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ORIGINAL ARTICLE

Is YouTube a reliable source for athletic taping?

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Abstract

Background Taping has a critical role in athlete health.

Aims To evaluate the quality, characteristics and reliability of the most viewed taping videos in YouTube.

Methods Uploaded videos were searched with "athletic taping" and "rigid taping" keywords in YouTube. The educational content quality of the videos was assessed using the Global Quality Scale (GQS), and reliability was evaluated using the Journal American Medical Association (JAMA) benchmark criteria. Video uploaders (source) were divided into three groups (physiotherapists (PT), athletic trainers (AT) and non-PT/AT) and compared in terms of video quality, reliability and characteristics.

Results 82 videos were included in the study. The mean JAMA score of the videos was 2.91 ± 0.89 and GQS score was 4.06 ± 0.87. A significant difference was found among video uploading groups base on days since upload, number of views, daily views, dislikes, like ratio, and JAMA and GQS scores ($p < 0.05$). Less number of days since upload was found for AT videos versus PT and non-PT/AT videos ($p = 0.007$, $p = 0.007$). The number of views and daily views were higher for PT videos than AT videos ($p = 0.004$, $p = 0.017$). The number of dislikes was also higher for PT videos compared to AT videos ($p = 0.017$), with no significant difference versus non-PT/AT group ($p < 0.05$). Non-PT/AT videos showed a greater like ratio than PT videos ($p = 0.022$). PT videos had higher JAMA and GQS scores compared to AT and non-PT/AT videos ($p = 0.001$ vs. $p = 0.001$, $p = 0.010$ vs. $p = 0.001$).

Conclusion YouTube can be regarded as a useful platform that provides high quality and reliable videos on athletic taping.

Trial registration ClinicalTrials.gov Identifier: This study does not include any human participants or animals.

Keywords Taping · Athletes · YouTube · Source · e-health

Abbreviations

sec	Second
GQS	Global Quality Scale
JAMA	Journal of the American Medical Association
PT	Physiotherapist
AT	Athletic trainer
non-PT/AT	Other uploaders

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Introduction

Taping is used by athletes in rehabilitation, training or games to alleviate pain and maintain functionality in sports injuries [1, 2]. Prophylactic and therapeutic effects of taping have been demonstrated in different parts of the body [2, 3]. The mechanical and physiological effects of taping include mainly reduced inflammation, correction, altered muscle activation and restriction of joint movements [4, 5].

There are many illustrated books that contain basic and technical information on taping methods. In addition to printed materials, internet has recently become an important

tool to access information. In parallel with the use of internet for social purposes and entertainment, internet is increasingly used to access online health information easily and quickly [6]. It has been reported that almost half of the adult population prefer internet to access health information [7]. Globally, YouTube is the most popular video hosting website that allows users to upload, view and share videos. With its vast amount of free video content, YouTube is regarded as an effective tool for acquiring and dissemination of health-related information. YouTube can be a resource for educating athletes and sedentary people, getting information about injuries and even learning taping techniques [8]. However, there are some concerns about the quality and content of the videos featured on this digital platform [9]. Verification of the scientific content, information quality and accuracy of shared videos is limited, raising doubts on their reliability and credibility [9, 10]. It was stated that there are videos containing contradictory and misleading health information on YouTube as well as videos providing high quality information [11].

To our best knowledge, there is no study investigating the content of YouTube videos on athletic taping. The accuracy and quality of YouTube videos presenting information on taping and taping demonstrations have not been previously assessed. The aim of the present study was to evaluate the quality, characteristics and reliability of the most viewed taping videos in English.

Methods

For this descriptive study, the keywords "athletic taping" and "rigid taping" were used to search for videos on YouTube. Videos uploaded on YouTube (www.youtube.com) website at any time were searched on February 17, 2021. Videos in English were searched for each keyword separately on YouTube (www.youtube.com) website and the first 50 videos were examined. The first 50 videos were included in the study because they were more popular videos viewed by the majority of the users [12]. A total of 100 videos were evaluated and videos that were non-English, poorly accessible, irrelevant, duplications and uploading time was more than 15 years were excluded. Approval for the study was obtained from the Ethics Committee for Non-Interventional Research Studies of Hasan Kalyoncu University Faculty of Health Sciences (No. 2021/009).

