Evaluation of the Content of YouTube™ Videos About Local Anesthesia in Pediatric Dentistry

Çocuk Diş Hekimliğinde Lokal Anestezi ile İlgili YouTube™ Videolarının İçeriklerinin Değerlendirilmesi

Kamile Nur TOZAR[a](ORCID-0000-0002-1801-9127), **Merve ERKMEN ALMAZ**[β](ORCID-0000-0001-6766-2023)

[a]Adıyaman Universty, Faculty of Dentistry, Department of Pediatric Dentistry, Adıyaman, Türkiye
[a]Adıyaman Üniversitesi Diş Hekimliği Fakültesi Pedodonti AD, Adıyaman, Türkiye
[β]Kırıkkale Universty Faculty of Dentistry, Department of Pediatric Dentistry, Kırıkkale, Türkiye
[β]Kırıkkale Üniversitesi Diş Hekimliği Fakültesi Pedodonti AD, Kırıkkale, Türkiye

ABSTRACT

Background: The purpose of this study was to assay the quality and substance of videos on YouTubeTM about local anesthesia in children and to assay whether they are practical for patients and parents.

Methods: A research was applied on Youtube™ using the search term "local anesthesia in pediatric dentistry" with the assumed sorting set to "sort by relevance". In our study, 113 videos out of 213 were excluded and 100 videos were analyzed. For video content classification, a 23-point score scale was used to classify video groups as low, moderate, and high video context.

Results: Most of the videos were uploaded by healthcare professionals (n=93; 93%), while the rest were uploaded by healthcare companies/websites (n=1; 1%) and others (tv channels, news agencies) (n=6; 6%). The average duration of videos was 9.49 minutes (range: 0.5-57.57 minutes; median: 4.25).

Conclusions: Although there are many videos on local anesthesia in children on YouTube™, these videos contain limited information in terms of content. There is a requirement to develop the quality of YouTube™ videos on this subject by dentists.

Keywords: Local anesthesia, pediatric dentistry, YouTube™

ÖZ

Amaç: Bu çalışmanın amacı, çocuklarda lokal anestezi ile ilgili YouTube™'daki videoların kalitelerini ve içeriklerini değerlendirerek hasta ve veliler için yararlı olup olmadığını analiz etmektir.

Gereç ve Yöntemler: Youtube™'de "local anesthesia in pediatric dentistry" arama terimi kullanılarak, varsayılan filtre "alaka düzeyine göre sırala" olarak ayarlanmış bir arama gerçekleştirildi. Çalışmamızda, 213 videodan 113'ü, çalışmaya dışı bırakıldı ve 100 video analiz edildi. Video içerik sınıflaması için 23 puanlık bir skor ölçeği kullanılarak low, moderate ve high video içerikli video grupları olarak sınıflandırıldı.

Bulgular: Videoların büyük çoğunluğu sağlık profesyonelleri (n=93; 93%) kalanları ise sağlık şirketleri ve web sayfası (n=1; 1%) ve diğerleri (tv kanalları, haber ajansları) (n=6; 6%) tarafından yüklenmiştir. İlgili videolarının ortalama uzunluğu 9.49 dk'dır (range: 0.5-57.57 dk; median: 4.25).

Sonuç: Çocuklarda lokal anestezi ile ilgili YouTube™'da bir çok video bulunmasına rağmen bu videolar içerik açısından sınırlı bilgiler içermektedir. Diş hekimleri tarafından bu konu ile ilgili YouTube™ videolarının kalitesinin artırılmasına ihtiyaç vardır.

Anahtar Kelimeler: Local anesthesia, pediatric dentistry, YouTube™

Introduction

In pediatric dentistry, prevention of pain during dental treatments is important in terms of gaining the child patient's trust and establishing a cooperative environment in dental treatments.[1] General anesthesia, sedation, local anesthesia, or topical anesthesia are applied for painless dental treatment in children. Local anesthesia is a provisional loss of sensation in a part of the body without suppressing consciousness.[2] The number of anesthetic agents used during treatment may affect the duration of the effect of anesthesia, its side effects, and toxicity findings.[3] Since children's body mass index and blood volume are lower than those of adults, it is necessary to reduce the amount of anesthetics used.[3-6] To provide successful anesthesia, the injection technique to be used and the maximum amount of anesthetic solution suitable for the jaw to be treated should be known.[3,7,8] However, there is no definite information about the minimum quantity of local anesthetic solution to be injected in children.[3]

