

# YouTube as a Source of Information on Orthodontic Miniscrews and Miniplates: Cross-Sectional Evaluation

## Ortodontik Minivida ve Miniplaklar Hakkında Bilgi Kaynağı Olarak YouTube: Kesitsel Değerlendirme

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**ABSTRACT Objective:** This study aimed to analyze the quality and reliability of information in the videos on YouTube about orthodontic temporary anchorage devices-miniscrews and miniplates. **Material and Methods:** A systematic search was performed on YouTube videos using the terms “orthodontic miniscrews”, “orthodontic miniplates”, and “orthodontic anchorage.” The first 100 videos that matched the inclusion criteria were assessed for each keyword. The source, duration, views, likes, and dislikes of each video were recorded. The reliability and quality of the videos were evaluated using the “reliability score” [adapted from DISCERN (Quality Criteria for Consumer Health Information)] and the Global Quality Scale (GQS), respectively. **Results:** Most of the videos were uploaded by healthcare professionals for each keyword. The mean reliability score on a 5-point scale was 1.3, 0.5, and 1.3 for videos on orthodontic miniscrews, miniplates, and anchorage, respectively. Regarding the GQS, most of the videos were evaluated as poor quality (54%). According to the Mann-Whitney U test results, regarding the GQS, the duration of the videos scored as moderate quality or higher was longer than that of the other videos ( $p<0.05$ ). **Conclusion:** Although most YouTube videos on temporary anchorage devices were uploaded by healthcare professionals, they were of poor quality as they contained limited information.

**Keywords:** Internet; orthodontic anchorage procedures

**ÖZET Amaç:** Bu çalışma, geçici ortodontik ankraj araçları olan mini-vida ve miniplaklar hakkında Youtube’da bulunan videoların kalitesini ve güvenilirliğini analiz etmeyi amaçlamaktadır. **Gereç ve Yöntemler:** “Orthodontic miniscrew”, “orthodontic miniplate” ve “orthodontic anchorage” terimleri kullanılarak YouTube üzerinde sistematik bir araştırma yapılmıştır. Her bir terim için dâhil edilme kriterlerini karşılayan ilk 100 video değerlendirilmiştir. Videoların kaynağı, süresi, görüntülenme, like ve dislike sayıları kaydedilmiştir. Videoların güvenilirliği, “reliability score” [DISCERN (Quality Criteria for Consumer Health Information)] ölçüm aracından uyarlanmış, kalitesi ise “Global Quality Scale” (GQS) kullanılarak değerlendirilmiştir. **Bulgular:** Her anahtar kelime için geçerli olmak üzere, videoların çoğunluğu sağlık profesyonelleri tarafından yüklenmiştir. Ortalama güvenilirlik skorları 5 puanlık ölçek üzerinden “orthodontic miniscrew”, “orthodontic miniplate” ve “orthodontic anchorage” anahtar kelimelerin sırasına göre 1,3, 0,5 ve 1,3’tür. GQS’ye göre videoların çoğunluğu zayıf kalitededir (%54). Mann-Whitney U testine göre GQS’nin ortalama ve üzeri değerlerde olduğu videoların süresi diğerlerine göre daha uzundur ( $p<0,05$ ). **Sonuç:** Her ne kadar geçici ankraj araçları ile ilgili YouTube videoları, çoğunluğu sağlık profesyonelleri tarafından yüklenmiş olsa da sınırlı sayıda bilgi içerdiği için kalite olarak yetersizdir.

**Anahtar Kelimeler:** İnternet; ortodontik tespit işlemleri

Anchorage control in orthodontics is highly important for the success of orthodontic treatment. The miniscrews, mini-implants, pins, onplants, miniplates, and fixation wires used for orthodontic treatment are called temporary anchorage devices.<sup>1-3</sup> Miniscrews and miniplates are often used as temporary anchoring devices in modern orthodontics. They are frequently and effectively used to provide anchorage in con-

temporary orthodontic treatment because they are relatively easily implemented and do not require patient cooperation.<sup>2</sup> The number of individuals undergoing orthodontic treatment continues to increase every day due to increasing orthodontic awareness and aesthetic concerns in modern society.<sup>4</sup>

Individuals wishing to obtain information about their treatments often use internet resources, in addi-

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Peer review under responsibility of Türkiye Klinikleri Journal of Dental Sciences.

