Educational Quality of YouTube Videos in Thumb Exercises for Carpometacarpal Osteoarthritis: A Search on Current Practice

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Abstract

Background: Conservative treatments are commonly performed therapeutic interventions for the management of carpometacarpal (CMC) joint osteoarthritis (OA). Physical and occupational therapies are starting to use video-based online content as both a patient teaching tool and a source for treatment techniques. YouTube is a popular video-sharing website that can be accessed easily. The purpose of this study was to analyze the quality of content and potential sources of bias in videos available on YouTube pertaining to thumb exercises for CMC OA. **Methods:** The YouTube video database was systematically searched using the search term *thumb osteoarthritis and exercises* from its inception to March 10, 2017. Authors independently selected videos, conducted quality assessment, and extracted results. **Results:** A total of 832 videos were found using the keywords. Of these, 10 videos clearly demonstrated therapeutic exercise for the management of CMC OA. In addition, the top-ranked video found by performing a search of “views” was a video with more than 121 863 views uploaded in 2015 that lasted 12.33 minutes and scored only 2 points on the Global Score for Educational Value rating scale. **Conclusions:** Most of the videos viewed that described conservative interventions for CMC OA management have a low level of evidence to support their use. Although patients and novice hand therapists are using YouTube and other online resources, videos that are produced by expert hand therapists are scarce.

Keywords: thumb, carpometacarpal, osteoarthritis, YouTube

Introduction

YouTube is the second largest search engine after Google, and more than 6 billion hours of videos are watched each month on this social media site.⁶ It is used for teaching and learning because it is interactive and widely accessible, and provides the viewer with a variety of content available as an online learning resource. YouTube contains a vast source of freely accessible medical information for patients and health care providers. The current modern student learners have been termed the “YouTube generation” because of their reliance on social information technology.⁴ Students in particular are increasingly using YouTube as a learning resource for practical education, in particular when it involves procedures and techniques, because of its practicality and portability.

Carpometacarpal (CMC) joint osteoarthritis (OA) is a common diagnosis among elderly individuals found to impact 26.2% of women and 13.4% of men aged 71 to 100 years.^{10,13} In early thumb CMC joint OA, the focus of conservative management should emphasize the reduction of

pain, improvement of functional abilities, and enhancement of joint stability. Conservative interventions aim to prevent the progression of joint damage and improve the individual’s quality of life through the reduction of pain.^{11,12} There is recent evidence that multiple conservative interventions performed in therapy may improve hand function and decrease hand pain in patients with CMC OA.¹ Various conservative approaches such as manual therapy, massage, therapeutic exercise program, heat therapy, electrotherapy, magneto therapy, laser, ultrasound therapy, transcutaneous electrical nerve stimulator (TENS), cryotherapy, patient education, and orthotic provision are described in the litera-

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SCORE	SCORE DESCRIPTION
1	Poor quality, information missing, technique misleading, not useful.
2	Generally sparse quality, some information provided but majority lacking, technique poor, very limitedly use
3	Moderate quality, important information provided but some lacking, technique mostly adequate, limitedly useful
4	Good quality, majority of information provided but some information lacking, technique adequate, useful
5	Excellent quality, full information provided, technique adequate, very useful

Figure 1. Global Score for Educational Value.

ture. To our knowledge, no study has analyzed the quality of videos on YouTube that demonstrate the different exercises used in the conservative treatment of CMC joint OA. The purpose of this study was to analyze the quality of the YouTube video content and identify the potential sources of bias in videos available on YouTube pertaining to thumb exercises for CMC OA.

Methods

The YouTube video database was systematically searched using the search term *thumb osteoarthritis and exercises* from its inception to March 10, 2017. Only videos with clear demonstration of exercises for thumb CMC OA posted by health professionals or institutions were included in the analysis. Duplicate videos were counted as one video. Exclusion criteria comprised videos that did not address exercises as part of treatment of thumb OA as the main topic, videos that addressed thumb pain without specifying the pathology, videos with duration of more than 20 minutes, industry videos, those that were not in English, or those that appeared after page 10 of the YouTube relevance-based list. Videos were categorized by technique, duration of video, age of video, and total views. The content of the videos was evaluated based on Global Score for Educational Value.^{5,9} Two independent clinical reviewers assessed the videos for procedural technique and educational value using a 5-point global score, ranging from 1 = poor quality to 5 = excellent educational quality. Two review authors (R.C.-T. and P.B.) independently conducted video selection and data extraction. A third author (J.H.V.) was consulted in case of disagreement between the primary reviewers. Reviewers were not blinded to information regarding authors of the videos.

Data Analysis

The mean scores were used to classify the videos into high, intermediate, and low quality. A video was rated high if the

average score was 5, intermediate if the score was 3 or 4 points, and low quality for a score of 2 or less (Figure 1).

Results

Video Selection

A total of 832 videos were identified as relevant and were included in the analysis. After screening the titles according to inclusion criteria, the videos that appear after page 10 of YouTube relevance-based list were eliminated. The remaining 28 full-view videos were assessed to verify their eligibility for inclusion in the present study. Ultimately, 18 of them were excluded because they did not meet our inclusion criteria that resulted in 10 videos (1.2%) being included in this study (Figure 2).