Social media emerges as a platform that is widely used by patients who want to obtain health-related information.[9] YouTube™ has videos with extensive information on many medical topics, including local anesthesia applications in pediatric patients. Due to the high interest in these videos by patients and their parents, the accuracy of their content is becoming increasingly important.[10]

The aim of this study was to assay the quality and substance of videos on YouTubeTM about local anesthesia in children and to assay whether they are practical for patients and parents.

Materials and Methods

To find videos about local anesthesia in pediatric dentistry, a research was performed on Youtube™ (www.youtube.com) on August 9, 2021, using the research term "local anesthesia in pediatric dentistry", with the supposed sorting set to "sort by interested". Most Youtube™ users scan the first three pages of the research results to learn about a topic and usually browse the first 30 videos.[10,11]

Ethics committee consent was not necessitated in this study, as data from a publicly accessible website were used. Since research results and descriptive features (e.g., views, likes, comments, and dislikes) may vary on distinct days, a playlist was composed from the selected videos. In the generated playlist, 200 videos were ranked by connection and an evaluation was made for the quality and accuracy of the knowledge presented in each video. Of the 213 videos, 113 were excluded because they did not meet the inclusion criteria. Finally, 100 videos were included in the study.

Inclusion criteria for the study: 1) English or Turkish videos; 2) Videos related to the topic. Exclusion criteria: 1) Non-English or non-Turkish videos; 2) Videos not related to the topic; 3) Insufficient image and sound quality; 4) Videos not related to the child patient; 5) Repetition of the same video; 6) Videos about general anesthesia and sedation.

Two researchers independently analyzed the content of all the videos. In case of disagreement, the researchers discussed and reached a consensus.

The resource locations (URL) of the videos were registered. The resource of the videos was categorized as health professionals (pediatric dentists/general dentists), healthcare companies/websites, layperson, and others (TV channels, news agencies, etc.). Video types were classified as educational (giving information on local anesthesia in pediatric dentistry, and types and complications of local anesthesia) and patient experiences. For each video, country of source, number of views, video duration (minutes), number of days since uploading, number of likes, number of dislikes, and number of comments were listed.

Interaction index and view rate were calculated according to the following formula:

$$\text{Interaction index} = \frac{\text{Number of likes} - \text{Number of dislikes}}{\text{Total number of views}} \times 100$$

$$\text{Viewing rates} = \frac{\text{Number of views}}{\text{Number of days since upload}} \times 100$$
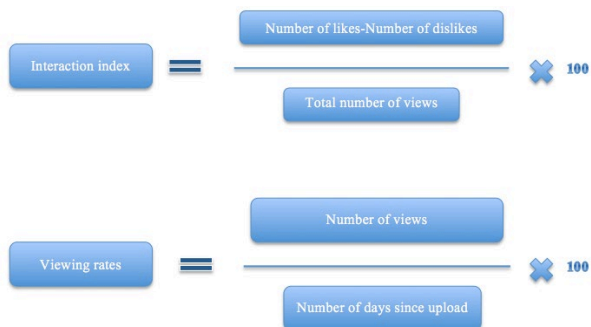
Selected Youtube™ videos were interpreted in terms of indication, contraindication, advantage, description, comprehensive procedure, cost, complications, and duration of anesthesia. Video contents were evaluated in terms of: type of anesthesia used (general anesthesia, sedation, local anesthesia, and topical anesthesia); regional block (mandibular anesthesia, tuber anesthesia, infraorbital anesthesia, mental anesthesia); infiltrative block (intraligamentary anesthesia, intrapulpal anesthesia, and palatal anesthesia); anatomical structures adjacent to the local anesthesia area; the area affected by local anesthesia; the method of applying local anesthesia; the manner in which topical anesthesia is administered; type of injector used in local anesthesia (disposable injector, metal injector, jet injector, or computer aided injector); local and topical anesthetics used (lidocaine, articaine, ultracaine, mepivacaine, bupivacaine, prilocaine, topical anesthetic-benzocaine, or topical anesthetic-xylocaine); the amount (kg/dose) of local anesthesia to be used and the toxic dose and adrenaline in its content; type of treatment in which local anesthesia will be used (restorative treatment, endodontic treatment, or tooth extraction); local anesthesia complications (allergy, toxicity, hematoma, paresthesia, methemoglobinemia, soft tissue injury, anesthesia failure, nerve damage, cardiovascular complications, or needle breakage during anesthesia); and the treatment of the complication and the use of agents that can reverse the effect of the local anesthetic agent after treatment. In Youtube™ videos, 1 point was given if the related topic was mentioned and 0 points were given if it was not mentioned.

