Clinical, Cosmetic and Investigational Dentistry
Dovepress
open access to scientific and medical research

Open Access Full Text Article
ORIGINAL RESEARCH

Orthodontic Elastics: A Multivariable Analysis of YouTube™ Videos

Ahmed A Alsulaiman[1], Osama A Alsulaiman[1], Reem I Alkhateeb[2], Luba AlMuhaish[2], Maher Alghamdi[2], Essam A Nassar[1], Naif N Almasoud[1]

[1]Department of Preventive Dental Sciences, College of Dentistry, Imam Abdulrahman Bin Faisal University, Dammam, Kingdom of Saudi Arabia; [2]College of Dentistry, Imam Abdulrahman Bin Faisal University, Dammam, Kingdom of Saudi Arabia

Correspondence: Ahmed A Alsulaiman, Department of Preventive Dental Sciences, College of Dentistry, Imam Abdulrahman Bin Faisal University, P. O. Box 1982, Dammam, 31441, Kingdom of Saudi Arabia, Tel +966138574928, Fax +966138572624, Email abalsulaiman@iau.edu.sa

Background/Purpose: Whether YouTube videos contain precise and adequate information on certain orthodontic procedures remains unclear. This study aimed to investigate the content and quality of YouTube videos on orthodontic elastics and identify the predictors of high-level content YouTube videos.

Materials and Methods: Two hundred YouTube videos were screened for eligibility, and after applying the inclusion criteria, 133 videos were excluded. Student's *t*-test was used to compare the characteristics, quality parameters, and total content of the low-level and high-level content videos. Chi-square or Fisher's exact tests were implemented to identify the source and content element differences across low-level and high-level content videos. Pearson's correlation coefficients were used to determine the relationship between the total content score, video information and quality index (VIQI), and YouTube characteristics. Stepwise linear multiple regressions with forward selection were used to test the association of the YouTube characteristics and VIQI with the total content score.

Results: Among 67 included videos, only 19.4% of videos were classified as high-level content videos. High-level content videos had significantly higher mean number of likes (MD = 4041.7; SD = 4680.7; P-value=0.0068), VIQI score (MD = 4.17; SD = 4.87; P-value=0.0073), and total content score (MD = 4.04; SD = 1.23; P-value=<0.0001). The adjusted linear regression model demonstrated a significant association between the total content score and VIQI, where 1 unit increase in the VIQI was significantly associated with a 0.16 increase in the total content score (B = 0.16; standard error [SE]=0.04; P = 0.0003). Further, a significant association was observed between the total content score and video duration, where 1 minute increase in the video duration was significantly associated with a 0.15 increase in the total content score (B = 0.15; SE = 0.05; P = 0.008).

Conclusion: This study demonstrated that YouTube content quality concerning orthodontic elastics is poor. Thus, future implementation of online visual content provided by certified orthodontists will ensure accurate and thorough information delivery.

Keywords: dentistry, orthodontics, social media, youtube, patient compliance

Introduction

Orthodontists regularly use inter-arch and intra-arch intraoral elastics as an active treatment component and a valuable additional auxiliary for a successful orthodontic outcome. Elastics, together with good patient cooperation, assist in correcting certain types of malocclusions, namely: 1. anterior-posterior discrepancies, 2. transverse discrepancies and, 3. vertical discrepancies.[1,2] At the time of elastic prescription, the Orthodontists' role is mainly to educate, encourage, and maintain compliance by reinforcing appropriate elastic use and wear, as this is a significant indicator for treatment success.[2] If noncompliance is encountered in elastic use and wear, there will be an increase in the treatment duration, which potentially imposes a compromise on the desired orthodontic outcome.[3]

Conventionally, patients obtained health-related information and instructions via their treating health care professional. This dynamic has changed in recent years with the development of the internet where it was found that about two-thirds of patients seek health-related information on the internet.[4] With the ease of internet access, the Orthodontists dissemination of information is not the only source patients rely on. Patients usually look for some advice from friends,

Received: 23 January 2024
Accepted: 3 May 2024
Published: 7 May 2024

relatives, and mainly from the internet about various treatments.[5] Aside from face-to-face patient-clinician and patient–patient interaction, the internet is a significant source of knowledge in the dental and medical fields.[6] In fact, patients tend to read articles or watch online videos regarding their health problems.[7]

