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The quality and reliability of YouTube videos on All-on-four concept

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ABSTRACT

The quality and reliability of YouTube videos on All-on-four concept

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Purpose. The purpose of this study was to evaluate the quality of popular videos available on YouTube related to the all-on-four implant concept. **Materials and Methods.** Videos containing information relevant to all-on-four implant were searched on YouTube on July 7, 2020. The videos were listed using the advanced search option 'sort by view-count' and the top 60 videos, which met the criteria and with duplications removed, were analyzed. The DISCERN instrument and JAMA benchmarks were used to evaluate selected videos. Statistical analysis was performed to evaluate the DISCERN scores according to the producer groups. **Results.** Based on DISCERN score, 39 videos were rated as poor and very poor, while only one video rated as good. Videos produced by dentists showed statistically significantly higher DISCERN score than videos produced for commercial use or by unknown. All videos met the criteria for authorship and currency of JAMA benchmark. However, the number of videos with reference and copyright displayed was very small at 16%. Also, the disclosure percentage related to sponsorship and financial support was 53.33%. **Conclusion.** Within the limitation of this study, YouTube was an inappropriate information source about all-on-four concept. Patients need to be careful not to completely trust dental information that they search on YouTube, and dentists will have to upload relevant and reliable information using evaluation criteria such as DISCERN and JAMA benchmark.

Key words : Dental Implants, Internet-Based Intervention, Social Media, Health Information Systems

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I . Introduction

After the concept of osseointegration was introduced by Brånemark, with the continuous development of technology, dental implant treatment in partially or completely edentulous patients has become one of the most reliable treatment methods. Clinicians are now able to present a satisfactory level of treatment options to patients who have had limitations in treatment esthetically and functionally by using various prosthesis types of implants¹⁾. The long-term success rate of dental implants in both fixed and removable prosthesis have been well studied. In previous studies, dental implant showed a high success rates and good patient satisfaction, regardless of the type of prosthesis^{2~5)}.

The “all-on-four” implant concept was introduced for the efficient use of residual alveolar bone in fully edentulous patients, allowing immediate loading and avoiding bone graft procedures that increase the cost of treatment and surgical complexity, as well as the complications associated with these procedures⁶⁾. The protocol involves a single-unit fixed provisional prosthesis supported by four implants. Two axially oriented implants are positioned in the anterior region and two tilted implants in the posterior region^{7,8)}. These treatment concepts have shown predictable results in patients with severely atrophic bones, and are presented as one of the most useful treatment option in many dental clinics⁹⁾. However, it is difficult for common patients to understand the concept of all-on-four treatment method. In addition, there is insufficient dental information acces-

sible to patients about the advantages and disadvantages of the all-on-four compared to conventional implants or dentures, and whether there are alternative treatment plans.

Traditionally, medical and dental information has been obtained by face-to-face consultation with doctors and dentists. However, with the rapid development of technology in modern society, the Internet has become a major source of information in personal life¹⁰⁾. According to the announcement by the International Telecommunication Union in 2020, one-third of the world's population currently uses the Internet through computers and mobile devices and the number of users continues to grow¹¹⁾. When people need information, they can quickly and easily get information by entering search terms into various Internet sites. As with all other sectors of society, it is common for people to use online resources to access medical information¹²⁾.

YouTube, a video streaming websites, is the most popular platform for patients seeking access to healthcare information as well as general content¹³⁾. YouTube users are free to watch videos, and anyone can upload them based on a variety of topics. However, these videos are not peer-reviewed, and since they are uploaded from various information sources, it is reported that there is a large deviation in quality¹⁴⁾. Several studies have evaluated the quality of information of YouTube videos about various healthcare areas and have concluded that these videos often contain incomplete and misleading information^{15,16)}.

Therefore, the purpose of this study was to eval-

uate the quality of the most popular videos available on YouTube related to the all-on-four implant concept. The first null hypothesis was that YouTube videos on all-on-four concept contain misleading or incomplete information. The second null hypothesis was that there is no difference in video quality depending on whether the producer is a dentist or not.

