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The Usefulness of YouTube Videos As a Source of Information on Dental Carving for Dental Students

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Abstract

Background: Dental students often use online video platforms in order to complete their missing information. The purpose of this study is to evaluate the usefulness of YouTube videos in terms of dental carving.

Methods: YouTube was searched for information using the search term "carving upper 1st molar tooth from soap" in Turkish. Two dental students reviewed the first 150 videos for the search term. After exclusions, 9 videos were included for analysis. Demographics of videos, including the type of source, length, viewers' interaction, and viewing rate, were evaluated. A 9-point usefulness score was created to evaluate the videos with the support of 2 experienced prosthesis lecturers.

Results: The mean usefulness score of videos was 6.6 ± 2.2 (range 3-9). There was no significant correlation between the usefulness score and other video demographics ($P > .05$). Although there was no statistically significant difference between the upload source and usefulness score, the only video that was found slightly useful was uploaded by a dental technician, and 2 videos with full points were uploaded by students.

Conclusion: Most YouTube videos on dental carving of the maxillary first molar were found to be very useful. Since the videos on social media can include misleading/incomplete information, online videos should only be used as an auxiliary material to face-to-face training.

Keywords: YouTube, usefulness, dental education, dental carving, upper first molar teeth

INTRODUCTION

Dentistry education includes basic and clinical sciences and intensive practical training. It consists of 3 stages: theoretical courses, preclinical courses in which laboratory studies are carried out (usually held in the first 2-3 years of education), and clinical training/internship (it includes real patient side practices of fourth and fifth grade students).[1] While theoretical lessons of these stages have been taught face-to-face in classrooms for years, practical and clinical trainings are face-to-face trainings in which the dexterity of the students is monitored individually by the instructor in the laboratories and clinics. First-year students carved soap and dental wax as part of their curriculum to learn about the morphology and anatomy of the permanent dentition. Students in their second and third years used dental models for their practical prosthetic and restorative assignments.

The novel coronavirus first appeared in patients with pneumonia of unknown origin in Wuhan, Hubei Province of China, in early December 2019. The virus has spread through human transmission from Wuhan to the rest of the world, posing a hazard on a global scale. The World Health Organization has classified coronavirus disease as a pandemic.[2] As a result of the pandemic, all schools and universities suspended education to minimize the spread of coronavirus. In addition, face-to-face practice for all practical/clinical courses has been suspended.[3] A dental curriculum that is entirely online has replaced earlier teaching techniques like face-to-face courses, lectures, practical applications, and seminars.[4,5] Universities

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have produced various solutions for the adaptation of practical courses to the online system. Universities began synchronous and asynchronous distance education for this purpose on their own distance learning platforms.[6] Some universities continued the practical courses by opening live calls on Zoom and Instagram platforms and some by uploading videos to their own systems. In this online education period, students started to benefit from online video platforms such as YouTube, Facebook, and DailyMotion in order to complete their missing information and especially to see practical applications from a different perspective. Since the students of this generation can use the internet very actively, they continued to benefit from online platforms for course materials and education after the pandemic, and they still continue.

The social media provides a useful platform for dental students who want to receive educational information. Due to its open-access nature and ability for users to upload videos for both social and educational purposes, YouTube has experienced enormous growth in popularity in recent years.[7] Every day, it receives more than 2 billion views. An average user spends at least 15 minutes each day on YouTube, where a new video is released every minute.[8] As an interface where material may be kept and users have a quick and cost-free access to this information, video-sharing sites like YouTube are attractive for sharing educational content and lectures on dentistry.[9] Since anyone can create and publish health-related Web 2.0 content, both true and incorrect information may be available. This is because these activities are not just limited to professionals.[10] Therefore, students should first follow their lecture notes, consult their educators, and then view YouTube videos as additional helpful material. Students should be warned by educators that they should not fully rely on the content of YouTube videos.

So far, several studies in the literature have evaluated YouTube content in various medical and educational aspects including oral health, dental education, oral cancers, and space maintainers.[9-12] Several studies, in both dental and medical education, report that YouTube is the most frequently used electronic resource/app by health professional students.[13,14] To our knowledge, no studies have assessed YouTube content regarding dental carving education. Therefore, the purpose of this study is to evaluate how useful YouTube videos are, especially in terms of dental carving education given in first and second grades.

MATERIAL AND METHODS

This study was exempted from ethical approval due to its observational nature and the use of publicly accessible data.

