Technical notes & surgical techniques

Evaluation of quality and reliability of YouTube videos on spondylolisthesis

Yüksel Uğur Yaradılmış[a,*], Ali Teoman Evren[a], Mustafa Caner Okkaoğlu[a], Özkan Öztürk[b], Bahtiyar Haberal[c], Mahmut Özdemir[d]

[a] From Department of Orthopaedics and Traumatology, University of Health Sciences, Keçiören Health Practice and Research Center, Ankara, Turkey
[b] From Department of Orthopaedics and Traumatology, Erzurum Health Practice and Research Center, Erzurum, Turkey
[c] From Department of Orthopaedics and Traumatology, Başkent University Hospital, Ankara, Turkey
[d] From Department of Orthopaedics and Traumatology, VM Medikal Park, Ankara, Turkey

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ABSTRACT

Background: YouTube is the most popular and the largest video portal and is a source of information in all areas. In our study, we aim to investigate the quality of videos on spondylolisthesis in the YouTube video portal and to detail the parameters for low-quality videos.

Material and methods: A search was made by using keyword "*spondylolisthesis*" on the YouTube search portal. 50 most watched videos were included in the study. The duration of the videos, view counts, like counts, dislike counts, number of comments, the date the video was published, and the video's release time were noted. Popularity of the video is determined by Video Power Index (VPI) and video quality is evaluated with DISCERN (Quality Criteria for Consumer Health Information), JAMA (Journal of the American Medical Association), and Global Quality Score (GQS) scoring systems. Video content was categorized as physician and non-physician, video length, release date, view count, daily view count, VPI, comments/year. The relationship between the groups and video quality was evaluated.

Results: Video uploaders consist of 27 physicians (54%), 7 health channels, 6 physiotherapists, 4 patients, 4 hospital channels, 1 chiropractic, 1 fitness coach. The mean JAMA score was 2.7 ± 0.6 (1–4), the mean DISCERN score was 35 ± 11.1 (16–64) and the mean GQS score was 2.84 ± 1.05. DISCERN, JAMA, and GQS scores correlate among themselves. In linear regression analysis, there was a significant difference between the duration of the videos, the view counts and the video quality scores (DISCERN and JAMA) ($p < 0.05$), no significant difference was observed between the daily view counts, like counts, dislike counts, VPI and comment count ($p > 0.05$).

Conclusion: The video quality of videos on Spondylolisthesis on YouTube was found to be low. Especially videos by non-physician uploaders, short videos, most viewed videos were found to have low quality.

1. Introduction

The internet is a source of information in all areas due to easy and fast Access, particularly for those seeking health-related reference. In a study conducted in the USA, half of the internet users consider the internet as a source of information in health [1]. YouTube is the most popular and the largest video portal with more than five million daily views and about 2000 h of video uploaded per hour [2,3]. Despite this dazzling traffic, YouTube's guidelines on content quality is questionable.

Previously, orthopedic surgeons presented studies on YouTube video quality regarding osteoarthritis, arthroscopic surgeries, and some lumbar pathologies [4–8]. When the lumbar pathologies are of interest in YouTube search, one of them is lumbar hernia, which is a common orthopedic disorder, and the other is kyphosis, which can start at different ages and cause anxiety in patients [8,9]. Another major lumbar pathologies that is searched on YouTube is spondylolisthesis, which is seen as isthmic type at younger ages, degenerative type at older ages and which causes people to worry.