Videos were scored between 0 and 23 according to their content and they were classified as low (0 to 7 points), moderate (8 to 15 points), and high (16 to 23 points) substance videos based on the total content score.[12]

SPSS 22.0 (IBM, New York, NY, USA) and R software programs were used for data analysis. In the comparison of the proportions of categorical outcome variables based on the independent groups, the Fisher's Exact test was used. According to Kim,[13] even though the Fisher's Exact test is used only in small sample analyses, it can still be used for all sample sizes. The Fisher's Exact test is appropriate especially for little number of observations (i.e., less than 10) in some cells. All analyses were made with the R software.[14]

Results

The first 213 videos on Youtube™ about local anesthetic applications used in dental treatments in children were examined. Of the videos of 113 videos were excluded from the study. The remaining 100 videos were assayed (**Figure 1**).
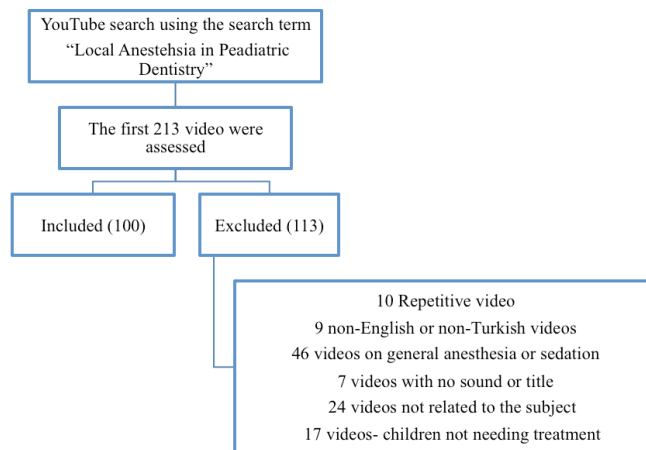

Fig 1. Youtube™ search strategy

Videos were uploaded from the United States (n=44; 44%), India (n=12; 12%), United Kingdom (n=4; 4%), Jordan (n=4; 4%), Saudi Arabia (n=3; 3%), and Greece, Bangladesh, France, Iraq, Israel, Egypt, and Turkey (n=10; 10%). The countries in which the remaining 23 (23%) videos were uploaded are unknown.

The majority of the videos were uploaded by health professionals (n=93; 93%) and the rest by health companies/websites (n=1; 1%), and other (tv channels, news agencies) (n=6; 6%). The average longness of YouTube™ videos on local anesthesia in children was 9.49 min (range: 0.5-57.57 min; median: 4.25). The mean number of views of the videos was 68,330.62 (range: 19-2,045,296); mean engagement index (views/day) 2.40 (range: 0.00-40.31); the average view rate was 12,385.63 (range: 4.33-918,677.07). The overall mean number of "likes" was 139.90 (range: 0-985), while the overall average number of "dislikes" was 27.46 (range: 0-875). The average number of days since upload was 980 (range: 26-4107). All of the analyzed videos (100%, n=100) were educational videos (**Table 1**).