YouTube Search

We searched YouTube (www.YouTube.com) in May 2023 videos related to dental carving using the default settings; only 1 search was performed: May 4, 2023, using the search term "carving upper 1st molar tooth from soap" in Turkish. Previous research in the literature reported that 95% of users conducting an online search on YouTube will watch no more than the first 60 videos of the output and would not continue to search after the first 5 pages. Most studies utilizing YouTube as a search engine have used 60-200 videos.[9] In accordance with this data, we viewed and analyzed the first 150 videos for this search term. Links to videos were saved for future analyses.

Selection and Analyses of Videos

Two dental students (E.K., İ.Ö.) initially viewed the videos together to exclude irrelevant videos such as non-Turkish language videos, videos that do not explain the relevant tooth (upper first molar), videos that do not include carving, videos with no sound, duplicate videos, advertisements, and conference lectures. The remaining videos were analyzed independently by 2 dental students (F.S.K., A.R.T.) to determine video demographics including video length, date, source of upload, country of origin, and numbers of total views, likes, and dislikes.

The sources of upload were categorized as universities or professional organizations, dentists or academicians, dental technicians, and dental students. Interaction index and viewing rate were calculated based on the methods described in the previous studies as following:[7,11]
Interaction index,

$$\frac{number\ of\ likes - number\ of\ dislikes}{total\ number\ of\ views} \times 100\%$$

Viewing Rate,

$$\frac{number\ views}{number\ of\ days\ since\ upload} \times 100\%$$

We assessed videos for the presence of content about upper first molar teeth properties, like its tubercules, fossas, shape of crown, number and position of roots, and tools used for carving. A usefulness score was created to evaluate the usefulness of the videos. While creating this scoring, support was obtained from 2 experienced prosthesis lecturers to determine the criteria. Each video was given a score from 0 to 9 to indicate its usefulness in providing students with adequate information (Table 1). Each criterion was given a score of 1 or 0 according to whether the video contains the criteria or not. The usefulness score results were classified as not useful, slightly useful, moderately useful, and very useful. A score of 9 indicated that the video mentioned all expected criteria. Score 0 indicated that the video does not contain any utilizable information about carving of first upper molar teeth. Any disagreements among researchers in usefulness scoring were solved by reviewing the literature and determining how consistent the provided information is with the lecture.

Table 1. Usefulness Score

Usefulness Score	
Scoring Item	**Score**
Introducing spatulas	1
Specifying Buccal/Mesial/Distal/Palatinal surfaces	1
Specifying the shape of crown	1
Describing tubercle sequence (size or volume)	1
Introducing the fossas	1
Explaining the Carabelli tubercle (Specifying its position)	1
Specifying the number of roots and the position of the furcation	1
Explaining crown/root ratio	1
Specifying the properties of the roots (order of volume, curve, etc.)	1
Total	**9**

Score 0, not useful; scores 1-3, slightly useful; scores 4-6, moderately useful; scores 7-9, very useful.

Statistical Analysis

The data obtained in this study were analyzed with Statistical Package for the Social Sciences 21 program (IBM SPSS Corp.; Armonk, NY, USA). Kolmogorov–Smirnov and Shapiro–Wilk's tests were used to investigate the normal distribution of variables. When the differences between the groups were examined, Kruskal–Wallis and Mann–Whitney *U*-tests, which are nonparametric methods, were used for comparisons between the groups when the variables did not comply with the normal distribution. Multiple regression analysis was performed to measure how much the independent variable explained the dependent variable. With regression analysis, it was indicated which of the variables had an effect. Statistical significance was set at $P < .05$.

RESULTS

The Output of the YouTube Search

The search term "carving upper 1st molar tooth from soap" (in Turkish) resulted in a total of 3265 videos. We evaluated the first 150 videos of the output for each search term. Of the 150 videos initially viewed, 141 were excluded (Figure 1).

Characteristics of Videos

The mean length of videos was 60.5 minutes ± 36 (range from 33.27 minutes to 108.1 minutes). The total number of views of upper first molar carving-related videos was 265 252 and the mean number of views was 29.472 (range from 3863 to 164 724). The overall mean number of likes was 346 (range from 55 to 1620), while none of the videos included in the study received dislikes.The mean viewing rate was 3726.1 views/day ± 676.,7 (range: 427.61-21420.55 views/day).