II. Materials and Methods

This study did not require approval from the local institutional review board because it used only publicly available data. Videos containing information relevant to all-on-four implant were searched on YouTube on July 7, 2020. The following individual search terms were used: all-on-four, all-on-four implant, all-on-4, and all-on-4 implant. The following inclusion criteria were applied as reported by previous studies^{17,18}: English language; content directly related to all-on-four; and acceptable visual and voice quality. Exclusion criteria for videos were as follows: non-English language; lacking visual or voice; and lasting greater than 15 minutes. The 15-minute video duration was chosen according to previous studies, as longer videos are unlikely to keep the attention of online viewer¹⁸. The videos were listed using the advanced search option 'sort by view-count'. The top 60 videos, which met the criteria and with duplications removed, were analyzed and the following parameters were recorded for all videos: view count; duration; uploaded date; producer (Table 1). Producer was classified by 'dentist', 'commercial', or 'unknown'.

tist', 'commercial', or 'unknown'.

The DISCERN instrument and JAMA benchmarks were used to evaluate selected videos. The DISCERN is a simple questionnaire that provides users with a valid and reliable way to evaluate the quality of written information about treatment options for health problems. It consists of a total of 16 questions, each of which is scored from 1 to 5. If the answer to the question is definitely 'yes', 5 points are given. If the video is considered to meet the criteria of the question to some extent, a partial score (2-4 points) is given. 1 point is given if the answer to the question is definitely 'no'. Questions are classified into 3 main categories: reliability, quality information about treatment options, and overall score. Questions 1-8 address the reliability of the publication and help you consider whether it can be trusted as a source of information for treatment options. Questions 9-15 focus on specific details of information about treatment options. Question 16 is the overall quality rating. Using DISCERN score, all videos were classified into 5 groups (very poor, poor, fair, good, or excellent).

The JAMA benchmarks aim to critically analyze the reliability and usefulness of healthcare-related information on the Internet. It evaluates the following four key factors that should be clearly stated on a website: authorship; attribution; disclosure; and currency¹⁹. Authorship requires the authors and contributors to provide their affiliations and credentials. Attribution relates to all relevant copyright information, as well as references and sources. Disclosure is assessed on whether website ownership

Table 1. Details of the 60 YouTube videos used in this study

YouTube address	View count	Duration	Date	Producer
https://www.youtube.com/watch?v=KmSXZIOG0gc&t=2s	2485620	3m 29s	17.05.09	Commercial
https://www.youtube.com/watch?v=KT6y0owcoho	784605	3m 31s	14.06.03	Dentist
https://www.youtube.com/watch?v=c_v9wC18ZUk	716639	8m 12s	18.07.25	Dentist
https://www.youtube.com/watch?v=Ushnj78EvH4&t=1s	628966	1m 41s	16.10.10	Commercial
https://www.youtube.com/watch?v=t7iSPmnxKbg	605884	4m 39s	17.02.08	Dentist
https://www.youtube.com/watch?v=Ek6NMY4Je9g	362587	13m 42s	16.12.21	Commercial
https://www.youtube.com/watch?v=m9X26G1lrHg	328308	10m 15s	19.11.04	Dentist
https://www.youtube.com/watch?v=n2d1p2ZdIN8	312853	1m 57s	17.08.05	Commercial
https://www.youtube.com/watch?v=w1HOjdBMBG0	249528	3m 06s	17.04.13	Commercial
https://www.youtube.com/watch?v=HT1eigG3SRQ	221002	7m 32s	11.01.20	Commercial
https://www.youtube.com/watch?v=OWL176rpAqs	222846	4m 44s	18.08.25	Commercial
https://www.youtube.com/watch?v=uZmsKG-8Ba0	214659	4m 31s	16.03.23	Dentist
https://www.youtube.com/watch?v=941ITDZC_pE	196479	5m 26s	12.02.06	Dentist
https://www.youtube.com/watch?v=Xx9sie4n-1U	195628	11m 37s	17.06.12	Dentist
https://www.youtube.com/watch?v=CdZEPfteuac	192420	5m 14s	16.03.23	Commercial
https://www.youtube.com/watch?v=snIMlgPhyV/k	161013	12m 25s	17.06.02	Dentist
https://www.youtube.com/watch?v=SzO7KvOLPzs	142221	3m 1s	18.02.17	Commercial
https://www.youtube.com/watch?v=O5NwF_8TkQc	130665	14m 16s	17.09.28	Unknown
https://www.youtube.com/watch?v=K-tP1IUrnZg&has_verified=1	117965	6m 4s	13.04.26	Commercial
https://www.youtube.com/watch?v=ifbSZOoncuk	115414	8m 42s	20.01.26	Commercial
https://www.youtube.com/watch?v=ZorTqqoKxhE	115371	10m 04s	16.04.08	Dentist
https://www.youtube.com/watch?v=hTDVW5c84FA&has_verified=1	112051	11m 35s	12.05.20	Commercial
https://www.youtube.com/watch?v=69T3dNQkQc	107488	2m 42s	17.05.23	Commercial
https://www.youtube.com/watch?v=_Z73SmD7Qol	103857	8m 52s	14.05.20	Commercial
https://www.youtube.com/watch?v=x87gLfXPLQ	101653	8m 5s	11.12.06	Dentist
https://www.youtube.com/watch?v=yACbLRcYJCM	101001	2m 5s	17.10.13	Dentist
https://www.youtube.com/watch?v=G-VScRqpTtA	92940	3m 59s	20.04.14	Commercial
https://www.youtube.com/watch?v=BclznbmpRB4	86696	2m 27s	17.02.04	Commercial
https://www.youtube.com/watch?v=ZXPZpK2sX5s	85052	10m 8s	15.09.13	Dentist
https://www.youtube.com/watch?v=tT_gmoT6KvM	81363	5m 32s	13.03.24	Unknown
https://www.youtube.com/watch?v=DPbFFTbdjE	73778	4m 49s	14.06.03	Commercial
https://www.youtube.com/watch?v=kRKP9IBey0o	61402	51s	18.03.14	Commercial
https://www.youtube.com/watch?v=_8_SXbeXB_g	60819	3m 43s	17.08.12	Dentist