**Received:** 04 Jan 2022

**Received in revised form:** 15 Mar 2022

**Accepted:** 28 Mar 2022

**Available online:** 05 Apr 2022

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tion to that given by their physicians.<sup>5</sup> Health-related searches on the internet are usually made through various websites and social media platforms. As a social media platform, YouTube (YouTube, LLC, San Bruno, CA, USA) services are available in more than 100 countries in 80 languages. Every passing minute, hundreds of hours of videos are uploaded to YouTube.<sup>6</sup> On the YouTube platform, which contains enormous information, information on healthcare needs to be accurate, reliable, and of high quality. As best as is known, no studies have been conducted so far on the YouTube data on miniscrews and miniplates used in orthodontic treatment. This study aimed to investigate the accuracy, reliability, and quality of the information on the YouTube platform on miniscrews and miniplates used in orthodontic treatment.

## MATERIAL AND METHODS

The study did not need ethical approval since it used only global internet data. Google Trends application was used to detect new keyword ideas on behalf of orthodontic miniscrews and miniplates. The search parameters were chosen in all countries, with the beginning date set as 2004 (Google Trends, April 26, 2021). After a few searches with possible keywords related to the base terms, novel keyword ideas were determined using the related queries table on Google Trends. As a result, the keyword “orthodontic anchorage” was added in the search terms.

Previous studies reported that 90%-95% of the audience watched videos on the first 3 pages or the first 60-200 videos.<sup>7-9</sup> In accordance with this data, it was decided to view and analyze the first 100 videos for each search term for the purpose of this study (i.e., a total of 300 videos). The search was performed on May 1, 2021, on the YouTube platform (<https://www.youtube.com>). All cookies and past searches were deleted before searching the keywords. Links for the videos were saved for future analyses. The inclusion criteria for the relevant videos included videos >10 min in duration, English language, and acceptable audio and visual quality. The exclusion criteria included eliminating irrelevant videos, such as advertisement videos, conferences and lectures, duplicate videos, songs, and digressive topic videos. The remaining YouTube videos were reviewed in de-

tail, and several general parameters were noted (e.g., the video duration, number of views, number of comments, date, source of upload, and likes and dislikes) by the author (F.A.A.). The sources of the videos were categorized as individual, healthcare professionals, and commercial. As described in similar previous studies, the viewers' interaction was calculated using the interaction index and viewing rate formulas.<sup>9,10</sup>

$$\text{Interaction index (\%)} = \frac{\text{Number of likes} - \text{Number of dislikes}}{\text{Number of views}} \times 100$$

$$\text{Viewing rate (\%)} = \frac{\text{Number of views} \times 100}{\text{Number of days since uploaded}} \times 100$$

The DISCERN tool (a questionnaire for evaluating the quality of written health information) was used to evaluate the reliability of the videos (Table 1).<sup>11</sup> The answer “no” scored 0 points, and the answer “yes” scored 1 point for the DISCERN tool question. Total of these points was presented as a reliability score. The Global Quality Scale (GQS) was used to analyze the general quality of the videos. The GQS, which is a 5-point scale, was applied according to the criteria proposed by Bernard et al. (Table 2).<sup>12</sup>

Half of the videos were randomly selected and evaluated again after 1 month by the same researcher. Intraobserver agreement according to the Cohen kappa statistics for GQS and DISCERN tool between the 2 evaluation times was 0.84 and 0.61, respectively.

Statistical analysis was performed using the IBM SPSS Statistics for Windows, version 20.0 (IBM Corp., Armonk, NY, USA). The video characteristics, which consisted of the number of views, number of likes, number of dislikes, number of comments, video duration, days since uploaded, interaction index, and viewing rate were used for descriptive statistics. The Shapiro-Wilk test was used to evaluate the normality of data distribution. The Mann-Whitney U test was used for comparing the video parameters among the videos with lower and higher reliability and GQS scores. Statistical significance was taken as p values less than 0.05.

**TABLE 1:** Reliability Score (Reproduced from the DISCERN tool).

a) Are objectives clear and achieved?
b) Are the sources of information used reliable?
c) Is the information presented balanced and unbiased?
d) Are additional sources of information listed for patient reference?
e) Are areas of uncertainty mentioned?
This questionnaire contained 5 questions. For each question, the answer "no" scored 0 points and the answer "yes" scored 1 point. A reliability score was obtained by calculating the total of these points.

**TABLE 2:** Global Quality Scale 5-point scale.

1= Very poor quality, poor flow, lack of information, nothing useful for patients.
2= Generally poor quality, low level of flow, some information is listed, but there are many important topics, of very limited use for patients.
3= Moderate quality, flow below ideal, some important information is adequately discussed, but other pieces of information are poorly discussed, somewhat useful for patients.
4= Good quality, generally good flow, most of the relevant information is listed, but some topics are not addressed, useful to patients.
5= Excellent quality, excellent flow, very useful for patients.