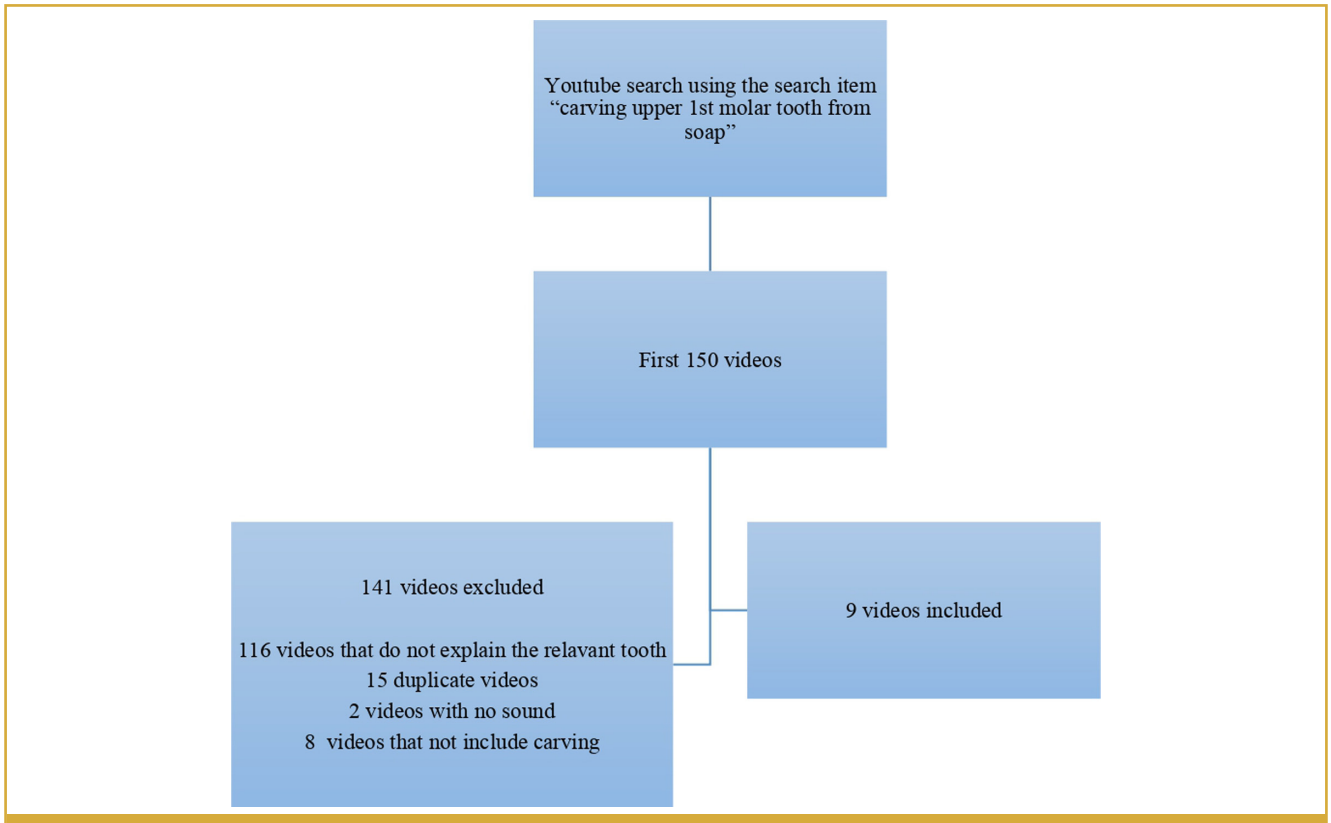

Figure 1. YouTube video selection for analysis.

Table 2. Upload Source According to the Usefulness of Score

Upload Source	Usefulness n (%)				
	Very Useful	Moderately Useful	Slightly Useful	Not Useful	Total
Academicians	1 (11.1%)	2 (22.2%)	0	0	3 (33.3%)
Dental students	4 (44.5%)	1 (11.1%)	0	0	5 (55.6%)
Dental technicians	0	0	1 (11.1%)	0	1 (11.1%)
Total	5 (55.6%)	3 (33.3%)	1 (11.1%)	0	9 (100%)

Of the 9 videos included in the study, 3 (33.3%) were uploaded by academicians, 5 (55.6%) were uploaded by dentistry students, and 1 (11.1%) was uploaded by a dental technician. The videos included in the study were uploaded between 2018 and 2022. The vast majority of these videos were uploaded in 2020 (33.3%) and 2021 (33.3%). The videos have been uploaded by users only from Turkey.

Content of Videos

YouTube videos about dental carving contain various information about the surfaces of the upper first molar tooth, crown/root ratio, fossas and tubercles, root number, and features. When the video contents were examined, it was seen that only 2 (22.2%) of the videos introduced the tools used for carving, and 4 (44.4%) mentioned the crown/root ratio. All of the videos included in the study introduced the fossa of the upper first molar tooth and indicated the carabelli tubercle and its position, which is unique to this tooth.