Classification of videos by their source

The source (uploaders) of the YouTube videos was categorized as academician, physician, physiotherapist (PT), athletic trainer (AT), athlete, trainer, healthcare organization, commercial and other. In cases where an appropriate statistical analysis was not possible, video uploaders were categorized as PT, AT and non-PT/AT (other) to allow for comparisons of video parameters.

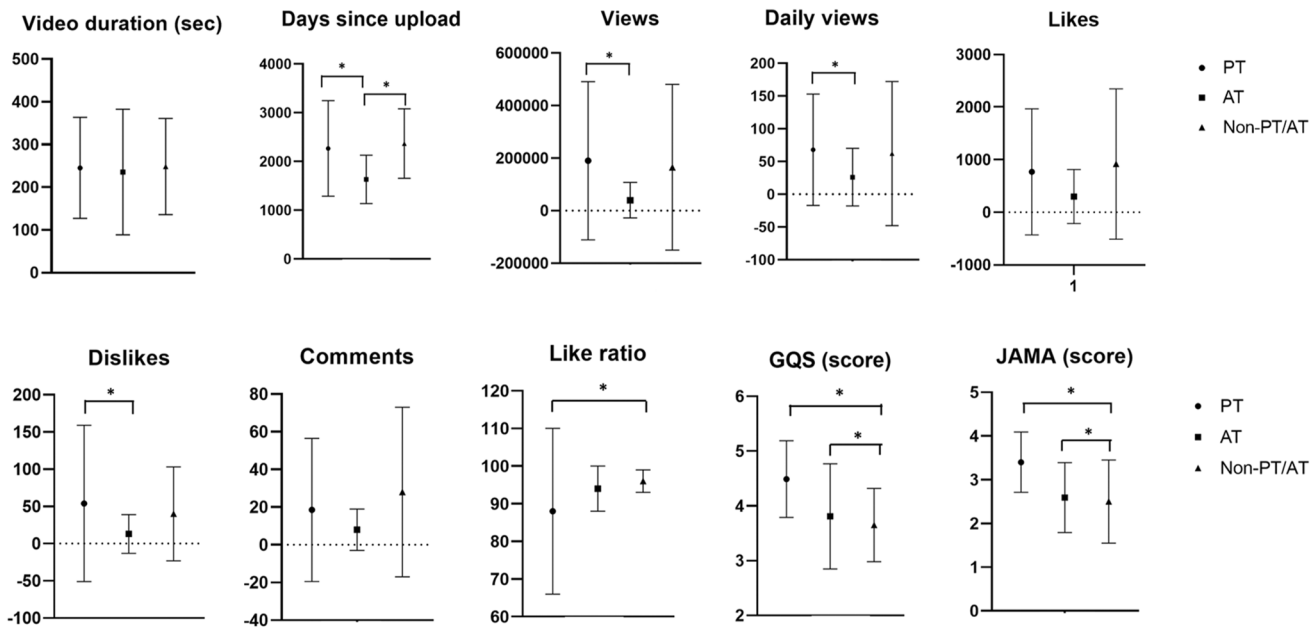

Fig. 1 The comparison of video characteristics among groups. Significant between group differences (*$p < 0.05$) can be observed

Evaluation of videos

Video characteristics

The video characteristics were retrieved from the pages viewed: title, duration, taping area, number of views, days since upload, view ratio (number of views/number of days since upload), number of likes, number of dislikes, like ratio (number of likes × 100/(number of likes + number of dislikes)).

The content, educational quality and reliability of the selected YouTube videos were evaluated independently by two researchers (SK, ÖT) [13, 14]. In the absence of consensus, the video was watched by a third researcher (YY) without their knowledge of previous score, and final decision was made [12, 13].

Quality

The materials used in the taping videos were examined in terms of positions, techniques and correct holding patterns. In addition to these contents, the educational content quality of the videos was assessed using the Global Quality Scale (GQS), a tool used for evaluating the quality of Internet resources [15]. The GQS is a Likert scale with scores ranging from 0 to 5 points. In this scale, a high quality video is assigned a score of 4 (good) or 5 (excellent) points, a moderate quality video gets a score of 3 points and a poor quality video is scored 1 or 2 points [15] (Table 1).