Spondylolysis can be seen in 6% of the population and can progress to spondylolisthesis by 75% [10]. Hsu et al. have shown that spondylolisthesis causes anxiety and a decrease in comfort levels in patients. The timing of surgical treatment for spondylolisthesis and alternative treatments were also investigated in the study [11]. For this reason, patients will also try to overcome their lack of information through the internet and video portals. No studies are evaluating YouTube video
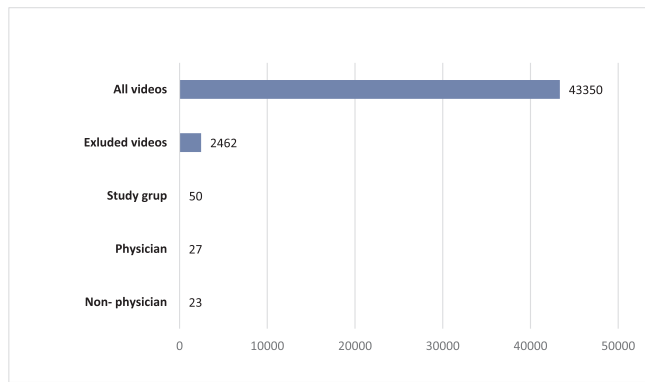
Fig. 1. Data of study design.

quality for spondylolisthesis in the literature.

An analysis on PubMED revealed 227 articles on video quality on YouTube, and 111 of them (including 13 orthopedics and traumatology videos) are health-related [12]. One of the major finding was the overall low video quality among these videos, although videos uploaded by the physicians had significantly higher quality. Other parameters will contribute to browsers to avoid low-quality videos.

In our study, we aim to investigate the quality of videos on spondylolisthesis in the YouTube video portal and to detail the parameters for low-quality videos.

2. Material and methods

2.1. Study design

A search was made by using keyword "*spondylolisthesis*" on the YouTube search portal on 11.03.2020. A total of 44,500 videos were identified [12]. The search results were sorted by the number of views from the filtering section. Videos that were non-English, multiple repetitions, < 60 s, and longer than 60 min were excluded from the study. The 50 most watched videos were included in the study (Fig. 1). The videos were evaluated by two orthopedics and traumatology surgeons. The duration of the videos, view counts, like counts, dislike counts, number of comments, the date the video was published, and the video's release time (first upload date-removal date) were noted. The videos were categorized according to the content of the video, according to the profession of the uploader, whether it was animation or real record.

Video content was classified as comprehensive information about the disease, description of the disease, surgery, non-surgical treatment, physical therapy exercises, patients' experience, and MRI images. Uploaders were categorized as physicians, patients, physiotherapists, health channel, hospital channel.

2.2. Additional calculations

Daily view count = View count/Video streaming duration (days),

Comment count per year = Comment count/Video streaming duration (years),

Video Power Index (VPI) = [like count/(dislike count + like count)] × 100

VPI determines the popularity of the videos.

2.3. Video quality

Video quality is evaluated with DISCERN (Quality Criteria for Consumer Health Information), JAMA (Journal of the American Medical Association), and Global Quality Score (GQS) scoring systems [13–15]. DISCERN, JAMA, GQS were evaluated by 2 Orthopaedics and Traumatology surgeons (ATE and YUY), and mean values were noted.

DISCERN consists of 15 questions, each with 5 points. A total of 15–75 points are taken. DISCERN scores between 63 and 75 points were classified as 'excellent', 51 and 62 as 'good', 39 and 50 as average, 28 and 38 as 'poor', and < 28 as very poor. While JAMA consists of 4 questions, each with a score of 1, GQS is a one-choice assessment scored between 1 and 5 based on video quality. DISCERN, JAMA, GQS scores were calculated with the arithmetic mean between observers. Higher scores obtained from the scales shows increased quality of the information.

2.4. Categorization

Video content was categorized as physician and non-physician, video length < 5, 5–10, > 10 min, release date < 5 (new videos), and > 5 years (old videos), first 25 and second 25 videos according to view count, Daily view count < 50 and > 50, VPI < 95 and > 95, comments/year > 50 and < 50. The relationship between the groups and video quality was evaluated.