The majority of the videos (88.9%) mentioned the 5 surfaces of this tooth and stated the shape of the crown. Seven of them (77.7%) classified the tubercles by size and volume, and more than half (66.6%) gave information about the number of roots and the characteristics of the roots (volume, slope, etc.).

Usefulness and Viewers' Interaction

The mean interaction index score was 1.53% ± 0.57 (range from 0.90% to 2.20%). A 9-point usefulness score was devised to evaluate the usefulness of videos for the presence of content about the surfaces of the upper first molar tooth, the tubercle and fossa features, the number of roots and the features of the roots, and the tools used for carving.

The mean usefulness score of videos was 6.6 ± 2.2 (range 3-9). There was only 1 (11.1%) slightly useful video, 3 (33.3%) moderately useful videos, and 5 (55.6%) very useful videos (Table 2). There were no 0-rated videos (not useful) and two 9-rated videos (a video, which got full score).

Usefulness score of videos showed no significant correlation neither with viewing rate ($r=0.805$; $P > .05$) nor with interaction index ($r=0.702$; $P > .05$) score. Additionally, no significant correlation was found between usefulness score and the video length ($r=-0.082$; $P > .05$) (Table 3). No correlation was found between upload source and views ($P > .05$), viewing rate ($P > .05$), interaction index score ($P > .05$), and usefulness score ($P > .05$). Although there was no statistically significant difference between upload source and usefulness score, the only video that was found slightly useful was uploaded by a dental technician. Two videos with full points were uploaded by dental students. Other videos that were found to be moderately and very useful were uploaded by dental students or academicians (Table 2). The kappa value for the interobserver agreement was found to be 0.857.

Table 3. Comparison Between Characteristics and Usefulness of YouTube Videos on Dental Carving

		Usefulness Score
Video length	*r*	−0.082
	P	.900
Viewing rate	*r*	0.805
	P	.247
Interaction index	*r*	0.702
	P	.236
Upload source	*r*	−0.549
	P	.397

DISCUSSION

Dental anatomy education consists of 2 stages, theoretical and practical, in the first years of dentistry education. These courses make an effort to accomplish certain objectives such as differentiating between primary and permanent teeth, recognizing anatomical landmarks, and recreating tooth morphology.[15] While the characteristic features of teeth are explained in theoretical education, carving from wax or soap is done in practical training to ensure psychomotor development of the students. The most popular method of teaching, which is regarded as the gold standard, involves carving the permanent teeth with soap or wax after their corresponding theoretical session.[1] The correct learning of dental anatomy is the primary basis for meeting the aesthetic and restorative needs of the dentistry profession.[16]

With the coronavirus disease 2019 (COVID-19) pandemic, online education has gained importance all over the world. The online education system, which started to be accepted gradually in dentistry faculties, was adapted to the education process very quickly. One of the most serious issues with distant learning is allowing students to improve their psychomotor abilities while using unfamiliar materials. The COVID-19 pandemic's distance education protocol produced

a difficult training environment, particularly for the preclinical dental courses. For this purpose, universities uploaded videos from their own platforms and offered online courses. Despite all these efforts, self-learning has gained great importance during the pandemic. Both the challenges of the pandemic and the new generation's tendency toward technology and to work on the internet have led to an increase in educational videos on social media platforms.[3,17]

The COVID-19 pandemic caused an increase in the usage of multimedia and web-based applications, as well as a necessary transition to more digital and video-based lectures (VBLs) in virtual/remote settings. However, not all dental schools have switched to VBLs in their curricula. Only 5% of the top 40 dental videos on YouTube are being recommended to students by dental schools.[18] Moreover, little is known about the effectiveness of these approaches to improve tooth-carving ability. In a study evaluating students' psychomotor skills in applied courses as a result of face-to-face and online education, it was reported that face-to-face education is the gold standard and online education can be accepted as an alternative in cases where face-to-face education cannot be performed.[17] On the other hand, in a study conducted with the Z generation, who can easily adapt to technology, it was reported that the students were very satisfied with the use of digital technology in dental anatomy education.[19]

Although there are studies evaluating the difference between online and face-to-face education, there is no study evaluating the content and usefulness of YouTube videos about dental carving to our knowledge. This study has importance; in fact, it is the first study to evaluate Turkish videos on this subject. In their study on YouTube as a learning tool, Snyder and Burke[20] reported that 89% of students claimed it improved their learning, and 73% indicated they would like teachers to utilize it more in the classroom. Similarly, in a study evaluating the use of YouTube videos by clinical dental students, 95% of the students reported that the videos were useful, and the majority of them wanted their faculty to share educational videos on social media. Thirty-six percent of these students indicated that they were not sure about the accuracy of the videos' content.[14] For this reason, it is important for dental institutes and academicians to upload more evidence-based educational videos to YouTube.

