

YouTube and the Expanding Role of Videos in Dermatologic Surgery Education

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Video is an excellent medium for medical education, both for clinicians and for the public. YouTube has emerged as one of the largest sources of freely accessible content. It is our intent to provide a preliminary discussion of the growing role of videos in medical education, sources of this video content, and the format of surgical video content on YouTube. Additionally, we will highlight the limitations and pitfalls that clinicians and the public should be aware of when viewing online video content. Several sources of both patient- and clinician-directed videos are easily accessible from the Internet and DVDs today. Medical professionals, students, and patients now have mobiles and instantaneous access to a growing collection of video content. A brief list of online video sources to view and learn dermatologic surgical techniques is provided. Given the increasing ease of creating and posting high-quality video content, this list will continue to grow, providing dermatologic surgeons with an ever-increasing wealth of visual knowledge. Although YouTube is a dominant source of publicly accessible videos, clinicians and consumers should be aware of the source and intent of the video content before accepting the content. Although it is easy to post content on YouTube, it is difficult to verify sources and the credentials of the people posting the videos. Therefore, the viewer should filter content with a discerning eye, embracing the concept of *caveat emptor*—or *buyer beware*.

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“See one do one teach one” is a well-known mantra in medical education often reiterated when learning examination skills or procedural skills in medical schools residencies fellowships and even in practice. There is no substitute for being present and witnessing the events of an examination or procedure unfold—static text and pictures in a book sim-

ply cannot compare. However, video is a medium that can approach recreating the experience.

If a picture is worth a thousand words, a video is worth a 100,000 or more. This is evident after speaking with almost any medical student on a clinical rotation today. Thousands of videos scattered on the Internet depict everything from drawing blood to performing an appendectomy, and students can access these videos to better prepare themselves for reality, that is, standing at a patient’s bedside or performing in the operating room. Along with a textbook review and discussion of procedural steps with residents and attending physicians, online videos have become a routine and important tool in preparing a student. In fact, students and residents can often be seen reviewing a video of a procedure to refresh their memory immediately before entering the procedure room.

Numerous studies have demonstrated the effectiveness of online learning, not limited to medical education. Advan-

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Table 1 Internet Sources of Surgical Videos

<p>YouTube² www.youtube.com Google©</p>	<p>The most extensive collection of videos of any kind, YouTube offers easily-accessible surgical videos to doctors, students, and patients. Anyone can post videos and anyone can view videos. Sources can be difficult to verify.</p>
<p>Virtual Derm Surg³ www.VirtualDermSurg.com Derm Education Foundation©</p>	<p>A free access, view-only website dedicated to the field of Dermatology and Dermatologic Surgery, Virtual Derm Surg provides complimentary, in-depth surgical training videos. The website also features procedures performed on high-fidelity cutaneous surgical models. Information is reliable and sources are verified. Content is owned and generated by the Derm Education Foundation, a not-for-profit organization. Several major US academic institutions are now using the site. Volume of content is limited, but growing.</p>
<p>Procedures Consult⁴ www.proceduresconsult.com Elsevier Inc.©</p>	<p>An extension of MDConsult, it is a view-only site of high-quality, reliable medical videos and information. Procedures Consult offers pre-procedure, procedure, and post-procedure information in the form of text, illustrations, animation, and video. Content is verified by physicians, and owned and generated by Elsevier. Discussions and posting by the public is prohibited. A paid account is necessary to gain access to all the features this website offers.</p>
<p>MedClip⁵ www.medclip.com Medical Videos©</p>	<p>An online medical networking community where users make content available to other users of MedClip. Members create their own profiles that are then shown to other members of this site. Content generation is limited to doctors, students and paramedical personnel, yet viewing content is unrestricted. This site offers easily-accessible, high-quality videos classified by specialty. Content is neither verified nor regulated.</p>
<p>ORLive⁶ www.orlive.com BroadcastMed©</p>	<p>This site is known for its live broadcasts of surgeries and consists of a library of over 10,000 surgical and clinical videos. Over 55,000 hours of video is streamed monthly to more than 160,000 visitors. The target audience includes physicians, surgeons, medical students, clinical staff, and caregivers. The content is offered from the perspective of a medical professional. ORLive offers reliable information and verifiable sources, and is utilized by doctors and medical centers to advertise their services. Members, including physicians, hospital systems, and pharmaceutical/medical device manufacturers, can post content. ORLive videos are accessible from YouTube.</p>
<p>AccessSurgery⁷-Harrison's Online www.accesssurgery.com McGraw Hill©</p>	<p>This online teaching tool has an extensive video library featuring surgical and technical procedures. The content is verified and generated by a highly-credible publishing source, and is intended for medical students and professionals. Paid access is required, and content is generated and regulated by McGraw Hill. To date, Dermatology content is limited to text.</p>
<p>MedlinePlus⁸ www.nlm.nih.gov/medlineplus/surgeryvideos.html U.S Library of Medicine and National Institute of Health</p>	<p>This free-access site has an extensive collection of categorized videos from verified and reliable sources. Content is owned and posted by Medline only; users cannot post. To date, dermatology-specific content is limited to Plastic Surgery, and is available in text form.</p>
<p>Medical Videos⁹ www.medicalvideos.us Bliss.com©</p>	<p>This website offers medical and surgical content including videos, and is accessible to the public. Access is free and its users generate content. Members post content that is unregulated by Medical Videos.</p>

