonsurgical options for meniscal tears encompass ice, heat, compression, bandages, and anti-inflammatory drugs.[26,27] Additionally, physical rehabilitation can aid in muscle strengthening and knee mobilization.[26,27] The treatment choice for a meniscal tear is influenced by factors such as injury severity, concomitant injuries, patient activity level, and pain tolerance. Patients with meniscal injuries may use the internet to compare recovery timelines between operative and nonoperative options. Therefore, it is crucial for physicians to participate in a shared decision-making model with their patients to determine the appropriate treatment regimen. Correcting misunderstandings about treatment options, rehabilitation, and recovery timelines is essential to establishing realistic expectations. This transparency is especially critical when discussing the recovery timeline for operative and nonoperative interventions given that the orthopaedic literature has highlighted that aligning preoperative expectations enhances postoperative outcomes and patient satisfaction.[28,29]

In contrast to the meniscal surgery group, the meniscal tear cohort posed significantly more questions related to policy ($P = .047$), particularly inquiring about indications and management ($P = .002$). The most frequently asked questions by the meniscal tear group were "What are three signs of a meniscus tear in the knee?" and "How do they do the test for a torn meniscus?" These queries not only reveal an interest in clarifying patients' diagnosis of a torn meniscus but also suggest patients' attempts at self-diagnosis. This highlights the value in surgeons offering patients additional education on the typical clinical presentation of meniscal tears, along with assurance that their symptoms match the diagnosis. The queries asked by this group also suggest a curiosity about the modalities used in nonoperative management. Meniscal tears can stem both from traumatic injuries such as those sustained by athletes and from a more degenerative process in older adults.[6,7] The orthopaedic literature has suggested that patients with nontraumatic meniscal lesions can equally benefit from surgical and nonsurgical treatments.[22] When surgeons are counseling patients with recently diagnosed tears, it is imperative to clearly convey the diagnosis to the patients and focus on educating them about the various treatment alternatives available.

On the other hand, the meniscal surgery cohort asked more "value" questions than the tear group ($P = .011$).

Most frequently, these included questions regarding pain and the evaluation of surgery. Specifically, the questions about pain may highlight an anticipatory aspect of the recovery journey, necessitating thorough discussions with the medical team to alleviate concerns and provide realistic expectations. Moreover, questions surrounding the evaluation of surgery reveal the patients' interest in comprehending the rationale behind treatment decisions. Surgeons serve a pivotal role in patient education by clearly outlining the criteria used to determine the necessity of surgery and likelihood of success after surgery. This information aids patients in making informed choices about their care, fostering a sense of partnership between patients and the health care team. Well-informed patients are better equipped to actively participate in their treatment plan, follow postoperative instructions diligently, and engage in their own recovery.[30-33] Additionally, research suggests that comprehensive surgical education contributes to reducing the risk of complications, lowering hospital readmissions, and ultimately decreasing health care–associated costs.[30,33]

In the meniscal tear group, 81.0% of the People Also Ask queries and 82.3% of the accessed Web pages were specifically related to the meniscus. Similarly, in the meniscal surgery group, 79.0% of queries and 81.7% of Web pages focused on the meniscus. The approximately 18% of Web pages not related to the meniscus underscores how quickly patients may encounter and be misled by information on treatment options, recovery timelines, and other details related to similar but distinct conditions. Therefore, surgeons should educate their patients about the prevalence of links related to various injuries, enabling them to discern and verify online information accurately regarding their meniscal condition.

Academic, medical practice, and single-surgeon websites were the 3 most popular website classifications encountered by both the meniscal tear and meniscal surgery groups. Collectively, these classifications comprised over 65% of the websites encountered in both groups. Despite their popularity, these 3 classifications scored poorly according to the JAMA criteria given that these Web pages often lacked essential information on authorship, references, publication dates, and disclosures. In contrast, medical journals achieved the highest JAMA scores by consistently providing and detailing this information. Similarly, a study assessing online resources about hyaluronic acid injections using the DISCERN score found that academic journals scored higher than medical practice and commercial sites.[34] Surprisingly, despite their high JAMA score, journals constituted only a small proportion of the websites searched in both the meniscal tear (1.7%) and meniscal surgery (5.7%) groups. This limited usage is likely attributed to the technical terminology present in these publications, making them less user-friendly for the general population. This aligns with existing literature that illustrates the diminishing readability of scientific journals.[12,35-37]

In comparison, legal sites, single-surgeon practice sites, and medical practice sites all had lower JAMA scores. Past studies on developmental hip dysplasia, distal radius fractures, and knee biologics have all highlighted the poor readability, quality, and accuracy of orthopaedic information available on websites.[38-40] We believe it is the surgeon's duty to make patients aware of the abundance of low-quality information available online and to proactively tailor discussions to address any inaccuracies regarding meniscal injuries. The orthopaedic community should consider developing more reliable, accessible educational resources for patients and integrating them into clinical practice. By addressing inaccuracies during consultations and providing high-quality, evidence-based information, surgeons can help set realistic expectations and improve patient outcomes.

Limitations

This study is not without limitations. The Google People Also Ask function relies on artificial intelligence to predict upcoming searches based on aggregated data from other users exploring similar topics. The predictions are influenced by an individual's previous search history, potentially resulting in different question lists for 2 users. To counteract this, we included a sizable sample of questions to ensure a comprehensive list. Additionally, each search was conducted using a freshly installed Web browser with no prior search history. Another limitation stems from the difficulty in confirming whether individuals seeking information either have meniscal tears or are potential candidates for meniscal surgery. It is unclear whether the inquiries in this study came from patients or from other individuals such as medical professionals seeking information for educational or research purposes. Therefore, although the study's findings are suggestive of what patients might search online, they cannot be stated with certainty. Furthermore, the most frequently encountered query in the meniscal tear group appeared 17 times, whereas in the meniscal surgery group, the most frequent query was encountered only 13 times (Table 4). This suggests that although certain questions are more common than others, there is a considerable amount of heterogeneity in what patients are searching for, and any patient education should be tailored to individual-specific knowledge gaps. Finally, it is important to note that although the JAMA criteria comprise a beneficial tool for evaluating website quality, they do not directly assess medical accuracy. These are characteristics of peer-reviewed scientific literature. Instead, these criteria focus on factors such as

authorship, publication dates, citations, and disclosures. These factors may serve as indicators of website quality, although they are just a proxy for the information's reliability and validity. Similarly, whereas a low JAMA score may indicate poor transparency in the 4 listed categories, it does not necessarily reflect poor accuracy or utility for patients. Nevertheless, the JAMA criteria have been used in numerous orthopaedic studies to evaluate the quality and accuracy of online information.[13,14,17,18]

Conclusions

The quality of online information related to meniscal tears and surgery is often suboptimal based on objective measures of value. Individuals frequently search for insights into indications, management, and technical details.

Disclosures

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: J.R. owns equity or stocks in Restor3d and reports a consulting or advisory relationship with Smith & Nephew and Stryker. J.C. reports board membership with American Orthopaedic Society for Sports Medicine, Arthroscopy Association of North America, and International Society of Arthroscopy, Knee Surgery & Orthopaedic Sports Medicine; reports a consulting or advisory relationship with Arthrex, ConMed Linvatec, RTI Surgical, Smith & Nephew, and Vericel; provides paid expert testimony for RTI Surgical; and receives speaking and lecture fees from Smith & Nephew. All other authors (J.S., J.S., A.H., A.H., C.M., S.S., J.R.M., D.P.) declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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