Table 1. Descriptive Statistics of the YouTube™ Videos

Variables	Minimum	Maximum	Mean	Std. Dev.	Median
No. of Views	19	2045296	68330.62	260258.32	2943
Duration (Minute)	0.5	57.57	9.49	12.80	4.25
Days Since Upload	26	4107	980	892.36	671
No. of Comments	0	805	27.19	87.08	4
No. of Likes	0	985	139.90	220.27	38
No. of Dislikes	0	875	27.46	109.46	1
Interaction Index	0.00	40.31	2.40	4.49	1.57
Viewing Rate	4.33	918677.07	12385.63	91979.61	667.28
Source of Upload	n	%			
Healthcare Professionals	93	93			
Commercial	1	1			
Layperson	0	0			
Other	6	6			
Video Type					
Educational	100	100			

Thirteen (13%) videos were included in the high substance video group, 41 (41%) videos were included in the low substance video group, and 46 (46%) videos were included in the moderate substance video group. Most of the videos uploaded by healthcare professionals appeared in moderate (n=46) and low content (n=41) groups (**Table 2**).

Table 2. Frequency Distribution of YouTube™ Video Demographics in Terms of Content Score Group

Variables	Content Score				p
	LOW (n=41)	MODERATE (n=46)	HIGH (n=13)	Total (n=100)	
Source of Upload					
Healthcare Professionals	37 (37 %)	43 (43 %)	13 (13 %)	93 (93 %)	0.52
Commercial	0	1 (1 %)	0	1 (1 %)	
Layperson	0	0	0	0	
Other	4 (4 %)	2 (2 %)	0	6 (6 %)	
Video Type					
Educational	41(41%)	46 (46 %)	13 (13 %)	100 (100%)	-

Fisher's Exact Test

YouTube™ videos contained various types of information about local anesthesia practices for patients and healthcare professionals. When the anesthesia types used in the videos were examined, it was seen that mandibular (n=43) and infiltrative (n=40) anesthesia are mentioned more (**Figure 2**). In the videos, the way of local (n=45) and topical anesthesia (n=29), the amount of local anesthesia to be used (n=32), and the amount of toxic dose (n=33) are mentioned. While the most commonly used local anesthetic agent in the videos was lidocaine (n=49), the addition of adrenaline to local anesthesia was mentioned in 45 videos.
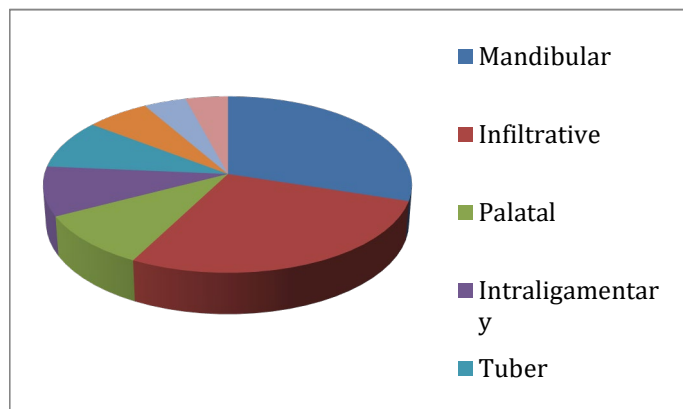

Fig 2. Types of anesthesia mentioned in YouTube™ videos about local anesthesia used in pediatric dentistry.

The most frequently mentioned local anesthesia complications in the videos were toxicity (n=20), allergy (n=17), and soft tissue injury (n=16) (**Figure 3**). There were 18 videos describing the treatment in case of complications.
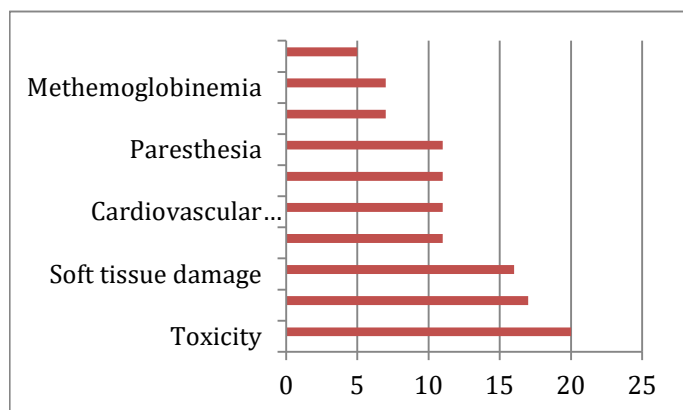

Fig 3. Complications of local anesthesia used in pediatric dentistry on YouTube™

According to the results of our study, videos in the high subtance score group were longer than moderate and low substance videos and videos in the moderate substance group were longer than videos in the low substance group. In terms of the time elapsed after uploading, videos in the moderate and high substance groups had a smaller mean than that in the low substance group. In addition, videos in the high and moderate groups had higher means than that in the low substance group in terms of like rates and interaction index. On the other hand, when evaluated in terms of number of views and viewing rates, those in the low substance group had a higher mean than those in the moderate and high substance groups (**Table 3**).