Social media provides an accessible platform for patients to seek knowledge about their health concerns.[5] With over than two billion clients and billions of daily views, YouTube is considered one of the main sources of online information.[8] When compared to other social media platform, YouTube uniquely provides audio and visual communication that brands it as freely available to all individuals worldwide.[9] Thus, YouTube is a powerful educational tool that orthodontists can utilize to attain and maintain orthodontic patient compliance. Clinicians should instruct their patients on how to appropriately use social media while receiving the treatment. It is important to note that not every YouTube video includes precise and adequate information on a certain issue, and some may even contain misleading information. Hence, healthcare providers must attentively listen to the patients and provide them with accurate information by emphasizing them again.[7]

Currently, there is limited evidence examining the dissemination, content, and quality of YouTube videos regarding orthodontic appliances, with only a limited number of studies available.[5,10–14] Notably, one study conducted a descriptive analysis focusing on the content and quality of YouTube videos specifically addressing orthodontic elastics.[14] Nevertheless, despite these investigations, to date, there has been a notable absence of studies identifying predictors of high-quality YouTube content pertaining to orthodontic elastics. Consequently, the primary objective of this study is to comprehensively assess the content and quality of YouTube videos concerning orthodontic elastics, while also attempting to identify predictors associated with high-quality content. Our null hypotheses are as follows: 1. There is no significant difference in quality scores between videos categorized as low-level content and those categorized as high-level content, and 2. There is no linear relationship between the content scores and quality scores, as well as the characteristics, of YouTube videos.

Materials and Methods

Search Protocol

The research protocol of this study followed previously validated methodology for YouTube content assessment.[5,10–14] To identify the most often used search keyword related to this study, the Google Trends website (https://trends.google.com/trends) was used, which calculates the search frequency compared to the total search volume in various regions of the world to identify the most frequently used search keyword in a particular area. To avoid limits based on user history and to broaden the search results, the search criteria were limited to: 1. Videos within the last 5 years and 2. Videos published worldwide. The key word "Orthodontics elastics" was identified as the most queried over a specific period.

Then, on September 19th, 2023, YouTube (https://www.youtube.com) was searched for videos about elastics in orthodontic treatment using the predetermined keyword: "Orthodontics elastics". The only search filter imposed was "sort by relevance". In previous studies, it was found that 95% of people performing an online search on YouTube will view no more than the first 60 videos and will limit their search to the first 5 pages. Most studies that employed YouTube as a search engine used 60–200 videos.[15–18] Accordingly, the first 200 videos were viewed and analyzed by two evaluators. The source locators (URLs) were backed up and saved in an Excel spreadsheet (Microsoft Corporation, Redmond, USA) for future analyses. A flow diagram was provided in Figure 1.

Moreover, the minimum sample size was determined based on a previous study that examined the quality of oral hygiene education in YouTube videos.[19] This study reported an average quality score of 3.60 (SD = 0.50) for high-level content YouTube videos, compared to 2.99 (SD = 0.59) for videos categorized as low-level content. Utilizing the G*Power version software package version 3.0.10 (Franz Faul, Universität Kiel, Germany), the necessary number of videos for the study was estimated. It was determined that a minimum of 10 videos were required for each group (ie, high-level, and low-level content categories), with a type I error rate of $\alpha=0.05$ and 80% power, assuming an effect size (d) of 1.4

Study Selection and Data Extraction

Two evaluators (LM and MN) viewed the videos separately to exclude irrelevant videos such as: non-English videos, videos with no sound or headings, duplicate videos, commercial videos, conference or university lectures, videos of