Alzahrani et al[21] examined the effect of online videos on carving ability in their study and reported that students who watched videos as well as reading lecture notes had higher carving ability.There are other studies in the literature that support these findings.[22,23] According to previous studies, the main advantages of digital resources such as VBLs and YouTube videos include their accessibility, flexibility to download materials whenever desired, and ability to revisit previously studied material. These studies demonstrate that VBLs can be more effective than textbooks and possibly even live lectures, with benefits for users.[16,18] In light of all these data, researchers stated that face-to-face education is the gold standard, and other methods can only be an auxiliary method in addition to the traditional method.[24]

The video search in this study showed that YouTube contains a variety of information, from a lecture on dental carving to simple trainings by individuals. However, when a specific tooth was searched, it was observed that the number of videos related to that tooth was very few. Many other tooth-related videos appeared as a result of the search, resulting in a high number of excluded videos. This result leads to the idea that a student who does not have enough knowledge about the specific names and characteristics of the teeth can get the wrong information by confusing the teeth. When we examined the videos that were excluded, we found that there were more second-half exclusions than first-half exclusions. This finding would suggest that when the number of pages is increased, there are more duplicate and irrelevant videos.

In the present study, there was no significant correlation between the videos' usefulness and the viewing rate or the interaction index score. Similar to our study, Knösel et al[10] did not find a significant difference between video usefulness and viewing and interaction rate in their study, where they examined videos related to dentistry education. Additionally, no correlation was found between upload source and views, as well as video length, viewing rate, and interaction rate. This result is consistent with the studies in the literature.[9,25]

Similar to other well-known social media sites, YouTube enables all registered users to post and share videos related to health education for free and without a referee check. Due to this feature, YouTube is more likely to post videos that are false and probably misleading and not supported by scientific evidence.[9] In this study, when the video content about dental carving of the upper first molar tooth was examined, it was observed that most of them were very useful, while the others contained incomplete information rather than false. For this reason, we think that YouTube videos on this subject can be used as supporting information, even if they are not direct course material. Similarly, Mukhopadhyay et al,[7] in their study examining YouTube videos with dental education content, reported that YouTube can be used as an auxiliary tool to support dentistry education because it is easily accessible online.

The only slightly useful video was uploaded by a dental technician according to our results. The videos uploaded by academicians and students were found in more detail and achieved higher scores. In accordance with our study, in a study in which YouTube videos were searched and evaluated under the name of dentistry education, it was reported that YouTube videos related to education were highly useful.[10] However, it is not possible to assume this result for

video content related to every topic about dentistry. There are studies in the literature reporting that video content on different dental topics is poor.[25] Source of the content on social media platforms (YouTube, Facebook, Instagram, etc.) is not inspected; most of them are not refereed or evidence-based.[26] Everyone can share videos on these platforms. Therefore, the content is not reliable. Arnett et al[27] claimed that only 4.2% of the dental educators uploaded an educational video to YouTube. Hence, students should be warned about inaccurate information. Additionally, since social media is being used more actively in the field of education, it is important to encourage dental educators, who can provide more accurate information content, to upload videos to these platforms.

The current study has a number of limitations. YouTube is a very dynamic platform where videos are constantly being added and removed. As a result, the search's outcomes may vary depending on the day and time. Additionally, the search terms used may have an impact on the results. Therefore, some students might use different search terms and might get different results.

CONCLUSION

Most of the YouTube videos on dental carving of the maxillary first molar are found to be very useful. However, the usefulness score did not correlate with other characteristics of the videos. Dentistry education has started to be digitalized in line with the requirements of the age. However, due to the nature of the practical stage of this training, the educator should follow the hand skills and knowledge of the student face-to-face. For this reason, video-based learning can only be used as a supplementary material instead of completely replacing education. Although educational institutions have video courses on their own online platforms, it is important for academicians to publish these videos on platforms that can be accessed by everyone, such as YouTube. Thus, it will help students who cannot reach the university system to get information from educators instead of other students, technicians, etc., and to train more knowledgeable dentists.

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