Table 3. Comparison of YouTube™ video characteristics based on the content score groups

	Content Score				
	LOW (A)	MODERATE (B)	HIGH (C)		
Video Characteristics	Mean±SD	Mean±SD	Mean±SD	p[1]	Pairwise Comparisons[2]
No. of Views	103949.31±384302.36	39261,31±65759.88	67907.00±208840.15	0.01	B<A*
Duration (Minute)	5.65±9.67	11.58±12.78	17.25±18.72	0.05	
Days Since Upload	1170.82±1020.48	895.14±696.52	734.23±1084.38	0.33	
No. of Comments	31.85±127.02	28.56±46.12	14.69±34.79	0.03	B<A* C<A*
No. of Likes	121.36±179.07	161.31±248.34	131.53±276.91	0.1	
No. of Dislikes	41.68±162.77	16.60±32.27	24.53±75.92	0.02	B<A*
Interaction Index	1.24±1.14	2.58±2.75	5.86±10.90	0.15	
Viewing Rate	25722.33±143510.27	3430.86±4975.93	2461.66±5460.73	0.02	B<A*

[1] *Kruskal Wallis Test*
[2] *Pairwise Comparisons Test*
*p<.05; **p<.01

Discussion

Before seeking for dental treatment, most patients and parents watch related videos on YouTube™, one of the social media tools, to learn about the treatment.[15-17] The accuracy of the information on YouTubeTM is questionable at best, due to the facileness of video uploading and the lack of standardization of the content of the uploaded videos.[16,18] Many videos have been researched using YouTubeTM, covering the topics of medicine[15-21] and dentistry.[9,10,12,16,17,25] However, this is the first study analyzing the quality of YouTube™ videos about the application of local anesthesia in pediatric dentistry.

Most of the videos in our study were uploaded by healthcare professionals (n=93; 93%). Gaş et al.[26] found similar results with our study. Since the majority of the videos were uploaded by health professionals, more high substance videos were expected; however, videos with moderate (n=43; 43%) content published by health professionals were found more in the present study. All of the videos in our study were educational (n=100; 100%). It was shown that videos uploaded by health professionals and health-related websites have more useful and educational content and have a greater impact on patients.[25]

The most commonly used local anesthetic agent in pediatric dentistry is amide-type agents.[28] It was reported that 2% lidocaine hydrochloride comprising 1:100,000 epinephrine is frequently used because of its low allergenicity and greater effect even at low concentrations.[29] The addition of vasoconstrictor to the local anesthetic agent has advantages such as preventing the vasodilator effects of the local anesthetic by constricting blood vessels, prolonging the effect of anesthesia, reducing systemic absorption and toxicity, and providing a bloodless area in surgical procedures.[28-30] In our study, the most frequently mentioned local anesthetic agent in the videos was lidocaine (n=49), while the addition of vasoconstrictor to local anesthesia was mentioned in 45 videos.

In pediatric dentistry, it is necessary to use local anesthesia at an appropriate dose according to body weight in order to prevent tongue or soft tissue trauma due to toxicity and long anesthesia duration.[2] In

379

the videos examined in our study, the amount of local anesthesia to be used was mentioned in 32 videos. In addition, having extensive knowledge of the anatomy of the head and neck helps to administer the anesthetic solution to the correct area and to minimize complications.[2] In 37 of the videos we analyzed, anatomical structures adjacent to the area where local anesthesia will be performed were mentioned.