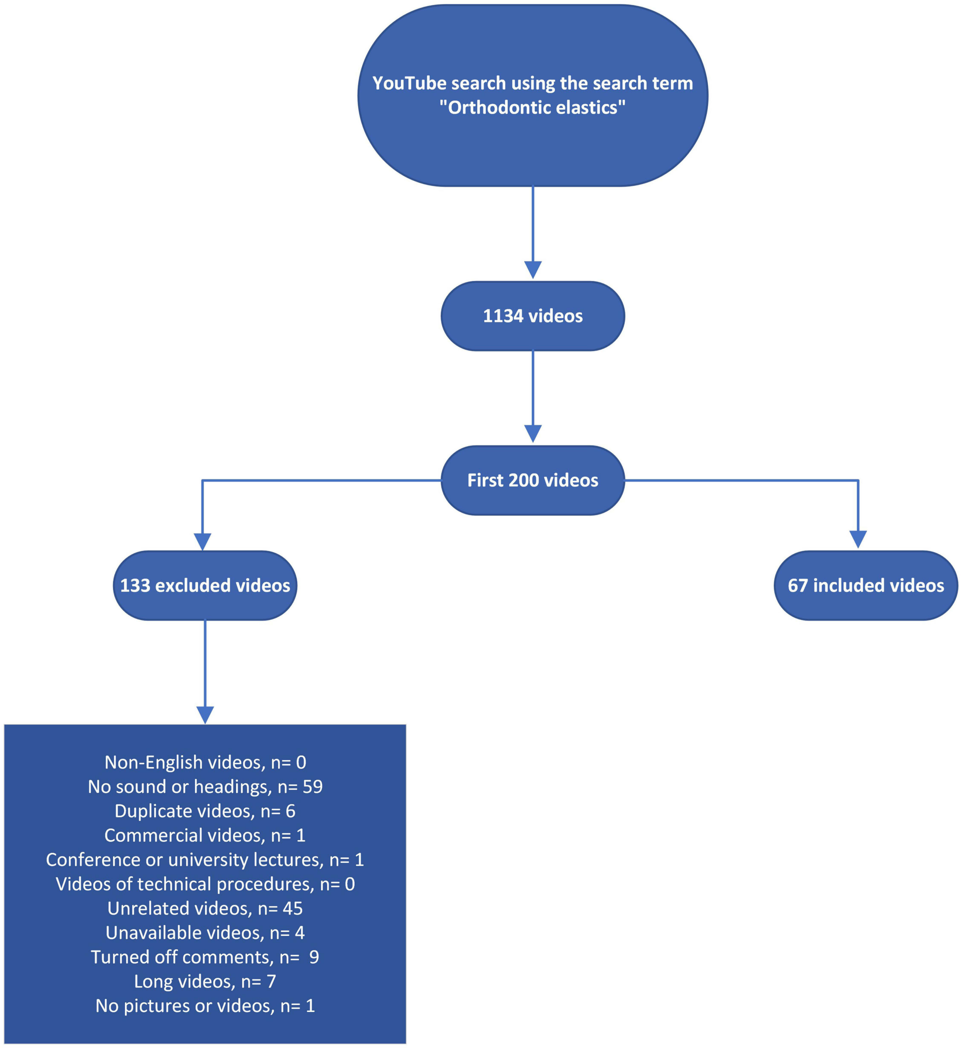

Figure 1 Flowchart diagram for the selection process of videos.

technical procedures, irrelevant videos, unavailable videos and turned off comments (Table 1). Disagreements between the two reviewers (LM and MN) were resolved through discussion until consensus or a third experienced reviewer (AA) was involved to resolve any disagreements.

The included videos were assessed by both evaluators (LM and MN) to record video demographic information such as: (1) number views, (2) number of likes, (3) number of dislikes, (4) number of comments, (5) duration of video, (6) days since upload (dentist/specialist, hospital/university, commercial, or layperson), (7) source of upload, and (7) viewing rate. The viewing rate was calculated using the following formula: (number of views ÷ number of days since upload) × 100%.[16]

Data Analysis

Following data extraction, two evaluators (LM and MN) separately assessed the YouTube videos for the inclusion of the following contents: (1) definition, (2) instructions on usage, (3) comparison of different types, (4) pain/discomfort, (5) impact on oral hygiene, (6) compliance, (7) type, (8) duration, (9) follow-up, (10) precaution (latex allergy), and (11) speech performance. Each of the contents was given a potential 1 point, for a total of 11 possible points, which was used to calculate the video's "total content score" (ie, the sum of the 11 contents elements). The content validity of the instrument was assessed to ascertain its suitability for measuring pertinent aspects concerning orthodontic elastics. This validation process involved a panel comprising four authors (AA, OS, EN, and NM), each possessing substantial

Table 1 The Number of YouTube Videos Excluded from the Study and the Reason for Exclusion

Reason for exclusion	Number of YouTube Videos
Non-English videos	0
No sound or headings	59
Duplicate videos	6
Commercial videos	1
Conference or university lectures	1
Videos of technical procedures	0
Unrelated videos	45
Unavailable videos	4
Turned off comments	9
Long videos	7
No pictures or videos	1
Total	133

expertise in the field of Orthodontics. Furthermore, the repeatability of the instrument was tested using interclass correlation and paired *t*-test, wherein seven randomly selected videos (ie, 10% of included YouTube videos) were evaluated twice 2 to 4 weeks apart. High inter-observer agreement was observed (Intraclass correlation ≥0.99), and no statistically significant differences were found between the two measurement occasions (p-value >0.05). Subsequently, the "total content score" was dichotomized into high- and low-content videos using the criterion that a score of 5 or more was indicative of high-content videos, while lower scores denoted low-content ones.[10]