tages include convenience, freedom of navigation, the option of repeated practice or viewing, and access to high-quality videos and images. Web sites that offer online resources for medical students represent a movement away from the traditional lecture-based education of the past to more modern, self-directed, web-based learning. Above all, the Internet is a tool that is used for storage and retrieval of vast amounts of information. It is a resource that, if used properly, can greatly enhance the learning experience of students and medical professionals alike.¹

With the accessibility of high-quality video equipment and the increasing bandwidth of the Internet, capture and deliv-

ery of video content is producing a revolution in the way students learn. This is not only true for medical students and professionals, but also for the public. High-definition, video camera-enabled mobile phones and consumer cameras allow almost anyone to shoot high-quality videos, and to quickly and easily upload to various public Internet sites that host catalogs of searchable videos. The videos available today allow one to visualize almost any process from changing a light bulb to performing a complex surgical procedure.

It is remarkable that anyone with Internet capabilities can access video content of surgical procedures online, primarily on YouTube.² Dermatologic surgery is growing in its involve-

ment with this modern form of information storage and retrieval, but it is still behind the times in comparison with the fields of gynecologic surgery and plastic surgery, which are leaders in terms of the volume of high-quality videos and associated blogs posted. Judging by the sheer number and quality of surgical videos found on the Internet today, plastic surgeons have best understood the advantages of posting video content and capitalizing on this resource to date. Comparing the sites listed in Table 1, it is clear that there is a link between quality and price. Those sites that are free to users are unregulated, content is posted in a haphazard and disorganized manner, and leave it up to the user to search for desired information. Paid subscription sites provide clearly delineated categories and search functions, and the posted content is of a significantly higher quality. However, the free sites do promote online communication between users and the ability to share videos across other social media platforms, features that are not part of most subscription sites. Perhaps in the future, subscription sites will be able to meld high-quality content with real-time user communication providing the best of both worlds. Additionally, paid sites have a clear focus on education, whereas the goal of many of these free user-generated sites is unclear.

YouTube: The Dominant Source of Surgical Videos

One of the leading sources of videographic information is YouTube. It is an online public communications site that combines video sharing and blogging into one. Individuals, not business or academic institutions, have uploaded the majority of YouTube's content. Unregistered users can view videos, whereas registered users can upload video content and make it available to the public. Users can respond to videos by adding comments below the video and rating the quality of both the video and posted comments. The highest-voted comments earn the top spot, which is an ad hoc method of validation and quality control. The site is self-regulated by its community. Videos considered to contain offensive content are available only to registered users who are aged at least 18 years. In November 2006, YouTube was bought by Google for US\$1.65 billion, and currently operates as a Google subsidiary. YouTube has emerged as a major Internet presence, since its founding in 2005. It offers ease of use and a huge variety of video content, including learning videos, entertainment, comedy, action, music, marketing, and much more. The ease of use and access, immediacy, less cost for posting, and instant access to the public make YouTube a practical tool for not only businesses, but also for a wide range of individuals, from musicians to the average kid posting a video of their school project.