## RESULTS

The first 100 videos of the output for each search term were viewed and evaluated. Based on the inclusion criteria, 36 videos on orthodontic miniscrew, 4 videos on orthodontic miniplate, and 21 videos on orthodontic anchorage were included. Of the included videos, 55 (90.2%) were uploaded by healthcare professionals. Table 3 shows the distribution of the included and excluded videos according to the groups. Table 4 shows the descriptive statistics of the video characteristics.

According to the reliability score, the information presented often was not balanced and unbiased (68.9%). The use of reliable sources of information (14.8%) and the inclusion of additional sources of information for patient reference (9.8%) were generally poor. Although the areas of uncertainty were usually not mentioned (98.4%), the aims were clear and achieved in most of the videos (73.8%). Regarding the results of GQS, 84% of the videos were of poor quality, 36% were generally poor or moderate, and 10% were good or excellent.

The mean value of the GQS score was  $1.8 \pm 1.2$  in the orthodontic miniscrew group,  $1.8 \pm 0.5$  in the orthodontic miniplate group, and  $1.7 \pm 1.1$  in the or-

thodontic anchorage group, which were determined by the author (Table 4). The mean value was  $1.8 \pm 1.1$  without any group except for all of the videos.

Comparisons of the video parameters among the videos with lower and higher reliability and GQS scores are shown in Table 5 and Table 6. The video duration and interaction index were significantly greater in the videos that had higher reliability score values ( $p < 0.05$ ) (Table 5). Similarly, Table 6 shows that moderate- or higher-quality videos (score 3-5) were of longer duration ( $p < 0.05$ ).

## DISCUSSION

As a result of the restrictions caused by the global pandemic, people are greatly relying on the internet to find out health-related information. In many health-related searches, YouTube, as a social media platform, is the most preferred because it is free and easily accessible, and contains audiovisual content.<sup>13,14</sup> This study aimed to evaluate the content, quality, and reliability of the information on YouTube about orthodontic miniscrews and miniplates, which are among the temporary anchorage devices commonly used during the orthodontic treatment of patients.

**TABLE 3:** The distribution of the included and excluded videos according to the keywords.

	Orthodontic miniscrew Frequency (n)	Orthodontic miniplate Frequency (n)	Orthodontic anchorage Frequency (n)
Suitable videos	36	4	21
Unsuitable videos	64	96	79
Long	15	53	26
Non-English videos	3	0	3
Lacking audio or visuals	17	14	18
Advertisement videos	6	0	0
Conferences and university lectures	0	4	6
Songs	4	0	5
Duplicate videos	1	0	9
Digressive topic videos	18	25	12

**TABLE 4:** Descriptive statistics of evaluated videos.

	Orthodontic miniscrew				Orthodontic miniplate				Orthodontic anchorage			
	Mean	SD	Minimum	Maximum	Mean	SD	Minimum	Maximum	Mean	SD	Minimum	Maximum
Views	38969.11	111957.17	140	677509	2287.5	2217.40	255	5447	12381.29	20690.80	109	84608
Likes	335.25	779.98	0	4588	22.50	20.74	5	49	145.67	283.08	0	1023
Dislikes	13.58	37.294	0	225	0.50	0.58	0	1	5.86	10.53	0	33
Comments	34.44	93.11	0	487	5.00	6.88	0	15	12.05	24.98	0	90
Duration	4.60	2.73	0.43	9.49	5.30	3.46	2.39	9.32	3.50	2.83	0.21	9.43
Days since upload	1247.11	936.70	7	3617	1180.75	1371.77	256	3200	1259.67	1113.31	116	3925
Interaction index	1.35	1.20	0.00	6.43	1.76	0.94	0.88	2.75	1.22	0.99	0.00	2.99
Viewing rates	3489.39	7837.06	22.71	43682.08	450.05	334.34	64.56	660.94	1217.8	1934.56	26.20	7929.52
Reliability score	1.3	1.1	0	4	0.50	0.58	0	1	1.3	1.23	0	4
GQS	1.8	1.2	1	5	1.8	0.50	1	2	1.7	1.1	1	4

GQS: Global Quality Scale; SD: Standard deviation.

**TABLE 5:** Influence of videos reliability on their parameters.

	DISCERN score 0-1		DISCERN score 2-5		p value
	Mean	SD	Mean	SD	
Duration	3.15	2.62	6.11	2.11	0.000
Views	31693.16	109888.86	20335.00	22068.79	0.542
Comments	17.26	51.40	37.26	100.20	0.082
Days since upload	1297.55	1067.53	1163.70	923	0.721
Like	228.21	748.98	284.61	356.26	0.090
Dislike	11.02	32.51	6.17	10.13	0.481
Interaction index	1.01	0.77	1.82	1.37	0.007
Viewing rates	2853.76	7846.50	2041.44	1921.53	0.334

SD: Standard deviation.