Using of a 5-point Likert scale, the quality of the videos was evaluated by the video information and quality index (VIQI). The videos were scored according to the following quality parameters: information flow, information accuracy, value (one point each for the use of photographs, animation, interviews, video subtitles, and a summary), and precision (coherence between video title and content). Then, total quality was calculated by summing the four quality parameters (ie, flow, accuracy, quality, and precision).[10,13]

Disagreements in content and quality assessment between the two reviewers (LM and MN) were resolved through discussion until consensus or a third experienced reviewer (AA) was involved to resolve any disagreements.

Statistical Analysis

Statistical package SAS 9.4 (SAS Institute, Cary, NC, USA) was used to analyze the data. The assumption of data normality was confirmed using Shapiro–Wilk test, Kolmogorov–Smirnov test. Descriptive statistics (Frequencies, Mean, Standard Deviation, Minimum, and Maximum) were employed for all variables. Student's *T*-test was used to estimate the characteristic, quality parameters and total content between low-level and high-level video content categories. Chi-square test or fisher exact test as appropriate were implemented to identify the source and content element differences across low-level and high-level video content categories. Pearson Correlation Coefficients were used to determine the relationship between total content score, VIQI, and YouTube characteristics. Stepwise linear multiple regressions with forward selection were used to test the association between YouTube characteristics (ie, Number of views, Number of likes, Number of dislikes, Number of comments, Duration in Days, and Viewing rate) and VIQI (ie, Flow, Accuracy, Value, and Precision) with the total content score. The significance level was evaluated at an alpha level of less than 0.05.

Results

Descriptive characteristics of the sampled YouTube videos, and the measured quality parameters were reported in Tables 2 and 3 respectively.

The characteristic comparison between the high-level content videos and low-level content videos showed that the high-level content videos had a significantly higher mean number of likes compared to low content videos (MD = 4041.7; SD = 4680.7; P-value=0.0068). Otherwise, the comparison between the high-level content videos and low-level content videos demographics showed that they had no significant differences in the following characteristics: 1. Number of views (MD = 95333.4; SD = 244852; p-value=0.2121), 2. Number of dislikes (MD = 9.2507; SD = 74.65; P-value=0.6897), 3. Number of comments (MD = 200.7; SD = 1017.7; P-value=0.53), 4. Duration (MD = 2.19; SD = 3.96; P-value=0.08), 5. Days since uploaded (MD=−362.3; SD = 1053.5; P-value=0.27), and 6. Viewing rate (MD = 16547; SD = 29195.4; P-value=0.07) (Table 4).

The source comparison between the high-level content videos and the low-level content videos showed no significant difference (P-value= 0.37). When compared to low-level content videos, the high-level content videos had significantly higher scores in certain content elements, where there was higher reported information on the following: definition (53.85% vs 12.96%; p-value= 0.004), comparison (92.31% vs 14.81%; p-value=<0.0001), compliance (69.23% vs 20.37%; p-value= 0.0013), type (92.31% vs 14.81%; p-value= <0.0001), wear duration (76.92% vs 22.22%; p-value= 0.0004), and precaution (46.15% vs 0.00%; p-value= <0.0001) (Table 5).

Table 2 Descriptive Statistics on the Characteristics of the Sampled YouTube Video

Variables	Minimum	Maximum	Mean	Standard Deviation
Number of views	18.00	1,490,304.00	111,928.82	245,941.12
Number of likes	0	35,000.00	1425.61	4916.36
Number of dislikes	0	374.00	35.31	74.18
Number of comments	0	7300.00	282.30	1013.14
Video duration	0.13	13.49	4.54	4.02
Days since uploaded	27.00	3918.00	1225.51	1055.40
Viewing rate	1.07	156,266.54	14,371.61	29,713.98

Table 3 Descriptive Statistics for the Quality Parameters and the Overall Quality of the Sampled YouTube Videos

Variables	Minimum	Maximum	Mean	Standard Deviation
Flow	0	5.00	3.21	1.73
Accuracy	0	5.00	3.72	1.70
Value	0	3.00	1.00	0.87
Precision	0	5.00	3.87	1.61
Total quality	0	18.00	11.79	5.11
Total content	0	8.00	2.75	2.02

https://doi.org/10.2147/CCIDE.S460910

Table 4 Comparison of the Characteristic Variables Between the High-Content and Low-Content YouTube Videos