Accuracy and reliability

The reliability of the information provided by the videos was assessed using The Journal American Medical Association (JAMA) benchmark criteria [16]. The JAMA benchmarks uses four core criteria (Table 2) and 1 point is assigned for each criterion met. A score of 4 points denotes high accuracy and reliability, whereas 0 points indicate poor accuracy and reliability.

Statistical analysis

Descriptive statistics were summarized as mean ± standard deviation, number and percentage. Whether the data followed a normal distribution was checked using the Shapiro–Wilk test. The Kruskal–Wallis test was used to compare non-normally distributed data for video uploading groups PT, AT and non PT/AT. Differences among the groups were determined using post hoc pairwise (Dunn's correction) comparisons. The consistency between the two researchers was assessed using the kappa coefficient. The SPSS, version 24.0 (IBM Corp. Armonk, NY, USA) was used for statistical analysis and a p value less than 0.05 was considered statistically significant.

Results

A total of 100 videos were examined in the present study. Eighteen videos were excluded: 15 videos were repetitive (duplications), 2 videos contained irrelevant information and 1 video did not play. Ultimately, 82 videos were included in the study. Intraobserver reliability was 0.82 for the JAMA score and 0.88 (95% CI) for the GQS score. Video characteristics and JAMA and GQS scores are shown in Table 3.

The videos were mostly uploaded by physiotherapists (40.2%) and athletic trainers (24.4%). There was no video uploaded by an athlete or trainer. The most common taping area was the ankle (42.7%), followed by the knee (19.5%).

Table 1 Global quality scale

Score	İtem
1	Poor quality, poor flow, most information missing, not helpful for patients
2	Generally poor, some information given but of limited use to patients
3	Moderate quality, some important information is adequately discussed
4	Good quality, good flow, most relevant information is covered, useful for patients
5	Excellent quality and excellent flow, very useful for patients

Table 2 JAMA benchmark criteria

Criteria	Description
Authorship	Author and contributor credentials and their affiliations should be provided
Attribution	All copyright information should be clearly listed, and references and sources for content should be stated
Currency	The initial date of posted content and dates of subsequent updates to content should be provided
Disclosure	Conflict of interest, funding, sponsorship, advertising, support, and video ownership should be fully disclosed

Table 3 Video characteristics

	Mean ± SD	Min–max
Video duration (sec)	242.8 ± 125.78	41–547
Days since upload	2081.4 ± 839.3	603–4324
Views	134,467.9 ± 259,663.3	250–1,443,293
Daily views	53.1 ± 83.3	0.24–457.91
Likes	650.8 ± 1110.06	0–5241
Dislikes	37.3 ± 78.44	0–539
Comments	17.5 ± 34.4	0–222
Like ratio	92.3 ± 15.7	0–100
GQS (score)	4.06 ± 0.87	2–5
JAMA (score)	2.91 ± 0.89	1–4

sec second, *GQS* Global Quality Scale, *JAMA* Journal of the American Medical Association, *SD* standard deviation, *min* minimum, *max* maximum

None of the taping videos contained information on hip taping (Table 4).

A significant difference was found among video uploading groups in terms of days since upload, number of views, daily views, dislikes, like ratio, and JAMA and GQS scores ($p < 0.05$). Other parameters were not significantly different among the groups ($p > 0.05$) (Table 5). Further statistical analysis showed that number of days since upload was less for the videos uploaded by athletic trainers than the videos uploaded by physiotherapists and non-PT/ATs ($p = 0.007$, $p = 0.007$). The videos uploaded by the physiotherapists had higher number of views and number of daily views compared to those uploaded by the athletic trainers ($p = 0.004$, $p = 0.017$). The number of views and number of daily views were comparable between PT videos and non-PT/AT videos and between AT videos and non-PT/AT videos ($p < 0.05$). The number of dislikes was higher for the PT videos than AT videos ($p = 0.017$) but similar among other groups ($p < 0.05$). The like ratio was higher for non-PT/AT videos than PT videos ($p = 0.022$) but not different versus AT videos ($p < 0.05$). JAMA and GQS scores were higher for PT videos than those for AT and non-PT/AT videos ($p = 0.001$ vs. $p = 0.001$ and $p = 0.010$ vs. $p = 0.001$, respectively) (Fig. 1).