Only 2 cases of disagreement between the assessors occurred regarding the inclusion of 2 videos in the study. The disagreement was regarding the aim of 2 videos. The doubt was resolved during a meeting consultation with another author (J.H.V.). Both videos were excluded because they did not meet the inclusion criteria.

The mean duration of the videos was 3.66 ± 3.11 min, and the mean score was 1.27 ± 1.2 . The age of the selected videos was between 2011 and 2016. In addition, the top-ranked video found by performing a search of “views” was a video with more than 121 863 views uploaded in 2015 that lasted 12.33 minutes and scored only 2 points on the Global Score for Educational Value rating scale^{5,9} (Table 1).

Educational Value and Intervention Techniques

Regarding the exercises performed in the videos, the rationale for the exercise performance and the frequency and dose of exercise were reported in 5 videos (50%), but only 4 of the 5 videos contained explanations that were considered to be thorough and complete. The muscles of the thumb, which were included in most of the videos, were the

Figure 2. Flowchart of video selection.

Table 1. Video Scores.

Videos	Score	Duration of video (min.)	Year created	Total views
1	3	2.16	2011	83 558
2	1	1.4	2014	10 057
3	2	1.32	2013	370
4	2	12.33	2015	121 863
5	2	3.41	2013	17 023
6	2	5.09	2012	15 402
7	1	3.12	2012	49 406
8	4	1.41	2011	16 065
9	3	3.37	2016	976
10	5	2.21	2016	2911

thumbs flexors and the opponens muscles. Three of the videos demonstrated thumb exercises in all directions without considering any particular muscle. Two videos provided instruction regarding an orthotic program as a complement to the exercises program.

Most of the videos achieved a score of less than 3 points, which means that they were considered to be low quality (Table 2). Only 1 of them had excellent quality with full information and demonstrated adequate techniques, and it lasted 2.21 minutes and had 2911 visits at the date of retrieval.

Ergonomic instruction was discussed in 6 videos (60%) but without a clear explanation except in videos 8 and 10. The mean score for educational videos was 2 out of 5 (Table 2).

Discussion

The purpose of this study was to conduct a review of YouTube regarding conservative interventions on pain and function in participants with thumb CMC OA. We found 10 videos, which is similar to the findings of Fischer et al that found 13 videos on the subject of knee OA.^{5,9} They also reported a 3.31-minute average length of the videos as compared with our average length of 3.66 minutes.^{5,9} The low scores achieved by the videos regarding thumb OA are comparable with other studies that reported low scores for YouTube videos on knee OA, rheumatoid arthritis, and femoroacetabular impingement.^{5,7,9} The low scores in our study were assigned because the directions provided by many of the videos were not comprehensive or based on the best scientific evidence. We found only 1 video that received a score of 5/5 as compared with the study of MacLeod et al that found no videos that received an excellent score.⁷ This equates to 10% of the videos that met our criteria as being of high quality.

The Internet has profoundly changed the way both patients and novice health care providers seek information.

Table 2. Content for Educational Value and Intervention Technique.

Video	Indication	Frequency of exercises	Clarity explanation	Force exercises	Orthotic	Ergonomic	Score
Video 1	+	+	–	Opponens/flexor	–	+	3
Video 2	–	–	–	Flexor	+	+	1
Video 3	–	+	–	Flexor	–	+	2
Video 4	–	–	–	All directions	–	–	2
Video 5	+	–	+	Flexor/opponens	–	–	2
Video 6	–	–	–	Flexor	+	–	2
Video 7	–	–	+	Flexor	–	–	1
Video 8	+	+	+	All directions	–	+	4
Video 9	+	+	–	Flexor/opponens	–	+	3
Video 10	+	+	+	All directions	–	+	5

While web-based resources cannot substitute for therapist-patient face-to-face treatment sessions, reports suggest that empowering patients with these learning tools may improve health outcomes in a cost-effective manner.^{2,3} However, it may be difficult for patients and novice providers to ascertain if a video's content is accurate and reflects best practices. Alarming is the fact that the video that received the most views in our study received only a 2/5 on the Global Score for Educational Value rating scale. One manner that may address the current issue is for professional organizations like the American Society of Hand Therapists to produce video content using its expert members. Also when professional societies upload videos, they need to ensure that the directions are comprehensive and also provide the rationale for the suggested treatments. Also clinicians should direct clients to video sources that they find to demonstrate best practice when using YouTube as a patient teaching tool.

This study has limitations. The information available on YouTube changes over time as video content is uploaded and deleted. Our study design was cross-sectional and was able to capture only a single snapshot of the information available on the website at the time of data extraction. Also, our analysis was limited to the first 10 pages. However, prior evidence suggests that most viewers do not go beyond the first few pages when performing a YouTube search.⁸

Conclusion

Many of the videos regarding the conservative management of CMC OA to improve hand function and decrease hand pain have limited evidence to support their content. Some practitioners focused on therapeutic exercises and rarely demonstrated manual therapy. Although learners and novice hand physical therapists are using YouTube and other online resources, expert clinicians have not been represented in these resources. Patients and students need to be cautious when using YouTube as a source for health-

related information. Professional organizations should consider guiding the process of producing and uploading quality videos to YouTube to create repositories of good examples and to direct patients and the YouTube generation toward more reputable resources.

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Ethical Approval

This study was approved by our institutional review board.

Statement of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Statement of Informed Consent

Informed consent was obtained from all participants and all procedures were conducted according to the Declaration of Helsinki.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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