Depending on the application of local anesthesia, localized or systemic complications can be seen at the injection site.[2] Local complications are needle breakage, paresthesia or prolonged anesthesia, facial nerve paralysis, trismus, soft tissue injury, hematoma, pain/burning at the injection site, infection, edema, and intraoral lesions after anesthesia.[29] Systemic complications are toxicity due to overdose, allergy, idiosyncrasy, syncope, drug interaction, cardiac arrest, and hyperventilation.[30] In the videos reviewed, the most frequently mentioned local anesthesia complications were toxicity (n=20), allergy (n=17), soft tissue injury (n=16), and nerve damage, hematoma, paresthesia, and cardiovascular complications (n=11).

The maximum recommended dose for children is 4.4 mg/kg for non-vasoconstrictor lidocaine and mepivacaine, and 7 mg/kg for vasoconstrictor lidocaine.[29,30] In 33 of the videos inspected in our study, the maximum dose of local anesthesia used in children was mentioned.

Soft tissue injury, such as tongue or lip injuries, after local anesthesia is a common complication in pediatric patients. In order to prevent this complication, phentolamine mesylate (OraVerse) is used to reverse the effect of local anesthesia after dental treatments.[2] The use of phentolamine mesylate (OraVerse) was mentioned in only 3 of the videos we reviewed.

While disposable injectors are generally preferred in local anesthesia applications, alternatively, computer-controlled local anesthesia systems and needle-free anesthesia methods can be used.[2] In the analyzed videos, disposable injector (n=20), metal injector (n=30), jet injector (n=9), and computer aided injector (n=16) were used.

When YouTube™ search is made by "relevance", it is seen that most of the videos appearing on the first page are of low quality in terms of content.[9] For this reason, when sorting by relevance on YouTubeTM, the contents of the videos appear to contain misleading information and have high viewing rates.[9] These videos cause patients and their parents to obtain erroneous and incomplete information[9]. In our study, it was observed that the viewing rates of videos with low substance were higher than the groups with moderate and high content.

As the quality of the video substance increased, the total content score and video time also increased. While the rates of liking and commenting on the videos were the highest in moderate content videos, the rate of dislike was higher in low content videos. YouTube™ users watch videos with better content and increase the number of views and likes of the videos they like.[16] Hatipoğlu and Gaş[16] found a positive relation between the total substance score and the view rate, video time, and number of likes. Lena and Dindaroğlu[17] reported that, unlike the present results, the total content score and dislike and comment numbers were higher in the high substance group than in the low substance group. The average durations of videos in the low substance and high substance groups were 5.65 minutes and 17.25 minutes, respectively. This remarkable time difference between the two groups shows that there is a positive relationship between the video duration and the total content score.[16] However, YouTube™ users generally do not prefer to watch long videos.[16] Tozar and Yapıcı[12] reported that the upload dates of the videos in the moderate and high substance groups were more recent, similar to our study, and they explained that these videos contained more up-to-date information.

As a result, although there are many videos on local anesthesia in children on YouTube™, the content of these videos is not satisfactory. Only 13% of uploaded videos are high substance videos. Health professionals should leader patients in this consider so that they can reach correct and up-to-date knowledge.

Conclusion

In pediatric dentistry, the application of painless local anesthesia is important in terms of gaining the patient's confidence and performing a successful dental treatment. Since the child patient and their parents frequently use social media to obtain information before receiving dental treatments, the accuracy of the information on YouTube™ needs to be evaluated. Complications that may occur as a result of the application of local anesthesia should be noted and awareness should be raised on this issue.