2.5. Statistical analysis

Data obtained in the study were analyzed using the SPSS 22 Windows Package Program software. Values were stated at a 95% confidence interval (CI). Data were recorded as percentage, arithmetic mean, and standard deviation. Compliance of the variables included in the analysis with normal distribution was analyzed with the Kolmogorov–Smirnov test. To evaluate the correlation between DISCERN, GQS, and JAMA points, Spearman correlation analysis was used according to the results of the normality test. Linear regression analysis was used for correlation between parameters (video length, view count, daily view count, VPI, comment count/year), and video quality. Video quality and seven categorical parameters were evaluated with the Chi-square test. Evaluating the correlation coefficient, $r:0–0.24$ was considered as poor, $r:0.25–0.49$ as moderate, $r:0.50–0.74$ as strong, and $r:0.75–1.0$ as very strong. The Cronbach α value was calculated to evaluate the compliance between the observers. Cronbach $\alpha < 0.5$ was considered as unacceptable, $0.5 \le \alpha < 0.6$ as poor, $0.6 \le \alpha < 0.7$ as acceptable, and $0.7 \le \alpha < 0.9$ as excellent. $p < 0.05$ values were considered statistically significant.

3. Results

The average video duration was 9.14 ± 12.64 (Range: 1–60) with an average number of views of 76782 ± 84920 (Range: 356074–11924) and daily views of 43.5 ± 48.2 (Range: 4–240). The mean number of comments was 54.8 ± 31.8 (Range1–509) and the average positivity was 502 ± 690 (Range:6–3446), against average negativity of 35 ± 11.1 (Range:16–64), mean VPI score was 92.6 ± 7.3 (Range 64–100) (Table 1).

Video uploaders consist of 27 physicians, 7 health channels, 6 physiotherapists, 4 patients, 4 hospital channels, 1 chiropractic, 1

Table 1
Data of videos.

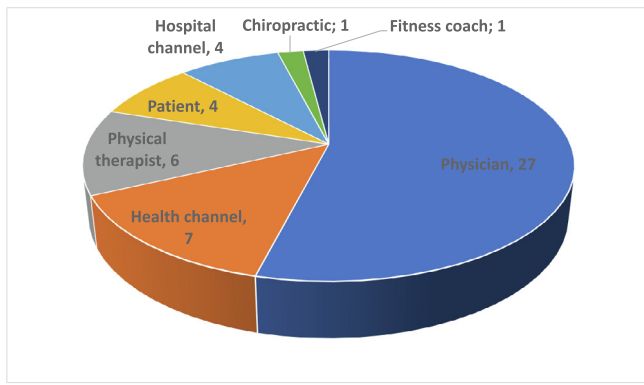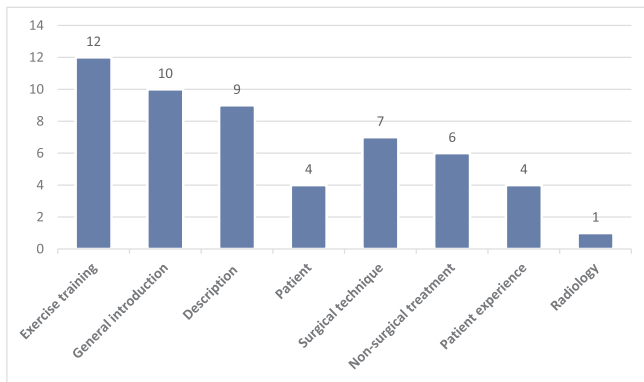|	Mean ± Std	Min-Max
Video Length (min)	9.14 ± 12.64	1–60
View Count	76782,9 ± 84920	11924–356074
Daily View Count	43.5 ± 48.2	4–240
Like Count	502 ± 690	6–3446
Dislike Count	35 ± 11.1	16–64
Comment/year	18,8 ± 31.8	1–140
VPI	92.6 ± 7.3	64–100
DISCERN	35 ± 11.1	16–64
JAMA	2.7 ± 0.6	1.5–4
GQS	2.84 ± 1.05	1–4

Fig. 2. Video Uploaders.

Fig. 3. Videos content.

fitness coach (Fig. 2). Video content; 12 exercise training, 10 general information, 9 description, 4 patients experience, 7 surgical technique, 6 nonsurgical treatment, 1 radiological information (Fig. 3).