Variables	High-LEVEL Content videos (n=13)		Low-Level Content Videos (n=54)		High - low	*P*-value
	Mean	Standard Deviation	Mean	Standard Deviation	Mean Difference (Standard Deviation)	
Number of views	188,765	406,883	93,431.30	189,850.00	95,333.40 (244,852)	0.212
Number of likes	4683.10	10,616.80	641.40	1161.60	4041.70 (4680.70)	0.007
Number of dislikes	42.77	100.20	33.52	67.53	9.25 (74.65)	0.690
Number of comments	444.10	1075.30	243.40	1004.20	200.70 (1017.70)	0.525
Duration	6.30	3.50	4.12	4.05	2.19 (3.96)	0.078
Days since uploaded	1295.80	1074.80	933.50	953.60	−362.30 (1053.50)	0.270
Viewing rate	27,708.00	42,420.20	11,161.00	25,257.30	16,547.00 (29,195.40)	0.071

The quality comparison between the high-level content videos and low-level content videos showed that the high-level content videos had a significantly higher mean compared to low-level content videos in the following elements: 1. Flow (MD = 1.46; SD = 1.64; P-value=0.0054), 2. Accuracy (MD = 1.12; SD = 1.66; P-value=0.033), 3. Value (MD = 0.67; SD = 0.84; P-value=0.01), and 4. Total quality (MD = 4.17; SD = 4.87; P-value=0.0073). Else, the element precision had

Table 5 Comparison of the Source and Content Between the High and Low Content YouTube Videos

Variable	High-Level Content Videos n=13	Low-Level Content Videos n=54	*P*-value
Source			
Dentist/specialist	84.62% (11)	66.67% (36)	0.361
Hospital/university	7.69% (1)	7.41% (4)	
Layperson	7.69% (1)	25.93% (14)	
Content			
Definition	53.85% (7)	12.96% (7)	0.004
Instructions	100.00% (13)	79.63% (43)	0.105
Comparison	92.31% (12)	14.81% (8)	<0.0001
Pain	46.15% (6)	24.07% (13)	0.169
Hygiene	7.69% (1)	0.00% (0)	0.194
Compliance	69.23% (9)	20.37% (11)	0.001
Type	92.31% (12)	14.81% (8)	<0.0001
Wear Duration	76.92% (10)	22.22% (12)	0.000
Follow-up not reported	100% (13)	100% (54)	1.0
Precaution	46.15% (6)	0.00% (0)	<0.0001
Speech	15.38% (2)	7.41% (4)	0.329

a borderline significance where there was a higher mean difference in high-level content videos compared to low-level content videos (MD = 0.93; SD = 1.58; P-value=0.0615). In addition, the high-level content had a significantly higher mean total content compared to low-level content videos (MD = 4.04; SD = 1.23; P-value=<0.0001) (Table 6).

A significant moderate relationship was found between total content and YouTube video information and quality score (VIQI) (r = 0.40; p-value=0.001). In addition, A significant weak relationship was found between total content and number of likes, video duration, and viewing rate (r=0.0.27; p-value=0.03, r = 0.37; p-value=0.002, r = 0.36; p-value=0.003, respectively) (Table 7).

The adjusted linear regression model showed a significant association between the total content score and YouTube video information and quality score (VIQI), where 1 unit increase in the VIQI is significantly associated with 0.16

Table 6 Comparison of the Quality Parameters and Total Content Between the High-Content and Low-Content YouTube Videos

Variables	High-Level Content Videos (n=13)		Low-Level Content Videos (n=54)		High - low	*P*-value
	Mean	Standard Deviation	Mean	Standard Deviation	Mean Difference (Standard Deviation)	
Flow	4.39	1.33	2.93	1.70	1.46 (1.64)	0.005
Accuracy	4.62	1.12	3.50	1.76	1.12 (1.66)	0.033
Value	1.54	0.78	0.87	0.85	0.67 (0.84)	0.012
Precision	4.62	1.12	3.69	1.67	0.93 (1.58)	0.062
Total quality	15.15	3.31	10.98	5.16	4.17 (4.87)	0.007
Total content	6.00	1.08	1.96	1.26	4.04 (1.23)	<0.0001

Table 7 The Relationship Between the Scores for Total YouTube Content Score, YouTube Video Information and Quality Score, and YouTube Video Characteristics

Variable		Total Content	Total Quality
Total quality	R	0.40	1.00
	P-value	0.001	1.00
Number of views	R	0.23	−0.11
	P-value	0.059	0.391
Number of likes	R	0.27	0.156
	P-value	0.028	0.208
Number of dislikes	R	0.6	−0.23
	P-value	0.196	0.068
Number of comments	R	0.21	−0.14
	P-value	0.082	0.247
Video Duration	R	0.37	0.06
	P-value	0.002	0.606

(*Continued*)

Table 7 (Continued).

