



Youtube as an education tool for shoulder arthroscopy: Is it the future?

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ABSTRACT

Introduction: The Internet remains a popular source of information to both the public and healthcare professionals. Initially launched in 2005 as a video sharing website, YouTube has developed into the second largest search engine available on the Internet. **Objectives:** This study aimed to evaluate the video content on shoulder arthroscopy available online, assessing its accuracy and quality in order to determine the overall usefulness for both patients and orthopaedic specialists. **Methods:** A search of the YouTube video database was conducted using the terms "shoulder", "arthroscopy" and "arthroscopic repair". The usefulness of each video's content was categorized as high, moderate or poor according to a devised scoring system. Spearman's rank correlation coefficient was used to analyze the relationships between usefulness scores generated for each video and their corresponding technical characteristics. **Results:** The videos assessed, on average scored highest in the area of basic arthroscopy demonstration and were least comprehensive in discussing complications and information on the anaesthetic. Overall a significant proportion of videos reviewed (70%) were categorized as "poor" in quality with just 5% deemed as "high" in quality and usefulness for the patient population. Spearman's rank coefficient revealed a moderate correlation between patient usefulness scores and length of video (Spearman's $\rho = 0.44$, $p = 0.051$) and a strong correlation between orthopaedic specialist usefulness scores and length of video (Spearman's $\rho = 0.65$, $p = 0.002$). **Conclusions:** Despite the continuing growing trend of internet use for health-education purposes, it would seem the quality of such information available on public domains remains deficient.

KEY WORDS: Shoulder Arthroscopy; Youtube; Internet; Patient Education; Medical Education; Quality of information.

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INTRODUCTION

The Internet remains a popular source of information to the public with patients aiming to better comprehend their health issues and ultimately make more informed decisions regarding their treatment options. Up to 65% of adults in the United States were found to use the Internet for health related information in a recent study addressing data from the national health interview survey (NHIS). [1] Furthermore a significant proportion of patients in a separate study deemed health information available on the Internet as equivalent to or better than that provided by their doctors. [2] The internet has also become a significant source for continued medical education (CME) amongst doctors, with internet based CME programs found to be as useful as traditional methods for conveying the most up-to-date knowledge and principles amongst physicians. [3] Information may be conveyed in various forms across the internet, with short video format becoming increasingly popular.

Initially launched in 2005 as a video sharing website, YouTube has developed into the second largest search engine available on the Internet. [4] According to statistics from YouTube, the website attracts over 1 billion individual users each month with over 6 billion hours watched during this time. [5]

Medical professionals are becoming more aware and concerned about the information available to their patients and this has seen the emergence of several recent studies

specifically addressing the role of video based websites, namely Youtube as a source for information to the public on a variety of subjects. Research into Internet based video content in various health areas including cardiopulmonary resuscitation, rhinosinusitis, burns first aid, paediatric tonsillectomy, rheumatoid arthritis, and epilepsy, has been conducted over the last five years. [6-11] The results of these studies demonstrate wide variability in the quality of information available.

Early literature reviews evaluating the use of medical videos on patient education highlighted their importance in reducing anxiety and emotional simulation whilst allowing patients to increase understanding of information. [12] More recently however, the first large systematic review looking at healthcare information available on YouTube raised several concerns relating to the content accessible. [13]

Advancements in shoulder arthroscopy techniques and developments in technology available have inevitably led to its increasing popularity amongst surgeons in the diagnosis and treatment of shoulder pathology. The last decade alone has seen arthroscopic therapeutic procedures including; subacromial decompression, extensive glenohumeral debridement and rotator cuff repair, rise by up to 12-fold, with over 70% of all rotator cuffs now repaired arthroscopically. [14,15]

As with any evolving surgical practice, the amount of available information on the Internet will be vast and

present in a variety of forms. The aim of this study was to evaluate the video content available on YouTube pertaining specifically to shoulder arthroscopy. The study looked specifically at the type of information available as well as its accuracy and quality in order to determine the overall usefulness of video content available for both patients and orthopaedic specialists. To our knowledge there are no previous studies, which have examined the characteristics of these videos.

METHODS

A search of the YouTube video database (www.youtube.com) was conducted on Nov 5th, 2015 using the terms “shoulder”, “arthroscopy” and “arthroscopic repair”. Filters were applied in accordance with the pre-set standard Youtube template, see Table 1. Research has shown users are seldom likely to click on search results, which are “below the fold” (i.e. results which only become visible on scrolling through the page) and even less likely to actively change page from the initial top ranking results.[16] Youtube presents its search results in the form of pages, with each page containing 20 videos. A total of 5 videos are immediately visible in a standard screen view. Based on the assumption that users were unlikely to proceed past the first page of results as ranked by the YouTube organization, we analyzed the first 20 videos for the purposes of this study.