Table 4 Source and content of taping videos

Source	$N = 82$	%
Academic	2	2.4
Physician	2	2.4
Physiotherapist	33	40.2
Athletic Trainer	20	24.4
Athlete	0	0
Trainer	0	0
Healthcare organization	16	19.5
Commercial	7	8.5
Other	2	2.4
Taping area		
Foot and toe	7	8.5
Ankle	35	42.7
Knee	16	19.5
Hip	0	0
Shoulder	6	7.3
Elbow	4	4.9
Wrist	8	9.8
Hand and thumb	6	7.3
Uploaded year		
2009	1	1.2
2011	7	8.5
2012	3	3.7
2013	14	17.1
2014	7	8.5
2015	12	14.6
2016	15	18.3
2017	9	11
2018	11	13.4
2019	3	3.7

Discussion

Sharing information about athlete health on Internet is growing quickly. During the global pandemic, e-health has also become popular worldwide, offering educational, practical and visual materials. It was reported that 238 million Americans with access to the Internet search online health information at least once a month and more than half of them do not trust the information they obtain [17]. YouTube is the most popular social media platform over 2 billion views each day where information on the etiology, prevention, diagnosis and treatment of diseases is shared [11]. On YouTube, videos can be easily uploaded by the users but the lack of regulations or policies to verify the quality, content and accuracy of the information disseminated by the videos is a major shortcoming. Presentation of health-related videos to users without verifying the knowledge, expertise or education of the uploaders about medical issues may result in circulation of incorrect or misleading information. Since the publication of the first study on the quality of YouTube videos in 2007, many studies have examined the quality of videos on various health conditions [11]. The quality of taping videos on YouTube featuring practical demonstrations has not been examined previously.

The number of views is the most important indicator of the popularity of videos shared on YouTube. In studies examining the quality of the first 50 videos on "kyphosis" and "meniscus", the number of views was 288,597 and 131,644 respectively [12, 18]. However, studies examining

Table 5 Comparison of video characteristics among groups

	Source groups (mean ± SD)			χ^2	*p*
	PT (*n* = 35)	AT (*n* = 27)	Non-PT/AT (*n* = 20)		
Video duration (sec)	245.34 ± 118.48	235.52 ± 146.92	248.2 ± 112.51	0.317	0.853
Days since upload	2265.43 ± 980.48	1631.59 ± 497.00[a,b]	2366.65 ± 713.72	12.458	**0.002**
Views	190,000.77 ± 300,974 [a]	39,785.70 ± 67,637.52	165,106.40 ± 315,713.41	10.373	**0.006**
Daily views	68.48 ± 85.49[a]	26.33 ± 44.05	62.45 ± 110.87	7.924	**0.019**
Likes	768.69 ± 1199.77	299.44 ± 513.49	918.85 ± 1428.23	5.454	0.065
Dislikes	54 ± 105.53[a]	13.19 ± 25.99	40.6 ± 63.46	7.695	**0.021**
Comments	18.51 ± 38.06	8.26 ± 11.56	28.25 ± 45.08	2.405	0.300
Like ratio	88.18 ± 22.87	94.55 ± 5.96	96.48 ± 2.54[c]	7.965	**0.019**
GQS (score)	4.49 ± 0.70[a,c]	3.81 ± 0.96	3.65 ± 0.67	15,664	**0.000**
JAMA (score)	3.4 ± 0.69[a,c]	2.59 ± 0.80	2.5 ± 0.95	18.243	**0.000**

Bold values indicate $p < 0.05$

sec second, *GQS* Global Quality Scale, *JAMA* Journal of the American Medical Association, *SD* standard deviation, *PT* physiotherapist, *AT* athletic trainer, *non-PT/AT* other uploaders

Significant difference after Kruskal–Wallis test results and post hoc pairwise (Dunn correction) comparisons

[a] $p < 0.05$ PT versus AT

[b] $p < 0.05$ AT versus non-PT/AT

[c] $p < 0.05$ PT versus non-PT/AT

the quality of videos related to diseases such as "Sjögren's syndrome" and "ankylosing spondylitis", the number of views falls below 10,000 [14, 19]. Thus, the number of taping videos that we identified was comparable to the number of views for popular videos on general orthopedic conditions. This finding suggests that taping videos are viewed by a wide audience and highlights the importance of promoting the right educational content for those who consider YouTube as a source of information. Moreover, we believe that since taping is one of the most common methods of preventing injury among athletes, curiosity about taping has fueled a growing interest in taping videos.