YouTube address	View count	Duration	Date	Producer
https://www.youtube.com/watch?v=qaQRS1owfE8	60277	1m 21s	17.11.10	Commercial
https://www.youtube.com/watch?v=b8nFCLHXiIE	58530	8m 39s	13.08.18	Unknown
https://www.youtube.com/watch?v=yMaLYumo8Jc	57520	3m 32s	16.04.10	Unknown
https://www.youtube.com/watch?v=tqS-46O6uSU	53777	6m 25s	17.01.04	Commercial
https://www.youtube.com/watch?v=WMybueWNwGw	53558	7m	16.03.03	Dentist
https://www.youtube.com/watch?v=hQieov1RItc	52105	8m 1s	13.08.20	Unknown
https://www.youtube.com/watch?v=Cgp9mDfy4PI	52266	2m 42s	17.11.11	Dentist
https://www.youtube.com/watch?v=58yzbzZJzsw	49916	2m 36s	12.03.31	Commercial
https://www.youtube.com/watch?v=jMr_Zd-4qCY	43966	2m 25s	17.02.08	Commercial
https://www.youtube.com/watch?v=wdYsls5YUXc	42422	3m 26s	14.09.17	Dentist
https://www.youtube.com/watch?v=4dDXdl33ADM	41497	4m 47s	07.05.28	Dentist
https://www.youtube.com/watch?v=p2yxHAPHTMM	36693	8m 34s	13.06.22	Commercial
https://www.youtube.com/watch?v=rzD13oad09E	34298	4m 17s	12.08.06	Commercial
https://www.youtube.com/watch?v=wKz_gbtbyD8	34036	14m 7s	17.09.24	Commercial
https://www.youtube.com/watch?v=5nhUizBiD6w	33709	5m 46s	19.04.05	Commercial
https://www.youtube.com/watch?v=koj2-HQwFlo	31720	4m 3s	12.02.10	Commercial
https://www.youtube.com/watch?v=XddtTxm8IMc	28826	7m 7s	17.01.13	Dentist
https://www.youtube.com/watch?v=msOLsLWGqHo	26789	8m 33s	17.12.20	Dentist
https://www.youtube.com/watch?v=eFH5fF4JyTc	26041	4m 3s	16.03.23	Commercial
https://www.youtube.com/watch?v=faHowDQFcjg	24788	3m 43s	16.01.08	Commercial
https://www.youtube.com/watch?v=aesXelCjgw0	24432	4m 2s	14.11.13	Commercial
https://www.youtube.com/watch?v=8_dAlmco9Fs	23479	6m 12s	14.02.15	Dentist
https://www.youtube.com/watch?v=SGYBaV-6ewA	21401	5m 11s	15.07.27	Dentist
https://www.youtube.com/watch?v=B6DI2IHGOX4	21014	2m 57s	17.12.07	Unknown
https://www.youtube.com/watch?v=AQNFzFQWQ2w	20836	8m 56s	14.5.15	Unknown
https://www.youtube.com/watch?v=9KX1p5nQpiY	20823	2m 2s	14.02.27	Dentist
https://www.youtube.com/watch?v=4Ccg6NMn0fQ	20875	2m 22s	15.06.17	Commercial

is fully disclosed as well as any sponsorship, advertising, commercial funding, or conflicts of interest. Currency requires that the website provide the dates when the content was uploaded.