Table 1. Filters set for search

Upload Date	Anytime
Type	All
Duration	All including Short (< 4 mins) and Long (>20 mins)
Features	All
Sort by	Relevance

Basic technical characteristics for each video were recorded, see Table 2. Furthermore the content of each video was further scrutinized based on several core areas including: anatomy demonstration, anesthesia, equipment, positioning and preparation, port insertion, basic diagnostic arthroscopy, therapeutic procedures, post-operative rehabilitation, and complications. A scoring system was devised based on 10 core areas identified, see Table 3. Two separate assessors assessed each video. A third senior assessor was available to provide further assistance with any discrepancies in scores determined. For trainees in the orthopaedic field, all core areas were deemed relevant and therefore videos were scored out of a potential 20 points. In contrast, a selection of five core areas were felt to be specifically appropriate for the lay audience and a separate score pertaining to the content and quality of the videos for patients was generated with a maximal possible score of 10 points. The usefulness of each video’s content was then categorized as high, moderate or poor according to the scores based on the algorithms in Tables 4 and 5. Spearman’s rank correlation coefficient was used to analyze the relationships between usefulness scores generated for each video and

their corresponding technical characteristics. All statistical analysis was performed using Stata vers. 8.2.

All videos relating to any aspect of shoulder arthroscopy were included into the study. Videos presented in languages other than English were excluded.

Table 2. Technical Characteristics

1	Video length (mins)
2	Time since first uploaded (months)
3	Creator of Video
4	Country of Origin
5	Number of Views
6	Number of Comments
7	Number of Subscribers
8	Allocated video category
9	Video Type (Live/Animated)
10	Intended Audience (Layperson/Physician)

RESULTS

The initial search returned 35,200 videos. From the first 20, one video was excluded as it pertained to veterinary shoulder arthroscopy and the next video along in the list was included for review. The mean video length was 6.25 minutes, with videos being available online on average for 25.5 months at the time of data collection. The mean number of views across all of the videos reviewed was 28,614, with the most popular video exhibiting 195,000 views and the least popular just 133. The majority of videos (N=16) originated from the USA, with three originating from the UK and one video originating from France. The target audience for each video was assessed, revealing that only 25% of videos were aimed at the layperson, with 65% aimed at healthcare professionals and 10% deemed to be unclear due to lack of sound commentary.

The videos assessed, on average scored highest in the area of basic arthroscopy demonstration, showing viewers a tour of the normal shoulder anatomy through the lens of an arthroscope, see Table 6. The videos were least comprehensive in discussing complications associated with the procedure and information on the anaesthetic (Mean scores: 0.1 and 0.2 respectively).

The video characteristics are presented in table 3 and separated according to their respective usefulness scores produced against all of the criteria, see Table 3. The average score out of a maximum of 20 was 6.05, and ranged from 2 to 14. For the lay audience videos were scored according to a selection of 5 specific criteria deemed relevant to patients, and the video characteristics according to the usefulness of the videos for patients are presented, see Table 5. The usefulness scores for patients ranged from 0 to 8 and averaged 2.55 out of a maximum of 10 points.

Tablel 3. Scoring system for core areas in shoulder arthroscopy

Core Area	Score		
	0	1	2
Anatomy Demonstration*	Not discussed	Brief description of shoulder anatomy	Thorough discussion of anatomy related to the arthroscopy procedure
Anesthetic*	Not discussed	Brief discussion of anesthesia involved	Thorough discussion of types of anesthesia available
Equipment	Not discussed	Brief discussion of equipment involved	Thorough discussion of equipment and its function
Positioning & Preparation	Not discussed	Incomplete/unclear demonstration	Clear sequence specified and demonstrated
Port Insertion	Not discussed	Incomplete/unclear demonstration	Clear demonstration of insertion point based on surface anatomy
Basic Diagnostic Arthroscopy	Not discussed	Incomplete/unclear procedure demonstration	Thorough example of procedure assessing all normal anatomy
Therapeutic Procedures	Not discussed	Basic description of an associated therapeutic procedure	Detailed demonstration of an associated therapeutic procedure
Post-operative Rehabilitation*	Not discussed	Brief discussion or demonstration of incomplete program	Clear demonstration of a complete program
Complications*	Not discussed	Brief description of some complications	All major complications discussed
Delivery of content*	Unclear/Difficult to follow	Moderate quality of delivery with areas of ambiguity	Clear, high quality delivery of all information

* Variables considered relevant for evaluation of videos for lay persons.