The mean JAMA score was 2.7 ± 0.6 (1–4), the mean DISCERN score was 35 ± 11.1 (16–64) and the mean GQS score was 2.84 ± 1.05. DISCERN score was 30% very poor (n:15), 40% poor (n:20), 20% average (n:10), 8% good (n:4) and 2% excellent (n:1) (Fig. 4). DISCERN, JAMA, and GQS scores positive correlate among themselves (Table 2).

In linear regression analysis, there was a significant difference between the duration of the videos, the view counts and the video quality scores (DISCERN and JAMA) ($p < 0.05$), no significant difference was observed between the daily view counts, like counts, dislike counts, VPI and comment count ($p > 0.05$) (Table 3).

There was a statistically significant difference between uploaders, view counts and video length of videos in terms of video quality (DISCERN, JAMA, GQS) ($p < 0.05$) whereas no significant difference
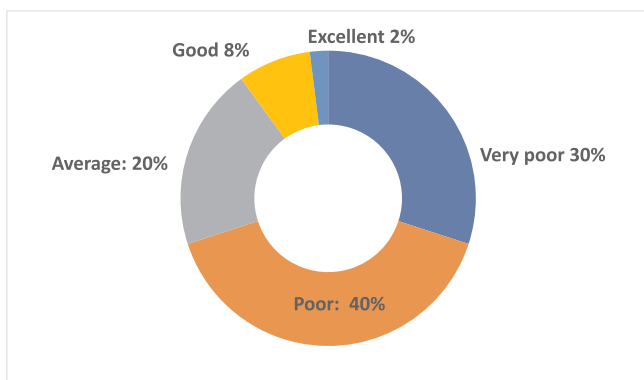

Fig. 4. DISCERN Score.

Table 2
Correlation of videos quality score.

	DISCERN	JAMA	GQS
DISCERN	1	0.740	0.703
JAMA	0.740	1	0.428
GQS	0.703	0.428	1

Table 3
Linear regression analysis countable parameters.

	DISCERN	R	JAMA	R	GQS	R
Video length	0.002*	0.436	0.000*	0.504	0.252	0.78
View count	0.048*	0.230	0.041*	0.289	0.470	0.104
Daily view count	0.358	0.146	0.397	0.308	0.123	
VPI	0.795	0.044	0.751	0.70	0.879	
Comment count	0.782	0.049	0.942		0.788	

is seen between daily view counts, VPI, comment/year, upload dates of the videos. Videos uploaded by physicians, second 25 videos by view count, longer videos have higher quality whereas videos uploaded by non-physicians, first 25 videos by view count, shorter videos have lower quality (Table 4).

4. Discussion

Misinformation is rampant in the internet; while it can cause patients to make wrong decisions, it may also cause conflicts in the patient-doctor relationship [16,17]. Video portals are used frequently and it is thought that the frequency of its use in the future will increase and exceed the search engines [18]. YouTube is the most widely used video portal, and also it provides information exchange with more than 1 billion views every month [19]. In this study, the quality of the top 50 most viewed videos on YouTube on spondylolisthesis was evaluated and features of low-quality videos are investigated. Quality of YouTube videos on spondylolisthesis was found to be poor and videos uploaded by non-physician users, shorter videos, and more popular videos found to havelower quality.

Our study is not the first study to evaluate YouTube video quality [4–9]. Other studies evaluating YouTube video quality also include similar study protocols, and the emphasis is often placed on low video quality [20]. Gokcen et al. evaluated lumbar region pathologies with 50 most viewed videos on spinal stenosis. They achieved low DISCERN and JAMA scores with high correlation among observers [8]. Kuru et al. could not find any perfect results according to DISCERN and most of the videos were found to have poorquality [6]. In our study, 1 video was evaluated as excellent, while 70% of the videos were found to have poor and very poor quality and it was similar to the literature.

