ORIGINAL RESEARCH

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Assessment of Lateral Epicondylitis Videos on YouTube

YouTube'da Lateral Epikondilit Videolarının Değerlendirilmesi

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Abstract

Objective: The aim of the present study was to assess the quality, reliability and educational value of health-related information videos about lateral epicondylitis on YouTube.

Method: The study conducted a search on YouTube on April 1, 2021 using the search term "lateral epicondylitis". Based on relevance to this keyword, the first 50 videos were recorded for assessment. The videos were assessed by two orthopedic surgeons. Video length in seconds, view counts, number of likes, number of dislikes, video category (animation or not), video content, days since upload, and source of upload (uploader) were recorded. All videos were analyzed for length, view counts, number of likes and source of upload. Quality of the videos was assessed using the global quality score (GQS) (score range: 0-4), Journal of the American Medical Association (JAMA) score (0-5), and DISCERN (15-75) score. The data were statistically analyzed according to these scoring systems.

Results: Like rate had no significant correlation with GQS, DISCERN, and JAMA scores. There was a significant positive correlation between view rate and GQS scores (p=0.038). View rate had no significant correlation with DISCERN (p=0.453) and JAMA scores (p=0.946). There was a significant positive correlation between video power index and GQS scores (p=0.036). Video power index had no significant correlation with DISCERN (p=0.442) and JAMA scores (p=0.938). According to the source of upload, there was a significant difference in JAMA and DISCERN scores between physicians and non-physicians. GQS did not significantly differ (p=0.15) according to the source of upload.

Conclusion: The analysis of the first 50 videos relevant to lateral epicondylitis on YouTube revealed that videos were uploaded mainly by healthcare professionals. Overall, the 50 videos had an average level of adequacy.

Keywords: Lateral epicondylitis, social media, YouTube

Öz

Amaç: Bu çalışmanın amacı YouTube'da lateral epikondilit ile ilgili sağlık ve bilgilendirme videolarının kalitesini, güvenilirliğini ve eğiticilik düzeyini değerlendirmektir.

Yöntem: Çalışmada YouTube üzerinde arama kelimesi "lateral epikondilit" yazılarak, 1 Nisan 2021 tarihli arama yapıldı. İlk 50 video bu anahtar terime göre en alakalı sıralama ile değerlendirme için kaydedildi. Videolar iki ortopedik cerrah tarafından değerlendirildi. Videoların saniye olarak uzunluğu, izlenme sayısı, beğenme sayısı, beğenmeme sayısı, animasyon olup olmadığı, içeriği, yüklenme gün sayısı ve video kaynağı kaydedildi. Tüm videolar uzunluk, izlenme sayısı, beğenme sayısı ve videonun kaynağı bilgileri ile analiz edildiler. Videoların kalitesini değerlendirmek için global kalite skoru (GQS) (score range: 0-4), Journal of the American Medical Association (JAMA) (0-5) ve DISCERN (15-75) skorlama sistemleri kullanıldı. Elde edilen veriler bu skorlama sistemlerine göre istatistiksel olarak analiz edildiler.

Bulgular: Beğenme oranı ile GQS, DISCERN ve JAMA arasında anlamlı bir ilişki yoktur. İzlenme oranı ile GQS (p=0,038) arasında pozitif yönlü anlamlı bir ilişki vardır. İzlenme oranı ile DISCERN (p=0,453) ve JAMA (p=0,946) arasında anlamlı bir ilişki yoktur. Video güç indeksi ile GQS (p=0,036) arasında pozitif yönlü anlamlı bir ilişki vardır. Video güç indeksi ile DISCERN (p=0,442) ve JAMA (p=0,938) arasında anlamlı bir ilişki yoktur. Yüklenme kaynaklarına göre JAMA ve DISCERN skorlarında doktor ve doktor olmayanlar arasında anlamlı fark vardır. Yüklenme kaynağı açısından GQS düzeyinde (p=0,15) anlamlı bir farklılık yoktur.