Table 4. Video characteristics according to usefulness of videos for orthopaedic specialists. Quality of video

	High (≥ 12)	Moderate (6-11)	Poor (≤ 5)	Spearman's rho	P-value
Number of Videos	2	9	9		
Average Length (mins)	14	6.1	4.9	0.65	0.002
Mean time since upload (months)	23.5	24	27.6	-0.20	0.398
Mean views	36028.5	23687.6	31893.3	0.22	0.341
Mean number of subscribers	668.5	255.8	295	0.06	0.790
Video Source					
Clinical Institute	1	7	5		
Commercial organization	1	2	1		
Educational Institute	0	0	2		
Private user	0	0	1		

Table 5. Video characteristics according to usefulness of videos for patients

	High (≥ 7)	Moderate (4-6)	Poor (≤ 3)	Spearman's rho	P-value
Number of Videos	1	5	14		
Average length (mins)	6	11.2	5	0.44	0.051
Mean time since upload (months)	17	17.8	28.9	-0.36	0.114
Mean views	2899	21493	32995	-0.03	0.884
Mean number of subscribers	33	401	304	0.01	0.974
Video Source					
Clinical Institute	1	3	9		
Commercial organization	0	2	2		
Educational Institute	0	0	2		
Private user	0	0	1		

Table 6. Average scores for each of the core areas assessed

Core Area	Average score (2)
Anatomy Demonstration	0.4
Anesthetic	0.2
Equipment	0.5
Positioning & Preparation	0.5
Port Insertion	0.65
Basic Diagnostic Arthroscopy	1
Therapeutic Procedures	0.85
Post-operative Rehabilitation	0.35
Complications	0.1
Delivery of content	1.5

Spearman's rank correlation coefficient revealed a moderate correlation between patient usefulness scores and length of video (Spearman's $\rho = 0.44$, $p = 0.051$) and a strong correlation between orthopaedic specialist usefulness scores and length of video (Spearman's $\rho = 0.65$, $p = 0.002$). Correlations between usefulness scores for both patients and orthopaedic specialists, and numbers of views for videos were weak and statistically non-significant. This was also found to be the case when comparisons were made against number of subscribers for videos.

DISCUSSION

To the best of the author's knowledge, this is the first study assessing the video content available on YouTube pertaining to shoulder arthroscopy. Of the videos analysed it was quite clear the majority (65%), were intended for the viewing of healthcare professionals, however being openly available on the YouTube platform it is likely that most patients concerned with the procedure will view this content.

This study confirms that the majority of videos pertaining to shoulder arthroscopy available on YouTube were of moderate to poor quality. Only 10% of the videos assessed were deemed as high in quality, when assessed against criteria relevant for orthopaedic specialists, and just 5% against criteria specific for laypersons. This seems to be in keeping with the majority of previous studies analyzing videos on various medical topics.

In this study the number of views, along with the number of subscribers to the video uploader, were used as indicators of the overall popularity of each video amongst the general public. It would seem that neither of these variables correlated with the usefulness scores determined in this study for each video.

The process by which YouTube establishes the default search result rankings of videos is multifactorial. There are several obvious considerations including number of times each video has been viewed along with the length of time videos are engaged with. However to the novice user, there are several more technical aspects used to establish a video's overall ranking when a search is implemented. These factors largely focus on the title of the video along with key words, transcripts and captions linked to the video. A well-versed user of YouTube may ensure a video ranks highly amongst its competitors using a process not necessarily dependent on the overall quality, relevance or usefulness of the video to the target audience.

Furthermore there are limited restrictions on new material, which can be uploaded onto YouTube. Current policies in place; ensure videos are evaluated to prevent the uploading of material considered to contain dangerous, explicit or harmful content.[2] However there is no censorship pertaining to accuracy or quality of health related videos.

It should be noted that, YouTube allows users to adapt search rankings according to certain variables namely; upload date, view count and ratings of the video. It is unlikely for this feature to result in a greater proportion of higher quality videos returning from searches in view of the lack of correlation shown in this study between the usefulness scores and these variables.

Previous studies have made suggestions on measures to improve the usefulness and quality of medical videos. [8-11] These recommendations largely revolve around establishing specialist committee 's for analyzing medical videos prior to their distribution on YouTube, whilst ensuring accepted videos are graded according to their quality and made available to users.

CONCLUSIONS

This study has further highlighted the issue of poor quality health information being readily available on major Internet sites. This is in keeping with the findings of the first large systematic review looking at healthcare information available on YouTube which raised several concerns relating to the content available online, labeling it as "misleading", "Anecdotal" and in some cases "contradictory to reference standards".[13] Furthermore it would seem the distinction between videos intended for educating specialists and those for the layperson is poorly proclaimed.

Patients often rely on the Internet as a prime source for gathering information regarding their health, with YouTube regarded as the second most popular search tool online. This emphasizes the importance of the findings of this study and the need for the healthcare community to act. It is therefore the author's recommendation that major search engines such as YouTube develop a peer review process prior to the distribution of their online health related content.

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