Table 2 is a sampling of dermatologic surgery procedures posted on YouTube. Responses through comments are minimal from professionals in the field, and therefore, it is unclear whether these posts are receiving adequate awareness. Given that YouTube is an open forum, anyone can post content to the site. As expected, physicians are posting videos of

Table 2 Dermatology Video Content Posted on YouTube

Procedure	Who is posting
Mohs surgery	<ul style="list-style-type: none"> • Dermatologists • American College of Mohs surgery
Shave/punch biopsies	<ul style="list-style-type: none"> • Dermatologists • Patients
SCC/BCC excisions	<ul style="list-style-type: none"> • Physicians
Wart removal	<ul style="list-style-type: none"> • Physicians • Patients
Cyst excision	<ul style="list-style-type: none"> • Physicians • Patients
Suturing techniques	<ul style="list-style-type: none"> • Sim Suture™ • Procedure Consult™ (procedureconsult.com) • Physicians
Adjacent tissue transfer simulations (W plasty, Z plasty, rhomboid adjacent flap, and V to Y flap)	<ul style="list-style-type: none"> • Physicians
Electrosurgery	<ul style="list-style-type: none"> • Ellman™

SCC/BCC, squamous cell carcinoma/basal cell carcinoma.

surgical content, in addition to patients, manufacturers of surgical equipment, and dermatologic societies such as the American Society for Dermatologic Surgery (ASDS) and the American College of Mohs Surgery (ACMS).

To date, it appears that the primary goal of physicians using YouTube is for advertising. Several individual and/or group practices are leveraging the new channel to reach customers and educate them about their services. Marketing-savvy physicians are also posting patient testimonials and videos of patients discussing procedures they have undergone, such as surgical excision and Mohs surgery/reconstruction. The testimonials serve a dual purpose of advertising and instilling confidence and trust in new customers who are about to undergo similar procedures with the same clinician.

YouTube is also serving as a new medium for education and awareness. Clinicians and students seeking to understand how a procedure is accomplished now have a visual tool that augments current textbooks. YouTube is an immediate resource to enhance training, and Internet access allows a quick, free, and extensive resource that can be accessed globally. Currently, comments between students and clinicians are fairly limited, demonstrating that viewers seem to be using the resources for viewing only, but not for discussion and questions and answers with other clinicians. For patients, it provides a medium to post and discuss procedures they have undergone. Additionally, patients now have a forum in which they can discuss their fears about the upcoming procedures. Blogs between patients appear to allay some of these fears. For example, a patient posted the following comment after viewing a video on Mohs surgery and reconstruction: "It's rare to see something this graphic on YouTube, but I find this to be the most helpful video I've yet found. And I'm a nurse with 16 years

of experience, trying to figure out how to explain the process better to my Mom (And maybe, to suggest a better treatment center than the one she's at) and Dad. Though, I expect this video would make my Dad pass out."²

Finally, patients who require services for which there is a lack of providers in their area can directly reach out to physicians for guidance after viewing their postings online. One such patient posted the following comment on YouTube after viewing a video of a W-plasty procedure for a malar scar revision: "Doctor, I have a scar on my left cheek can you help me?" It remains to be seen whether comments such as these actually result in physicians taking on new patients from an online query.

Considering the Source of Videos on YouTube

The Internet serves as a paradigm shift in how we access and share information in written form. YouTube has the potential to add to this paradigm shift in terms of visual information. However, academic institutions, especially in the field of medicine and surgery, have not yet harnessed this potential. For example, YouTube has devoted an entire section of its content dedicated to education. Among topics in graduate education, premier management institutions are posting lectures on classical disciplines such as finance, economics, marketing, and so forth, allowing all levels of "students" to continue their professional development—all of which was information previously limited to Master of Business Administration students.

However, medical education has not kept pace. The American Academy of Dermatology (AAD), the ASDS, and the (ACMS) have the ability to provide high-quality, validated, educational material to the public via the Internet. Some of this material already exists in the form of DVDs sold to their members. Videos from key thought leaders in dermatologic surgery on basic and cutting-edge procedures would allow clinicians to enhance their clinical acumen. These resources could be made available online, enhancing the skill set of self-learning physicians. This type of learning can have a great impact, which includes, improving patient care, enhancing physician job satisfaction, and an up-tick in physicians' books of business. Another useful advance would be the content robust enough that medical professionals could view videos to learn and gain continuing medical education credit.