**TABLE 6:** Influence of videos reliability on their parameters.

	GQS score 1-2		GQS score 3-5		p value
	Mean	SD	Mean	SD	
Duration	3.91	2.91	5.73	1.89	0.018
Views	29786.20	97125.80	17710.08	21635.31	0.986
Comments	18.57	46.66	50.25	138.238	0.841
Days since upload	1301.39	1027.30	1025.33	942.60	0.364
Like	260.22	681	205.58	344.42	0.657
Dislike	11.47	36.579	7.74	10.40	0.832
Interaction index	1.15	0.83	2.00	1.73	0.104
Viewing rates	2722.86	6923.71	1820.3862	2047.78	0.767

GQS: Global Quality Scale; SD: Standard deviation.

The reasons for choosing this topic included the frequent use of temporary anchorage tools in orthodontics and the possibility of patients experiencing fear and anxiety when they first hear about these devices and thus their seeking extra information.<sup>15</sup>

In similar studies on YouTube, the number of videos included in the analyses usually ranged from 60 to 200.<sup>7-9</sup> In this study, the first 100 videos were analyzed for each search term, similar to the study by Kovalski et al.<sup>15</sup> The reason why very few videos on the term “orthodontic miniplate” could be included was because congress recordings were uploaded as piecemeal long videos. On searching the term “orthodontic miniplate” 45% of the first 100 videos consisted of these congress recordings.

A majority of videos included in this study were uploaded by healthcare professionals, similar to the investigations by Yavuz et al. and Sezici et al.<sup>16,17</sup> The reason for this might be that miniscrews and miniplates were used in a limited number of treatments, not in every orthodontic treatment. On the contrary, some studies on YouTube reported that most of the videos were shared as a personal experience by individuals.<sup>14,18-20</sup> This might be due to the fact that the treatments in the mentioned studies had a greater impact on individuals' lives.

According to the mean GQS and reliability score in this study, the quality and reliability of the YouTube videos on miniscrews and miniplates were generally poor. Ustdal and Guney reported that the content of YouTube videos about clear aligners indi-

cated moderate quality and poor reliability.<sup>18</sup> However, yet another study showed that the content in YouTube videos was excellent regarding accelerated orthodontics.<sup>16</sup> The different results might have been due to the differences in the studied subjects and the researchers who examined them.

Although a majority of the included videos were uploaded by healthcare professionals, the reliability and quality were evaluated as low. The possible reasons for these results could be that some videos only consisted of how the orthodontic miniscrews or miniplates were placed, others explained their usage in a single region, and some others only described the case reports. All these situations contained limited information, far from providing comprehensive information on the usage of miniscrews and miniplates.

According to the Mann-Whitney U test results, regarding the GQS, the duration of the videos scored as moderate quality or higher was longer than that of other videos ( $p < 0.05$ ). Other parameters of the videos did not affect the GQS ( $p > 0.05$ ). Longer videos might be of increased quality as more information could be given. Similarly, video reliability was directly proportionate to the video duration. Lena and Dindaroglu stated that the duration of the videos showed the highest correlation with the total content score.<sup>14</sup> Other parameters of videos did not affect the reliability score results ( $p > 0.05$ ). On the contrary, Kovalski et al. reported that video duration did not statistically affect the GQS and reliability scores of videos related to oral leukoplakia.<sup>15</sup> The differences in the research

subjects and researchers might have caused these contradictory results.

In line with the studies that examined health-related YouTube videos, the present study had some limitations.<sup>7-10</sup> First, YouTube is a highly dynamic platform, where videos are uploaded and deleted on a daily basis. Thus, the results can change according to the date of the search. Second, although English is a global language, this study examined videos only in English, was a geographic limitation. Finally, the results can vary related to the keywords used in the search. If some individuals use other search terms, this will lead to different results.

## CONCLUSION

YouTube comprises various information on temporary anchorage devices. Although most of the videos were uploaded by healthcare professionals, the reliability and quality of the videos assessed in the present study were of low grade. Information content

increased as the video length increased. Further research should be performed to evaluate the quality, reliability, and content of knowledge about temporary anchorage devices in different social platforms and in different languages.

## Source of Finance

*During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.*

## Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

## Authorship Contributions

*This study is entirely author's own work and no other author contribution.*

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