In our study, 3 accepted scoring systems were used to evaluate video quality: DISCERN, JAMA, and GQS. The difference in the question content of these scores attracted the attention of the observers and aroused curiosity about the correlation of the scores. Interobserver reliability was high, similarto the literature [8]. Correlation of the scoring systems (Table 2) could not be presented in the literature. In our study, a high correlation was presented as a result of the reliability of the scores.

Except for a few studies, about 50% of video uploaders consist of physicians, and the quality of these videos is found to be high [6]. In our study, 54% of the video uploaders were physicians, which have relatively higher quality, however, DISCERN scores were mostly average and poor even in videos uploaded by physicians. Doctor uploaders need to improve themselves in this regard.

The other findings of our study are shorter videos have lower quality and do not have enough information. There is a negative correlation between view count, daily view count, and video quality. This

Table 4
Relationship between seven categoric variables and video quality.

		DISCERN	p	JAMA	p	GQS	p
Physicians	27	40.1 ± 10.7	0.000*	3 ± 0.5	0.000*	3.2 ± 1	0.001*
Non-Physicians	23	28.9 ± 8.1		2.3 ± 0.47		2.4 ± 1	
Old videos (> 5 years)	22	33.8 ± 10	0.591	2.6 ± 0.6	0.644	2.9 ± 1.1	0.639
New videos (< 5 years)	28	36.4 ± 11		2.7 ± 0.5		2.7 ± 1	
View count first 25	25	31.3 ± 8.2	0.033*	2.4 ± 0.4	0.005*	2.8 ± 1	0.715
View count second 25	25	38.3 ± 12		2.9 ± 0.6		2.88 ± 1.1	
Daily view count < 50	22	35.5 ± 10	0.814	2.76 ± 0.6	0.692	2.88 ± 0.9	0.540
Daily view count > 50	28	34.5 ± 12		2.6 ± 0.6		2.8 ± 1.1	
Video length < 5	18	30 ± 7.9	0.043*	2.3 ± 0.6	0.007*	2.6 ± 1	0.638
Video length 5-10	19	35 ± 9.5		2.8 ± 0.5		2.9 ± 1.1	
Video length > 10	13	40.8 ± 14.3		3 ± 1		3 ± 1	
VPI < 95	25	34.5 ± 12	0.662	2.64 ± 0.6	0.450	2.8 ± 1.1	0.871
VPI > 95	25	35.4 ± 10		2.88 ± 0.9		2.88 ± 1.1	
Comment < 50	30	34.5 ± 12	0.715	2.64 ± 0.6	0.937	2.8 ± 1.1	0.791
Comment > 50	14	35.4 ± 10		2.76 ± 0.6		2.88 ± 1	

means that the most viewed videos may be misinformative and high-quality videos are not popular. There are also studies reporting that useless videos are more popular than useful videos [21,22]. The literature emphasized not only the number of views of the videos but also the time elapsed since the videos were uploaded [23]. There was no significant relationship between the like counts, dislike counts, comment counts, and VPI and quality of the videos, and these parameters don't correlate with the video quality.

Spondylolisthesis is seen isolated or with other spinal deformities that occurs at different ages for different reasons and it has two main types; isthmic and degenerative. Indications for surgery, conservative treatment options, and prognosis of the disease are subjects with separate subtitles. Patients are mostly curious about disease progression and treatment options. When the videos are analyzed, only 20% of the videos (n: 10) have detailed information, while 80% (n: 40) address specific topics. Only 5 of these 10 videos have information about the subtypes and prognosis of spondylolisthesis and lack of this information is the main defect in most of the videos.

There are limitations to this study. Our analysis was limited to content on YouTube, and other video-hosting sites may have videos with greater educational quality. Different search results are possible at different times. This study includes only English speaking videos. No grading system was used to assess misinformation.

5. Conclusion

The video quality of videos on Spondylolisthesis on YouTube was found to be low. Especially videos by non-physician uploaders, short videos, most viewed videos were found to have low quality.

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Declaration of Competing Interest

The authors 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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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.inat.2020.100827.

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