Manufacturers of products used by dermatologic surgeons are underrepresented in content posted on YouTube. As a key stakeholder in the field, they have currently underused the opportunity to provide online training material to a wide audience. This may be a function of the heavily regulated environment governing promotional materials that can be provided by these companies. Although these companies do not routinely produce public access videos, they do increasingly use Internet technology to host online educational programs to qualified health care practitioners. This allows greater flexibility and reduced cost as compared with live dinner programs. These pro-

grams are usually based on PowerPoint presentations rather than videos, but this is likely to change as streaming video technology via teleconferencing improves and becomes more reliable.

Perils and Pitfalls of Learning from YouTube Videos

It should be noted that there are limitations on current dermatologic surgery postings on YouTube. Given the open access nature of YouTube, anyone can post content on clinical procedures without oversight on the quality of what is being posted. Additionally, the credentials of physicians posting their videos are sorely lacking—most physicians do not introduce themselves by name in their posts. Therefore, there is no accountability for the quality of information provided. If the information is supplied by a reputable and impartial organization such as the AAD various audience members can derive greater value from what they are seeing and engage in richer discussions via comments posted.

The content posted on dermatologic surgery is limited, especially compared with other surgical fields, such as laparoscopic procedures and plastic surgery. Dermatology has yet to catch up with these other surgical fields when it comes to the volume and quality of videos being posted. Plastic surgeons have embraced the format of reaching patients and clinicians via videos, as they recognize the value in educating clinicians in training, promoting and sharing cutting-edge techniques in the field, and putting knowledge directly in the hands of their consumers.

In addition to numbers of procedures, step-by-step instructions are lacking in the video that is posted. Animations or videos without verbal explanations are what users currently have to view, precluding education of surgical techniques.

The majority of dermatologic procedures posted are by patients taking a video of themselves in the office, breaking confidentiality of themselves and their clinicians with their voices, and often, faces are revealed. The purpose of these informal video blogs by patients is unclear, other than to share their "status" with friends, à la Facebook.

It is the responsibility of the viewer to determine the quality and creditability of information posted. Users need to be aware that sheer volume on YouTube does not correspond with high quality.

A Potential Alternative to YouTube

One of the more promising Web sites on the Internet today is Procedures Consult,⁸ a growing online resource for medical professionals. The site is designed to help medical professionals prepare for, perform, and test their knowledge of medical procedures. Owned by Elsevier, content is developed in conjunction with academic institutions including Harvard University and the University of Pennsylvania. The site provides coverage of >300 medical procedures spanning 7 specialty areas, including anesthesia, emergency medicine,

internal medicine, orthopedics, family medicine, pediatrics, and general surgery. Procedures Consult offers a training physician area designed for medical students and interns.

The paid-access site allows access for both medical groups and individuals. The site offers credible and reliable videos and animations of procedures along with step-by-step instructions and illustrations to promote learning. It also provides procedure-specific indications, contraindications, necessary equipment, relevant anatomy, postprocedure care details, and possible complications. Finally, Procedure Consult's customizable testing service provides feedback to group administrators or the test takers themselves on how well participants have mastered a particular procedure. It remains to be seen whether this service could be used for continuing medical education credit.

There are approximately 20 dermatology procedures found on Procedures Consult to date. Although the volume of information is significantly lower relative to YouTube, the quality, accessibility, and thoroughness of the information on Procedures Consult are of much higher caliber. The Web site offers students an opportunity to fully understand and master all aspects of a procedure, from the beginning to the end. This is in contrast to a Web site, such as YouTube, which often only provides viewers with a video and no other accompanying information. Although students may learn the mechanics of a procedure from YouTube videos, they may not fully understand the reasoning behind the mechanics along with preprocedural and postprocedural details. Procedures Consult also offers a mobile version compatible with most smart phones, allowing physicians and students to access material on the go.

Conclusions

YouTube is a critical resource of information for clinicians and the lay public. Since 2007, it has been ranked one of the top 10 Internet sites. There are certainly competitors on the horizon, poised to provide higher-quality content in addition to the video; however, they are not free services. Medicine, in general, has proven to be a late adopter of video technology, and specifically, the field of dermatologic surgery has yet to fully embrace the medium to provide education, disseminate information, and connect individuals, thereby creating meaningful relationships between patients, physicians, and corporations.

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