Sonuç: YouTube'da lateral epicondilit ile en alakalı ilk 50 video analiz edildiğinde ağırlıklı olarak sağlık profesyonelleri tarafından videoların yüklenmiş olduğu görüldü. Genel olarak, 50 video analiz edildiğinde ortalama düzeyde yeterliliğe sahiptir.

Anahtar kelimeler: Lateral epikondilit, sosyal medya, YouTube

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Introduction

The Internet has become the most practical and quickest way to access information in the last three decades. In parallel with the popularity of the Internet, many people utilize the Internet or social media as the first source of information especially before medical procedures to be performed during the pandemic or to learn the details of their diseases. The video-sharing site most commonly used to explain medical conditions and medical procedures is YouTube.

There are currently over 2 billion active YouTube users. Almost 70% of video viewers watch videos on mobile devices (1). Patients often try to gather information about their diseases by watching YouTube videos (2-4). These patients also include those with extremity disorders. In particular, patients with lateral epicondylitis, which is resistant to medical and conservative therapy, go through a more comprehensive search over time. Patients can increase their anxiety levels by constantly thinking about the worst and referring to the most negative examples based on the videos they watch.

Kunst et al. (5) concluded in their study, conducted in 2002, that health-related websites had not been improved enough and had inadequate information. In order for patients to access accurate information, videos need to have a high-quality content about health-related information. However, although accessed by everyone, the utility and accuracy of the information obtained over the Internet is controversial (5).

Since being founded in 2005, YouTube has 30 million daily and 2 billion monthly active users (6). From this point of view, YouTube is a site with visual browsing on almost every topic, including health-related subjects. However, YouTube is a video site established for entertainment or social purposes rather than educational or academic videos.

Although patients utilize the Internet or YouTube to search their medical conditions, only 18% discuss this online search with their clinicians (7). In addition, 75% of chronic patients make online search to reach a final decision just before treatment (8). Despite all, the Internet still does not have an effective control mechanism for health education.

Lateral epicondylitis is a common medical condition seen in orthopedics and physical therapy outpatient clinics. We conducted this study to establish the extent of accurate information obtained by our patients about this condition through online search. Lateral epicondylitis patients, particularly those who work in the heavy industry, are under significant stress to maintain their active work lives. In the literature, orthopedic and physical therapy studies evaluating the quality and specificity of YouTube videos are limited in number. These studies are about scoliosis, bone tumors, arthritis of the hip, and anterior cruciate ligament tear in particular (3,9-12). There is a lack of studies on lateral epicondylitis.

The aim of the present study was to assess the quality, reliability and educational value of health-related information videos about lateral epicondylitis on YouTube.

Materials and Methods

YouTube search

In this study, a search was performed on YouTube on April 1, 2021, using the search term ''lateral epicondylitis''. Based on the relevance to this keyword, the first 50 videos were recorded for assessment (Table 1). This was considered an appropriate method for video selection because this was an accepted assessment method in other peer-reviewed literature on orthopedic surgery (9). Only videos in English language were included in the study. Videos with information unrelated to lateral epicondylitis, those in non-English languages, those for advertising purposes, and those with only audio were excluded. This study does not contain any human or animal resources, ethical approval was not needed for this study. Patient information was not used in the study. Therefore, the patient consent document was not obtained.

The videos were watched independently by two orthopedists. Video length in seconds, view counts, number of likes, number of dislikes, video category (animation or not), video content, days since upload, and source of upload (uploader) were recorded. The source of upload was classified as patient experience, physician, physiotherapist and health website. The video content was categorized as surgical technique, disease-specific assessment, exercise training, and advertisement. For each video, a video power index (VPI) (like ratio × view ratio/100), a view ratio (number of views/days), and a like ratio [like×100/(like + dislike)] were calculated. We used these measurements in our study since they were used in previous studies published in previous peer-reviewed journals (13).