Statistical analysis was performed with software

(SPSS 23.0, IBM Inc., Armonk, NY, USA) and statistical significance was set at $P < .05$. The Kruskal wallis test and Mann-whitney test were conducted to evaluate the DISCERN scores among the producer groups.

III. Results

The average score for each question of DISCERN is in Table 2. Considering the score of question 1, 2, and 3, the videos generally had a clear purpose and were highly relevant to all-on-four concept. However, the scores of questions 4 to 8 that assess the reliability of the information sources used in the video were relatively low. The treatment process and benefits of the all-on-four concept were generally well explained, but the risks of treatment were insufficient.

DISCERN score for each producer group is shown in Table 3. Based on DISCERN score, 60 videos were classified from very poor to excellent and average score for all videos was 36.90. 39 videos were rated as poor and very poor, while only one video rated as good. Videos produced by dentists showed statistically significantly higher DISCERN score than videos produced for commercial use or by unknown.

Every YouTube video shows the producer's name and the uploaded date. Therefore, all videos met the criteria for authorship and currency of JAMA benchmark. However, the number of videos with reference and copyright displayed was very small at 16.67%. Also, the disclosure percentage related to sponsorship and financial support was 53.33% (Table 4).

IV. Discussion

The present study evaluated the quality of the

YouTube videos related to the all-on-four implant concept. According to the results of this study, the first null hypothesis that YouTube videos on all-on-four concept contain misleading or incomplete information was partially accepted. The second null hypothesis that there is no difference in video quality depending on whether the producer is a dentist or not was rejected.

All-on-four implant has many clinical advantages and has been widely used as a treatment option for fully edentulous patients. However, there are limited ways in which patients can get information about specific implant treatment plans. Information is generally obtained through consultation with dentists or the Internet such as websites, blogs, YouTube, and social network services.

Among these sources of information, approximately 73% of American adults use YouTube, making it the most popular social media platform, and there are 30 million active users a day around the world²⁰). However, few studies have evaluated YouTube videos in the field of prosthetic dentistry, especially for treatment options, and are often analyzed with subjective criteria by researchers. Therefore, in this study, DISCERN tool and JAMA benchmark were used to objectively evaluate the quality of Internet information.

According to the DISCERN score of videos, only one video was rated good or higher. Also, many of the videos were rated below poor grade. Given these results, it was considered inappropriate to get information about treatment option such as all-on-four through YouTube video. Similarly, previous stud-

Table 2. Average score per DISCERN question among all YouTube videos

DISCERN Question	Mean Score (1–5)
1. Are the aims clear?	3.30
2. Does it achieve its aims?	3.30
3. Is it relevant?	3.18
4. Is it clear what sources of information were used to compile the publication (other than the author or producer)?	1.52
5. Is it clear when the information used or reported in the publication was produced?	1.37
6. Is it balanced and unbiased?	1.85
7. Does it provide details of additional sources of support and information?	1.50
8. Does it refer to areas of uncertainty?	1.43
9. Does it describe how each treatment works?	3.45
10. Does it describe the benefits of each treatment?	3.57
11. Does it describe the risks of each treatment?	2.07
12. Does it describe what would happen if no treatment is used?	1.40
13. Does it describe how the treatment choices affect overall quality of life?	3.12
14. Is it clear that there may be more than one possible treatment choice?	1.75
15. Does it provide support for shared decision making?	1.75
16. Based on the answers to all of the above questions, rate the overall quality of the publication as a source of information about treatment choices.	2.35

Table 3. Total DISCERN score according to the producer group

DISCERN Score (16–80)	Commercial (n= 31)	Dentist (n= 22)	Unknown (n= 7)	Total
16–26 (very poor)	1	0	1	2
27–38 (poor)	24	7	6	37
39–50 (fair)	6	14	0	20
51–62 (good)	0	1	0	1
63–80 (excellent)	0	0	0	0
Average DISCERN score	34.58 ^a	42.23 ^b	30.43 ^a	36.9

The different lower case letters in rows indicate significant difference ($P < .05$).