Variable		Total Content	Total Quality
Days since uploaded	R	−0.12	−0.16
	P-value	0.355	0.184
Viewing rate	R	0.36	0.10
	P-value	0.003	0.442

Table 8 Adjusted Linear Regression Model on the Association Between the YouTube Video Characteristics and Total YouTube Content Score

Variable	Beta Estimate	Standard Error	Standardized Beta	*P*-value	R^2
Intercept	0.64	0.58	0.57	0.910	0.3137
Video information and quality score (VIQI)	0.16	0.042	0.407	0.0003	
Video duration (VD)	0.15	0.054	0.295	0.0077	
Number of comments (NC)	0.0004	0.0002	0.208	0.0589	

increase in the total content score (B = 0.16; SE = 0.04; p-value=0.0003). In addition, there is a significant relationship between the total content score and video duration, where a 1-minute increase in the video duration is significantly associated with a 0.15 increase in the total content score (B = 0.15; SE = 0.05; p-value=0.008) (Table 8).

Discussion

Elastics are valuable active component in all stages of orthodontic treatment as it is used frequently to correct dental or skeletal problems in each plane (transverse, anterior-posterior, and vertical).[1,2] The success of orthodontic elastics use in orthodontic treatment depends greatly on patients' compliance.[3] In addition, patients' compliance is strongly associated with excellent communication and information delivery by the operator.[16] Nowadays, internet platforms are trendy among patients seeking health-related information.[7] It was found that 80% of internet searches are related to health problems and treatments.[20] Compared to other social media platforms, YouTube was found to be the most favored among orthodontic patients.[21] It is essential to evaluate the quality of information provided in such commonly used platform. While a previous study[14] attempted to investigate the content and quality of orthodontic elastics, our analysis revealed shortcomings in their statistical methodology. Specifically, their approach lacked rigorous testing and reporting on the quantification of the association between YouTube video content, quality, and characteristics. Therefore, additional research is necessary to identify predictors associated with high-level content YouTube videos.

The null hypotheses of our study were rejected, as the average number of likes of YouTube videos in the high-level content where significantly higher than those for low-level YouTube videos. In addition, the main findings of this study revealed a significant positive correlation between the overall content scores of YouTube videos and their quality scores (VIQI). Additionally, weaker but still significant positive relationships were found between the overall content scores of YouTube videos and likes, video duration, and viewing rate. The adjusted linear regression model confirmed a significant link between overall content scores of YouTube videos and VIQI, showing an increase in content score with higher VIQI. Furthermore, the content score showed a significant positive association with video duration. In summary, the study suggests that video characteristics such as likes, duration, and viewing rate influence content scores and quality.

In contrast to our findings, Ozkan et al did not explore the variations in characteristics, content elements, and quality parameters across different categories of low-level and high-level content YouTube videos related to orthodontic elastics. Instead, their primary focus was on reporting that such videos generally fell within the poor content category, which is consistent with our study's observations. It's worth noting that Ozkan et al analyzed 81 videos, whereas our study included 67, a difference that may be attributed to two main factors: firstly, variations in inclusion/exclusion criteria, with our study employing more rigorous methodological criteria, and secondly, the dynamic nature of YouTube, where characteristics constantly fluctuate in real-time.[14] YouTube has been evaluated as an information source in many aspects of dental health including space maintainers, caries, oral cancers, dental implants, impacted canines, orthognathic surgery, and different orthodontic treatment modalities. Similarly, the previous literature is in agreement with our outcome that the YouTube content quality is poor.[5,10–16,19,21–30] Future studies could further investigate the specific mechanisms through which these factors impact content scores and quality, potentially exploring moderating variables or conducting experimental interventions to test causal relationships. In addition, it would be intriguing to explore the integration of YouTube videos with other digital instruments used in dentistry, such as smartphone applications and artificial intelligence, to assess their combined effects in daily clinical practice.[31,32]