Assessment of video reliability and educational content

Videos were independently scored by two orthopedists according to content, global quality score (GQS), Journal of the American Medical Association (JAMA) score, and DISCERN score (14-16). The videos were watched separately

Table 1. Links of videos sorted by relevance in the search for lateral epicondylitis on YouTube (first 50 videos)

N	Video source link
Video 1	https://www.youtube.com/watch?v=4vk3i22z3Ko
Video 2	https://www.youtube.com/watch?v=r_A84ox9JRM
Video 3	https://www.youtube.com/watch?v=qn2VT7Df7no
Video 4	https://www.youtube.com/watch?v=qdbC9Ic3qCg
Video 5	https://www.youtube.com/watch?v=Lf695_IJO8g
Video 6	https://www.youtube.com/watch?v=8K7jzDIUpLI
Video 7	https://www.youtube.com/watch?v=kAy8q7yJAHM
Video 8	https://www.youtube.com/watch?v=92FXZlXZaf0
Video 9	https://www.youtube.com/watch?v=X2BrySMybtI
Video 10	https://www.youtube.com/watch?v=xoj-L_UlbEw
Video 11	https://www.youtube.com/watch?v=NExFfXSe2Mc
Video 12	https://www.youtube.com/watch?v=uFNhlBR-Ae0
Video 13	https://www.youtube.com/watch?v=iAlFqxkYz_o
Video 14	https://www.youtube.com/watch?v=DgwQSPQv_Zo
Video 15	https://www.youtube.com/watch?v=w-uLcHXO2b4
Video 16	https://www.youtube.com/watch?v=BXAzcjxIHMg
Video 17	https://www.youtube.com/watch?v=r_A84ox9JRM
Video 18	https://www.youtube.com/watch?v=txB_JsCGaBo
Video 19	https://www.youtube.com/watch?v=ltjqrllSxDk
Video 20	https://www.youtube.com/watch?v=bW2jpzl1FSY
Video 21	https://www.youtube.com/watch?v=Wk6ZNJ8MVk4
Video 22	https://www.youtube.com/watch?v=XK9tqcQnykE
Video 23	https://www.youtube.com/watch?v=Z50T8J5mQEE
Video 24	https://www.youtube.com/watch?v=MghCqfcqJHI
Video 25	https://www.youtube.com/watch?v=w-uLcHXO2b4
Video 26	https://www.youtube.com/watch?v=thUlPbCX4fU
Video 27	https://www.youtube.com/watch?v=BXAzcjxIHMg
Video 28	https://www.youtube.com/watch?v=slf_42AhFzU
Video 29	https://www.youtube.com/watch?v=uY-oy4h2YnI
Video 30	https://www.youtube.com/watch?v=GOwqNDP40TQ
Video 31	https://www.youtube.com/watch?v=uSHNPJQEs4Q
Video 32	https://www.youtube.com/watch?v=NTs9q8WdTbY
Video 33	https://www.youtube.com/watch?v=4bgELYdFavs
Video 34	https://www.youtube.com/watch?v=LttMqFJI2WM
Video 35	https://www.youtube.com/watch?v=yKjVcdD1dig
Video 36	https://www.youtube.com/watch?v=ofKRUmAaqy4
Video 37	https://www.youtube.com/watch?v=7xMn9RRsmAs
Video 38	https://www.youtube.com/watch?v=8ls_H4vHfOM
Video 39	https://www.youtube.com/watch?v=PdGuk6RSGh4
Video 40	https://www.youtube.com/watch?v=8k-mqAqGnGA
Video 41	https://www.youtube.com/watch?v=IjUrBZC8KwE
Video 42	https://www.youtube.com/watch?v=OT7jVNF8wvw
Video 43	https://www.youtube.com/watch?v=ayCJYZ47SJo
Video 44	https://www.youtube.com/watch?v=UpZKU677pqQ

Table 1. Continued

N	Video source link
Video 45	https://www.youtube.com/watch?v=rRlGA9cerhs
Video 46	https://www.youtube.com/watch?v=FiQF6QLv4Y0
Video 47	https://www.youtube.com/watch?v=jxbTNT_ZdL8
Video 48	https://www.youtube.com/watch?v=EsZcJRttJPo
Video 49	https://www.youtube.com/watch?v=qTjDq3_D-FU
Video 50	https://www.youtube.com/watch?v=sWiLrHy9ky8

by two orthopedists and then their scores were added up and divided by two, yielding the average GQS, DISCERN, and JAMA scores (Figure 1).