Although popularity is important, the content and quality of the videos are equally important issues that need to be taken into account. Interestingly, the mean JAMA and GQS scores of the taping videos examined in this study (2.91 and 4.06, respectively) were higher than those for kyphosis videos (1.36 and 1.68) and meniscus (1.55 and 2.12) videos with a very high number of views [12, 18]. We think that this may be related to the fact that taping videos (53%) were mostly uploaded by physiotherapists and athletic trainers. This finding might differentiate our study from aforementioned studies because in those studies, the reason for low number of views was identified as uploading of the videos by persons who are not physicians or healthcare providers. In a study examining the quality of videos searched using the keywords "anterior cruciate ligament" or "ACL", poor content quality was found for the majority of the videos, suggesting that videos providing information on orthopedic conditions may not be reliable [20]. However, based on the results of our study, YouTube currently seems to be an appropriate source of information to educate athletes, students or patients due to its high quality video content and reliability. In a systematic review investigating the healthcare information shared on YouTube, several strategies were proposed to help patients develop "skills to access, understand and use existing information effectively" and it was concluded that YouTube may be used as a very effective source of information if informed search practices are followed [11]. From this standpoint, contrary to the studies which suggested that the use of YouTube videos for accessing health information would be inappropriate due to poor content quality [21, 22], our study reveals the importance of uploading of the videos by healthcare professionals, as recommended by the systematic review mentioned above.

Taping videos mostly included ankle and knee taping. This may be related to the ease of taping lower extremity (compared to proximal joints), its effectiveness and the fact that most injuries occur at these anatomic sites. The absence of hip taping videos on YouTube lends support to this argument.

Individuals viewing videos on YouTube can click the like or dislike button and make comments about videos. In the current study, differences were found in the number of daily views, like ratio and number of dislikes among the video uploaders. Compared to the videos uploaded by athletic trainers, the number of views and daily views were higher for the videos uploaded by physiotherapists but the number of dislikes was also higher. This may be explained by less number of days since upload for AT

videos, meaning that AT videos were more up to date. Furthermore, although the like ratio was similar between PT and AT videos, PT videos had a lower like ratio than that of non-PT/AT videos. The content and quality of the videos uploaded by physiotherapists were better compared to the videos uploaded by ATs and non-healthcare professionals. Through their education, physiotherapists and athletic trainers gain a different set of skills to improve athlete health and rehabilitation. Thus, their educational background and professional skills may have contributed to better quality and content of the videos they upload compared to other groups. It is known that videos uploaded by healthcare professionals have a significantly higher quality than those uploaded by persons without credentials or those that present patient experience [23–25]. Considering the similar pattern of taping between PTs and ATs, their differential social engagement skills or attitudes may have affected viewers' response. Further studies are needed to corroborate our findings.

This study has a number of limitations. Firstly, we evaluated video quality using subjective tools, JAMA and GQS, and conducted a search for videos in English only. Nevertheless, there is no established system for assessing video quality and other studies have also used these measurement methods. Perhaps the major limitation of our study is the low number of videos but considering that Internet users generally tend to access information in the first 2 or 3 pages, this may be acceptable.

Conclusion

YouTube can be regarded as a useful platform that provides high quality and reliable videos on athletic taping. Physiotherapists and athletic trainers may guide athletes and students on how to use YouTube appropriately to discriminate useful from misleading information. Athletic trainers can work to improve the quality and content of their videos and physiotherapists may consider developing their social engagement skills to increase their like ratios.

Author contributions SU: conception and design, writing manuscript, editing and final approval of manuscript, draft the manuscript. SK: data collection, critical review of manuscript. ÖT: data collection. YY: statistical analysis of data.

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Code availability Not applicable.

Declarations

Conflict of interest All authors declare that they have no conflict of interest.

Ethical approval This study was approved by the Ethics Committee for Non-Invasive Research Studies of Hasan Kalyoncu University Faculty of Health Sciences (approval number 2021/009).

Informed consent Not applicable.

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