KAYNAKLAR

1. Trophimus GJ, Vignesh R, Shankar P. Local Anesthetics in Pediatric Dental Practice. Research J. Pharm. and Tech 2019;12(8):4066-4070.
2. American Academy of Pediatric Dentistry. Use of local anesthesia for pediatric dental patients. The Reference Manual of Pediatric Dentistry. Chicago, Ill: American Academy of Pediatric Dentistry 2020;318-23.
3. Massir E, Palmon Y, Zilberman U. Local Anesthesia in Pediatric Dentistry. How Much is Enough? Dentistry 2018;8:480-483.
4. Ashkenazi M, Blumer S, Eli I. Effectiveness of computerized delivery of intrasulcular anesthetic in primary molars. J Am Dent Assoc 2005;136(10):1418-1425.
5. Berggren U, Meynert G. Dental fear and avoidance: causes, symptoms and consequences. JADA 1984;109(2):247-251.
6. Ayer WA. Psychology and Dentistry:Mental Health Aspects of Patient Care. 1th edn, Haworth Press; 2005. 15-34.
7. McDonald RE, Avery DR. Dentistry for the Child and Adolescent. 8th edn, St Louis, CV Mosby; 2004. 270-284.
8. Brunetto PC. Anesthetic efficacy of 3 volumes of lidocaine with epinephrine in maxillary infiltration anesthesia. Anesth Prog 2008;55:29-34.
9. ElKarmi R, Hassona Y, Taimeh D, Scully C. YouTube as a source for parents' education on early childhood caries. Int J Paediatr Dent 2017;27(6):437-443.
10. Paksoy T, Gaş S. Quality and content of YouTubeTM videos related to sinus lift surgery. J Oral Maxillofac Surg Med Pathol 2020;33:48-52.
11. Hegarty E, Campbell C, Grammatopoulos E, DiBiase AT, Sherriff M, Cobourne MT. Youtube TM as an information resource for orthognathic surgery. J Orthod 2017;44(2):90-96.
12. Tozar KN, Yapıcı Yavuz G. Reliability of information on YouTube™ regarding pediatric dental trauma. Dent Traumatol. 2021 Jul 21. doi: 10.1111/edt.12708. Epub ahead of print.
13. Kim HY. Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test. Restor Dent Endod. 2017;42:152-5.
14. R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. 2020.
15. Al-Silwadi FM, Gill DS, Petrie A, Cunningham SJ. 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.
16. Hatipoğlu Ş, Gaş S. Is Information for Surgically Assisted Rapid Palatal Expansion Available on YouTube Reliable? J Oral Maxillofac Surg. 2020;78(6):1-10.
17. Lena Y, Dindaroğlu F. Lingual orthodontic treatment: a YouTubeTM video analysis. Angle Orthod. 2018;88(2):208-214.
18. Nason GJ, Kelly P, Kelly ME, et al. YouTube as an educational tool regarding male urethral catheterization. Scand J Urol. 2015;49(2):189.
19. Keelan J, Pavri-Garcia V, Tomlinson G et al. YouTube as a source of information on immunization: a content analysis. JAMA. 2007;298(21):2482-2484.
20. Tian Y. Organ donation on web 2.0: content and audience analysis of organ donation videos on YouTube. Health Commun. 2010;25(3):238–246.
21. Kumar N, Pandey A, Venkatraman A, Garg N. Are video sharing web sites a useful source of information on hypertension? J Am Soc Hypertens. 2014;8(7):481-490.
22. Lopez-Jornet P, Pons-Fuster E, Ruiz-Roca JA. YouTube videos on oral care of the organ or hematopoietic stem cell transplant patients. Support Care Cancer. 2017;25(4):1097-1101.
23. Hassona Y, Taimeh D, Marahleh A, Scully C. YouTube as a source of information on mouth (oral) cancer. Oral Dis. 2016;22(3):202-208.
24. Delli K, Livas C, Vissink A, Spijkervet F. Is YouTube useful as a source of information for Sjögren's syndrome? Oral Dis. 2016;22(3):196-201.
25. Nason K, Donnelly A, Duncan HF. YouTube as a patient-information source for root canal treatment. Int Endod J. 2016;49(12):1194-1200.
26. Gaş S, Zincir ÖÖ, Bozkurt AP. Are YouTube videos useful for patients interested in botulinum toxin for bruxism? J Oral Maxillofac Surg. 2019;77(9):1776-1783.
27. Altan Şallı G, Egil E. Are YouTube videos useful as a source of information for oral care of leukemia patients? Quintessence Int. 2020;51(1):78-85.
28. Jayakaran TG, Vignesh R, Shankar P. Local anesthetics in pediatric dental practice. Res J Pharm Technol. 2019;12(8):4066 4070.
29. Troutman KC. Pharmacologic Management of pain and anxiety for pediatric patients, In: Wei SH, editor. Pediatric Dentistry Total Patient Care, Philadelphia, PA: Lea and Febbiger; 1985;156 162.
30. Malamed SF. Anesthetic considerations in dental special-ties. In: Handbook of Local Anesthesia. 6th ed. St. Louis, Mo. Mosby; 2020;289-307.