The JAMA scoring system is a non-specific and objective tool for online videos and resources. It consists of 4 individual criteria. Each criterion is scored 1 point and the total score ranges from 0 to 4 points. A score of 4 indicates high reliability and accuracy for the online source, while a score of 0 indicates poor source reliability and accuracy (Table 2).

Non-specific educational content quality was assessed using the GQS. The GQS assesses the educational value of video content based on 5 criteria. The source is given 1 point for each of the present criteria. A score of 5 indicates the highest quality of education (Table 3).

The DISCERN score generally assesses the video content for integrity, purpose and relevance, objectivity, accuracy of therapeutic options, and the availability of alternative therapeutic options. It is a test consisting of 15 items. Each item is scored from 1 to 5. A score of 63-75 is considered as excellent, 51-62 as good, 39-50 as fair, 28-38 as poor, and <28 as very poor (Table 4).

In the study, the VPI, view ratio and like ratio were calculated using respective formulas. The formula used to calculate the view ratio and like ratio were as follows: (number of

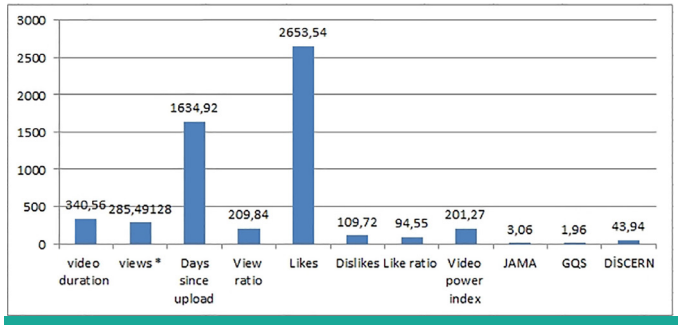

Figure 1. Representation of the variables used in the study on the scatterplot

** Value×10³, JAMA: Journal of the American Medical Association, GQS: Global quality score*

Table 2. JAMA scoring system

Criteria	Description
Authorship	Author and contributor credentials and their affiliations should be provided.
Attribution	Clearly lists all copyright information and states references and sources for content.
Currency	Initial date of posted content and subsequent updates to content should be provided.
Disclosure	Conflicts of interest, funding, sponsorship, advertising, support, and video ownership should be fully disclosed.

JAMA: Journal of the American Medical Association

Table 3. Global quality score criteria

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

Table 4. DISCERN scoring system, each item is scored from 1 to 5 and then added up

Section 1 **Is the publication reliable?**
1. Are the aims clear?
2. Does it achieve its aims?
3. Is it relevant?
4. Is it clear what sources of information were used to compile the publication (other than the author or producer)?
5. Is it clear when the information used or reported in the publication was produced?
6. Is it balanced and unbiased?
7. Does it provide details of additional sources of support and information?
8. Does it refer to areas of uncertainty?
Section 2 **How good is the quality of information on treatment choices?**
9. Does it describe how each treatment works?
10.Does it describe the benefits of each treatment?
11. Does it describe the risks of each treatment?
12. Does it describe what would happen if no treatment is used?
13. Does it describe how the treatment choices affect overall quality of life?
14. Is it clear that there may be more than one possible treatment choice?
15. Does it provide support for shared decision-making?

views/days) and [likex100/(like + dislike)], respectively. The formula used to calculate the VPI was as follows: (like ratio*view ratio/100) (9,13).

Statistical Analysis

Statistical analysis was performed using SPSS 25.0 for Windows 10 software. The independent samples t-test was used to analyze the difference in mean scores between two groups. Correlations among continuous variables were examined using the Pearson's correlation test. The study was conducted at 95% confidence interval.

Results

All results are summarized in Tables 5-7. All analyzed data, mean values, standard deviation and ranges are explained in Table 5. Three (6%) videos included animation, 22 (44%) videos physicians, 10 (20%) videos health websites, 13 (26%) videos physiotherapists, 1 (2%) video commercial product company, 3 (6%) videos academic content, and 1 (2%) video included a patient's own experience. Regarding video contents, there were 22 (44%) clinical (disease-related) videos, 11 exercise (22%) training videos, 2 (4%) advertisement videos, 11 (22%) disease-specific information videos, 3 (6%) surgical technique and approach videos, and 1 (2%) patient experience video.