Table 4. JAMA benchmarks and percentages

JAMA Benchmarks	Number	Percentage
Authorship	60	100%
Attribution	10	16.67%
Disclosure	32	53.33%
Currency	60	100%

ies have reported that there is a limit to obtaining medical information from YouTube and other Internet websites^{21,22}. The overall score was particularly very low on questions about providing sources of information or presenting other treatment options, which means that information on YouTube is being biased.

Few of the videos evaluated in this study met the attribution of JAMA benchmark. This seems to be due to one of the features of YouTube videos, which consumes content within a short time²³. The average playtime of videos surveyed in this study was around six minutes. In order to attract viewers' attention and provide information within this limited time, the less interesting parts are excluded, and especially references are often omitted. These characteristics of YouTube result in poor reliability of information.

As the DISCERN score analysis by producer, the video uploaded by dentist was significantly high, and a considerable number of videos were rated fair. It means that YouTube videos by dentists are relatively reliable and dentists should work to provide more high-quality information to the public and patients on the Web, including YouTube.

Information on the Internet has the advantage of being easily obtained without physical limitation, especially YouTube is a tool that can efficiently provide information through video and audio in a short time. However, in the healthcare field, only clear-source and evidence-based information needs to be provided by experts, as it can have a direct impact on the health and quality of life. It is also important for dentists to explain the limitations of obtaining information on the Internet and to lead to proper information acquisition when consulting patients on prosthetic treatment plan.

Within the limitation of this study, YouTube was an inappropriate source for providing information about all-on-four concept to patients. Patients need to be careful not to completely trust dental information that they search on YouTube, and dentists will have to upload relevant and reliable information using evaluation criteria such as DISCERN and JAMA benchmark.