The present study carries out several limitations. Since YouTube is considered a time sensitive and dynamic website, the views, likes, dislikes, and comments are all changing by the second. Videos were sorted by relevance and studied in a specific and short-time frame to reduce time-dependent fluctuations. The results are susceptible to change depending on the keywords used. However, using Google Trends to determine the most used term minimizes this variation. Moreover, only videos in English were included which prevents the evaluation of videos in different languages serving other non-English-speaking populations. Furthermore, a notable gap exists in clinical trials within dentistry regarding YouTube's utilization across diverse populations, despite its widespread accessibility and popularity for dental health information. Bridging this gap is critical for comprehending YouTube's role in dental education and patient care. Therefore, conducting rigorous clinical trials is imperative to assess YouTube's efficacy, safety, and outcomes across various dental contexts and patient demographics, thus informing clinical practice and public health strategies.

Conclusion

YouTube videos discussing orthodontic elastics were deemed to have poor content and quality. Factors like likes, duration, and viewing rate influenced both content scores and overall quality. Specifically, video duration and VIQI emerged as significant predictors for higher-level content YouTube videos. Technology is influencing every aspect of life, including healthcare. The need for healthcare providers to acknowledge and follow the demand is definite. Thus, future implementation of online visual content provided by certified specialists would ensure accurate and thorough information delivery. In addition, professionals must educate their patients on the quality and the accurate source of videos found on YouTube.

Data Sharing Statement

Data are available from the corresponding author on reasonable request.

Ethics Approval and Informed Consent

The Imam Abdulrahman Bin Faisal University Institutional Review Board confirmed that our research doesn't qualify as human research and, therefore, doesn't necessitate IRB submission or approval for their standards.

Author Contributions

Ahmed Alsulaiman is the main author. All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval for the version to be published; and agreed to be accountable for all aspects of the work.

Disclosure

The authors report that they have no conflicts of interest in this work.