According to the Pearson's correlation test, like ratio was not statistically significantly correlated with GQS (p=0.772), DISCERN (p=0.713), and JAMA (p=0.486) scores. There was a significant positive correlation between view ratio and GQS scores (p=0.038). View ratio had no significant correlation with DISCERN (p=0.453) and JAMA scores (p=0.946). There was a significant positive correlation between view ratio and GQS scores (p=0.036). View ratio had no significant correlation with DISCERN (p=0.442) and JAMA scores (p=0.938).

When sources of upload were classified as physician and non-physician (academic content, commercial product companies, medical content and animation, physiotherapist, physical training or athletic trainer (non-physiotherapist), patient), there was a significant difference in JAMA and DISCERN scores between physicians and non-physicians. GQS did not significantly differ (p=0.15) according to the source of upload. According to this result, the GQS score did not differ between physician and non-physician uploaders. There was a significant difference in JAMA scores ($p<0.05$) between the sources of upload. There was a significant difference in JAMA scores in favor of physicians between videos uploaded by physicians and by non-physicians. There was a significant difference in

DISCERN scores (p<0.05) between the sources of upload. There was a significant difference in DISCERN scores in favor of physicians between videos uploaded by physicians and by non-physicians (Table 7).

There was no significant difference in view ratios (p>0.05) between the sources of upload (physicians and non-physicians). According to this result, the view ratios did not differ between physician and non-physician uploaders. There was no significant difference in like ratios (p>0.05) between the sources of upload (physicians and non-physicians). According to this result, the like ratios did not differ between physician and non-physician uploaders (Table 7).

Discussion

This is the first study to focus on lateral epicondylitis and provide information on the effects of video content quality on patients. The first focus of the study was to discuss how well lateral epicondylitis was explained on YouTube and the quality of video content.

Most of the videos were produced by healthcare professionals in our study. Although the literature review showed that video uploads by patients were not to be underestimated, our study found that videos were mainly uploaded by healthcare professionals.

The mean video length was 5.67 min in our study, while previous studies reported a length of 6.17-16.18 min (3-9-17-18).

Table 5. Video characteristics of the YouTube videos

Characteristic	Mean	SD	Minumum	Maximum
Video duration (sec)	340.56	244.16	23	1234
Views	285491.28	496753.60	119	2180469
Days since upload	1634.92	1130.91	27	4369
View ratio[α]	209.84	351.74	0.5	1274.84
Likes	2653.54	5658.88	6	24000
Dislikes	109.72	268.24	1600	0
Like ratio[β]	94.55	4.76	78.18	100
Video power index[ı]	201.27	338.08	0.48	1217.29
JAMA*	3.06	0.91	1	4
GQS*	1.96	0.75	1	5
DİSCERN*	43.94	43.94	15.5	71.4

*Average of the scores given by two orthopedists watching the videos, [α]View ratio; number of views/days, [β]Like ratio; like×100/(like+dislike), [ı]VPI: Video power index; like ratio × view ratio, SD: Standard deviation, JAMA: Journal of the American Medical Association, GQS: Global quality score

The statistical assessments did not reveal any statistically significant relationship among like ratios and GQS, DISCERN and JAMA scores. This finding suggests that video likes by video viewers are not related to video content quality and originality. However, GQS scores were found to have a significant positive correlation with view ratio and VPI (Table 6). The GQS assesses non-specific educational content quality. Obviously, view ratio increases with increasing content, specific information and quality useful for patients. However, DISCERN and JAMA scores were not correlated with like ratio, view ratio and VPI. DISCERN and JAMA scores, which provide more academic and professional information flow, did not attract the attention of video viewers. However, other studies established more likes in low quality videos (19,20).