Conflicts of Interest

The author has no conflicts of interest to declare

참 고 문 헌

1. Steigenga JT, al-Shammari KF, Nociti FH, Misch CE, Wang HL. Dental implant design and its relationship to long-term implant success. *Implant Dent* 2003;12:306-317. [https://doi: 10.1097/01.ID.0000091140.76130.A1](https://doi.org/10.1097/01.ID.0000091140.76130.A1).
2. Adell R, Lekholm U, Rockler B, Brånemark PI. A 15-year study of osseointegrated implants in the treatment of the edentulous jaw. *Int J Oral Surg* 1981;10:387-416. [https://doi:10.1016/s0300-9785\(81\)80077-4](https://doi.org/10.1016/s0300-9785(81)80077-4).
3. van Steenberghe D, Lekholm U, Bolender C, Folmer T, Henry P, Herrmann I, et al. Applicability of osseointegrated oral implants in the rehabilitation of partial edentulism: a prospective multicenter study on 558 fixtures. *Int J Oral Maxillofac Implants* 1990;5:272-281.
4. Buser D, Weber HP, Bragger U, Balsiger C. Tissue integration of one-stage ITI implants: 3-year results of a longitudinal study with hollow-cylinder and hollow-screw implants. *Int J Oral Maxillofac Implants* 1991;6:405-412.
5. Adell R, Eriksson B, Lekholm U, Brånemark PI, Jemt T. Long-term follow-up study of osseointegrated implants in the treatment of totally edentulous jaws. *Int J Oral Maxillofac Implants* 1990;5:347-359.
6. Maló P, Rangert B, Dvårsäter L. Immediate function of Brånemark implants in the esthetic zone: a retrospective clinical study with 6 months to 4 years of follow-up. *Clin Implant Dent Relat Res* 2000;2:138-146. [https://doi: 10.1111/j.1708-8208.2000.tb00004.x](https://doi.org/10.1111/j.1708-8208.2000.tb00004.x).
7. Maló P, Rangert B, Nobre M. "All-on-Four" immediate-function concept with Brånemark System implants for completely edentulous mandibles: a retrospective clinical study. *Clin Implant Dent Relat Res* 2003;5:2-9. [https://doi: 10.1111/j.1708-8208.2003.tb00010.x](https://doi.org/10.1111/j.1708-8208.2003.tb00010.x).
8. Babbush CA, Kutsko GT, Brokloff J. The all-on-four immediate function treatment concept with NobelActive implants: a retrospective study. *J Oral Implantol* 2011;37:431-445. [https://doi: 10.1563/AAID-JOI-D-10-00133](https://doi.org/10.1563/AAID-JOI-D-10-00133).
9. Soto-Penalzo D, Zaragozí-Alonso R, Penarrocha-Diago M, Penarrocha-Diago M. The all-on-four treatment concept: Systematic review. *J Clin Exp Dent*. 2017;9:e474-e488. [https://doi:10.4317/jced.53613](https://doi.org/10.4317/jced.53613).
10. Lee JY, Lee JH, Park YH. A design and implementation of the management system for number of keyword searching results using Google searching engine. *JKIICE* 2016;20:880-886. <https://doi.org/10.6109/jkiice.2016.20.5.880>.
11. Cha YS, Hwang SM, Yang PJ. Achilles tendon injury and seasonal variation: An analysis using Google Trends. *Korean J Sports Med* 2019;37:155-161. <https://doi.org/10.5763/kjism.2019.37.4.155>.
12. Biggs TC, Bird JH, Harries PG, Salib RJ. YouTube as a source of information on rhinosinusitis: the good, the bad and the ugly. *J Laryngol Otol* 2013;127:1-6. [https://doi: 10.1017/S0022215113001473](https://doi.org/10.1017/S0022215113001473).
13. Bezner SK, Hodgman EI, Diesen DL, Clayton JT, Minkes RK, Langer JC, et al. Pediatric Surgery on YouTube™: Is the Truth Out There? *J Pediatr Surg* 2014;49:586-589. [https://doi: 10.1016/j.jpedsurg.2013.08.004](https://doi.org/10.1016/j.jpedsurg.2013.08.004).
14. Gaş S, Zincir ÖÖ, Bozkurt AP. Are YouTube videos useful for patients interested in botulinum toxin for bruxism? *J Oral Maxillofac Surg* 2019;77:1776-1783. [https://doi: 10.1016/j.joms.2019.04.004](https://doi.org/10.1016/j.joms.2019.04.004).
15. Basch CH, Brown AA, Fullwood MD, Clark A, Fung IC, J Yin. YouTube as a source of information on skin bleaching: a content analysis. *Clin Exp Dermatol* 2018;43:399-403. [https://doi: 10.1111/ced.13335](https://doi.org/10.1111/ced.13335).
16. Lena Y, Dindaroğlu F. Lingual Orthodontic Treatment: A YouTube™ Video Analysis. *Angle Orthod* 2018;88:208-214. [https://doi: 10.2319/090717-602.1](https://doi.org/10.2319/090717-602.1).
17. Ozsoy HE. Evaluation of YouTube videos about smile design using the DISCERN tool and Journal of the American Medical Association benchmarks. *J Prosthet Dent* 2021;125:151-154. <https://doi.org/10.1016/j.prosdent.2019.12.016>.
18. Nason K, Donnelly A, Duncan HF. YouTube as a patient-information source for root canal treatment. *Int Endod J* 2016;49:1194-1200. [https://doi: 10.1111/iej.12575](https://doi.org/10.1111/iej.12575).
19. Olkun HK, Demirkaya AA, Aras B. The quality of Internet information on lingual orthodontics in the English language, with DISCERN and JAMA. *J Orthod* 2019;46:20-26. [https://doi: 10.1177/1465312518824100](https://doi.org/10.1177/1465312518824100).
20. Langford A, Loeb S. Perceived patient-provider communication quality and sociodemographic factors associated with watching health-related videos on YouTube: a cross-sectional analysis. *J Med Internet Res* 2019;21:e13512. [https://doi: 10.2196/13512](https://doi.org/10.2196/13512).
21. Gokcen HB, Gumussuyu G. A quality analysis of disc herniation videos on YouTube. *World Neurosurg* 2019 Feb 2;S1878-8750(19)30246-3. [https://doi: 10.1016/j.wneu.2019.01.146](https://doi.org/10.1016/j.wneu.2019.01.146).
22. Loeb S, Sengupta S, Butaney M, Macaluso Jr JN, Czarniecki SW, Robbins R, et al. Dissemination of misinformative and biased information about prostate cancer on YouTube. *Eur Urol* 2019;75:564-567. [https://doi: 10.1016/j.eururo.2018.10.056](https://doi.org/10.1016/j.eururo.2018.10.056).
23. Xianhui C, Barry L, Ling L. A survey of current YouTube video characteristics. *IEEE Multimedia* 2015;22:56-63. [https://doi: 10.1109/MMUL.2015.34](https://doi.org/10.1109/MMUL.2015.34).