References

1. Nanda R. Esthetics and Biomechanics in Orthodontics. *Elsevier Health Sci*. 2014.
2. Singh VP, Pokharel PR, Pariekh K, et al. Elastics in orthodontics: a review. *Health Renaissance*. 2012;10:49–56. doi:10.3126/hren.v10i1.6008
3. Veeroo HJ, Cunningham SJ, Newton JT, et al. Motivation and compliance with intraoral elastics. *Am J Orthod Dentofacial Orthop*. 2014;146 (1):33–39. doi:10.1016/j.ajodo.2014.03.021
4. Bujnowska-Fedak MM, Waligóra J, Mastalerz-Migas A. The internet as a source of health information and services. *Adv Exp Med Biol*. 2019;1211:1–16.
5. Çapan BŞ. YouTube as a source of information on space maintainers for parents and patients. *PLoS One*. 2021;16:e0246431. doi:10.1371/journal.pone.0246431
6. Noll D, Mahon B, Shroff B, et al. Twitter analysis of the orthodontic patient experience with braces vs Invisalign. *Angle Orthod*. 2017;87:377–383. doi:10.2319/062816-508.1
7. AlGhamdi KM, Moussa NA. Internet use by the public to search for health-related information. *Int J Med Inform*. 2012;81(6):363–373. doi:10.1016/j.ijmedinf.2011.12.004
8. Google. Press. Available from: https://www.youtube.com/about/press/. Accessed September 19, 2023.
9. Li HO, Bailey A, Huynh D, et al. YouTube as a source of information on COVID-19: a pandemic of misinformation? *BMJ Glob Health*. 2020;5: e002604. doi:10.1136/bmjgh-2020-002604
10. Lena Y, Dindaroğlu F. Lingual orthodontic treatment: a YouTube™ video analysis. *Angle Orthod*. 2018;88(2):208–214. doi:10.2319/090717-602.1
11. Meade MJ, Sooriakumaran P, Dreyer CW. Orthodontic retention and retainers: quality of information provided by dental professionals on YouTube. *Am J Orthod Dentofacial Orthop*. 2020;158(2):229–236. doi:10.1016/j.ajodo.2019.08.013
12. Ustdal G, Guney AU. YouTube as a source of information about orthodontic clear aligners. *Angle Orthod*. 2020;90(3):419–424. doi:10.2319/072419-491.1
13. Ozturk T, Gumus H. YouTube as an information and education source for early orthodontic treatment. *Am J Orthod Dentofacial Orthop*. 2022;162 (3):e123–e132. doi:10.1016/j.ajodo.2022.06.013
14. Özkan TH, Dursun D, et al. An assessment of the quality of information for patients on YouTube™ regarding orthodontic elastics. *Turk J Orthod*. 2022;35(3):192. doi:10.5152/TurkJOrthod.2022.21132
15. Nason K, Donnelly A, Duncan HF. YouTube as a patient-information source for root canal treatment. *Int Endod J*. 2016;49(12):1194–1200. doi:10.1111/iej.12575
16. Hassona Y, Taimeh D, Marahleh A, et al. YouTube as a source of information on mouth (oral) cancer. *Oral Dis*. 2016;22(3):202–208. doi:10.1111/odi.12434
17. Desai T, Shariff A, Dhingra V, et al. Is content really king? An objective analysis of the public's response to medical videos on YouTube. *PLoS One*. 2013;8(12):e82469. doi:10.1371/journal.pone.0082469
18. Fox S, Duggan M Information triage. Pew Research Center. Pew Research Internet Project. Available form: http://www.pewInternet.org/2013/01/15/information-triage. Accessed May 3, 2024.
19. Topsakal KG, Duran GS, Görgülü S, et al. Is YouTube™ an adequate source of oral hygiene education for orthodontic patients? *Int J Dent Hyg*. 2022;20(3):504–511. doi:10.1111/idh.12557
20. Madathil KC, Rivera-Rodriguez AJ, Greenstein JS, et al. Healthcare information on YouTube: a systematic review. *Health Informatics J*. 2015;21:173–194. doi:10.1177/1460458213512220
21. Al-Silwadi FM, Gill DS, Petrie A, et al. Effect of social media in improving knowledge among patients having fixed appliance orthodontic treatment: a single-center randomized controlled trial. *Am J Orthod Dentofacial Orthop*. 2015;148(2):231–237. doi:10.1016/j.ajodo.2015.03.029
22. Hakami Z, Maganur PC, Khanagar SB, et al. Thumb-sucking habits and oral health: an analysis of YouTube content. *Children*. 2022;9(2):225. doi:10.3390/children9020225
23. Knösel M, Jung K. Informational value and bias of videos related to orthodontics screened on a video-sharing web site. *Angle Orthod*. 2011;81 (3):532–539. doi:10.2319/091710-541.1
24. Hegarty E, Campbell C, Grammatopoulos E, et al. YouTube™ as an information resource for orthognathic surgery. *J Orthod*. 2017;44(2):90–96. doi:10.1080/14653125.2017.1319010
25. Grewal J, Marria G, Goel S. Information content of YouTube videos on orthognathic surgery–Helpful? *Indian J Dent Sci*. 2019;11:90. doi:10.4103/IJDS.IJDS_102_18
26. Livas C, Delli K, Pandis N. 'My Invisalign experience': content, metrics and comment sentiment analysis of the most popular patient testimonials on YouTube. *Prog Orthod*. 2018;19:3. doi:10.1186/s40510-017-0201-1
27. Yavuz MC, Buyuk SK, Genc E. Does YouTube™ offer high quality information? Evaluation of accelerated orthodontics videos. *Ir J Med Sci*. 2020;189(2):505–509. doi:10.1007/s11845-019-02119-z
28. Hatipoğlu Ş, Gaş S. Is information for surgically assisted rapid palatal expansion available on YouTube reliable? *J Oral Maxillofac Surg*. 2020;78 (6):1017.e1–1017.e10. doi:10.1016/j.joms.2020.01.013
29. Yavan MA, Gökçe G. YouTube as a source of information on adult orthodontics: a video analysis study. *J World Fed Orthod*. 2022;11(1):41–46. doi:10.1016/j.ejwf.2021.09.001
30. Sezici YL, Gediz M, Dindaroğlu F. Is YouTube an adequate patient resource about orthodontic retention? A cross-sectional analysis of content and quality. *Am J Orthod Dentofacial Orthop*. 2022;161(1):e72–9. doi:10.1016/j.ajodo.2020.12.023
31. Pascadopoli M, Zampetti P, Nardi MG, et al. Smartphone Applications in Dentistry: a Scoping Review. *Dentistry Journal*. 2023;11(10):243. doi:10.3390/dj11100243
32. Kaya E, Gunec HG, Gokyay SS, et al. Proposing a CNN method for primary and permanent tooth detection and enumeration on pediatric dental radiographs. *J Clin Pediatr Dent*. 2022;46(4):293–298.