Our study established statistically significant differences between physician and non-physician uploaders. No significant difference was found in GQS scores and like

Table 6. Statistical relationship among like ratio, view ratio, video power index and GQS, DISCERN and JAMA scores

	GQS	DISCERN	JAMA
Like ratio (p-value[α])*	0.772 (r=0.04)	0.713 (r=0.05)	0.486 (r=-0.10)
View ratio (p-value[α])*	0.038 (r=0.30)	0.453 (r=0.11)	0.946 (r=-0.01)
Video power index (p-value[α])*	0.036 (r=0.29)	0.442 (r=0.11)	0.938 (r=-0.01)

[α]Pearson correlation test, *Correlation is significant at the 0.05 level (2-tailed), SD: Standard deviation, JAMA: Journal of the American Medical Association, GQS: Global quality score

Table 7. Relationship between doctor and other video uploaders by video source

Scoring system	Video source	N	Median score	SD	p
GQS	Doctor	22	2.13	0.77	0.15
	Others*	28	1.82	0.72	
JAMA	Doctor	22	3.81	1.18	0.01
	Others*	28	2.92	1.15	
DISCERN	Doctor	22	52.09	13.27	<0.001
	Others*	28	37.54	12.35	
Like ratio	Doctor	22	93.45	5.40	0.15
	Others*	28	95.41	4.09	
View ratio	Doctor	22	225.99	403.53	0.78
	Others*	28	197.15	312.25	

* Academic content, commercial product companies, medical content and animation, physiotherapist, physical training or athletic trainer (non-physiotherapist), patient (uploaded for individual experience), p: Independent samples t-test, SD: Standard deviation, JAMA: Journal of the American Medical Association, GQS: Global quality score

ratios between physician and non-physician uploaders; however, there was a significant difference in JAMA and DISCERN scores between physician and non-physician uploaders in favor of physicians. Physician uploaders were more successful in describing the current medical condition, explaining the treatments and complications in detail, and questioning the reliability of their resources. However, there was no difference in the like and view ratios, which are the causes of trends on YouTube, between videos uploaded by physicians and non-physicians. However, the review of literature did not identify any significant correlation between videos by uploaders and video quality (20,21).

In their study on bone tumors and YouTube contents, Sezgin and Erman (9) reported the mean GQS, JAMA and DISCERN scores as 2.22 (1-4), 2.12 (1-3), and 33.48 (17-66), respectively. In this study, the average JAMA, GQS and DISCERN scores, which were used to assess various aspects of the videos such as content, appropriateness of treatment, quality, accuracy and reliability, were 3.06, 1.96, and 43.94, respectively. Considering these findings, the video quality in our study was average.

The most important limitation of the study was that the first 50 videos were watched and assessed. However, previous studies were also found to conduct a similar assessment (22,23). Another limitation of the study was that the assessment was made by two orthopedists. Another limitation is that YouTube search ranking varies across countries. However, we found that the most relevant video ranking remained same when the country was changed using proxy networks. Another limitation of the study is that lateral epicondylitis is also referred to as tennis elbow at the same time. In the study, lateral epicondylitis was used instead of tennis elbow as a search word. Tennis elbow search term is a disease that is mostly used by the public. However, lateral epicondylitis is a more scientific and medical term than tennis elbow. However, when the literature is searched, YouTube reviews with the search term tennis elbow have not been done before. Moreover, the search term of tennis elbow and YouTube videos have not been examined in the literature before.

Conclusion

In conclusion, the Internet and YouTube are the first sources that people refer to about health as is every topic in the 21st century. The analysis of the first 50 videos relevant to lateral epicondylitis on YouTube revealed that videos were uploaded mainly by healthcare professionals. Overall, the 50 videos had an average level of adequacy in terms of quality and content. We believe that this study revealed the extent of accurate information obtained on YouTube videos by patients with lateral epicondylitis and the quality standards of the videos watched from the perspective of healthcare professionals.

Ethics

Ethics Committee Approval: This study does not contain any human or animal resources, ethical approval was not needed for this study.

Informed Consent: Patient information was not used in the study. Therefore, the patient consent document was not obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: M.A., A.M., Design: M.A., A.M., Data Collection or Processing: M.A., A.M., Analysis or Interpretation: M.A., A.M., Writing: M.A.

Conflict of Interest: No conflict of interest was declared by the authors.

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