

# Common Femoral Artery Access on YouTube: What Practices are Being Shown and Who is Delivering the Message?

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**OBJECTIVES:** Novice learners are increasingly turning to YouTube as a learning resource for surgical procedures. One example of such a procedure is common femoral artery puncture and sheath placement. Practitioners in several specialties perform this procedure to access the arterial system for angiography and intervention. We set forth to compare the techniques demonstrated on YouTube by the various specialists, as well as compare each specialty's prevalence on this website.

**METHODS:** YouTube ([www.youtube.com](http://www.youtube.com)) was accessed in December 2015 at multiple time points with a cleared-cache web browser for the keyword search categories: "femoral artery access," "femoral access," and "angiography access." The top 500 videos from each of these keyword searches were analyzed. Videos were categorized by practitioner specialty, technique, duration of video, age of video, and total views. Videos with clear demonstration of femoral artery access were included in the analysis. All industry videos were excluded from the analysis. Categorical variables were compared using Fisher's exact test, and continuous variables were compared with the Student's *t*-test.

**RESULTS:** A total of 2460, 4680 and 1800 videos were found for each keyword search, respectively. Of these, 33 videos clearly demonstrated femoral artery access technique. Vascular specialists, compared to interventional cardiology and radiology, had fewer videos ( $n = 4$  vs. 14) and older videos ( $3.5 \pm 2.1$  y vs.  $2.25 \pm 0.5$  y,  $p < 0.05$ ). The vascular specialists demonstrated ultrasound-guided access, while interventional cardiology predominantly demonstrated landmark-guided access ( $p < 0.05$ ).

**CONCLUSIONS:** Although YouTube and other online resources are being used by novice learners, vascular specialists are underrepresented for femoral artery access, a foundational vascular procedure. Other practitioners demonstrate videos with landmark-guided access and rarely demonstrate ultrasound use. As recognized vascular experts, vascular surgeons should improve their visibility in online learning resources. (J Surg Ed ■■■-■■■. ©2016 Published by Elsevier Inc. on behalf of the Association of Program Directors in Surgery)

**KEYWORDS:** YouTube, medical students, residents, femoral artery access, vascular surgery

**COMPETENCIES:** Medical Knowledge, Practice-Based Learning and Improvement

## INTRODUCTION

Media for teaching and learning are becoming more interactive and widely distributed with the availability of online learning resources.<sup>1,2</sup> Current modern medical student learners have been termed the "YouTube Generation" because of reliance on social information technology.<sup>3-6</sup> Medical students and residents in particular are increasingly using YouTube as a learning resource for surgical education, in particular when it involves procedures, because of its practicality and portability.<sup>7</sup>

Common approaches to the femoral artery include using of anatomical landmarks, ultrasound identification, and fluoroscopic guidance. Fluoroscopy-guided common femoral puncture technique has been widely accepted despite limited and conflicting data.<sup>8-11</sup> Direct palpation of the common femoral artery can be identified in the inguinal skinfold but is considered the most unreliable method and should be avoided except in nonobese patients with straightforward anatomy.<sup>12</sup> Ultrasound is considered a reasonable adjunct by many practitioners for

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access of the femoral artery. This common practice is supported by large European<sup>13</sup> and American Society Guidelines.<sup>14</sup> To date the only study that has examined fluoroscopic vs. ultrasound imaging has been the FAUST trial.<sup>15</sup> These investigators randomized just over 1000 patients to either fluoroscopic or ultrasound guidance during retrograde femoral artery access. The primary result was equivalency of the 2 imaging modalities with minor variation in overall complication rate of ultrasound and fluoroscopic imaging of 1.4% and 3.4%, respectively.

The goal of our study was to gain insight into what students are seeing and learning on YouTube by looking at what is being taught and by whom. To do so, we used femoral artery puncture as a way to highlight the potential impact of YouTube as a learning resource and to illustrate the need for a stronger presence by vascular surgery in online learning. Practitioners in several specialties perform this procedure to access the arterial system for angiography and intervention. Our goal was to compare the techniques demonstrated on YouTube by the various specialists, as well as compare each specialty's prevalence on YouTube.

## METHODS

YouTube ([www.youtube.com](http://www.youtube.com)) was accessed in December 2015 at multiple time points with a cleared-cache web browser for the keyword search categories: "femoral artery access," "femoral access," and "angiography access." The top 500 videos from each of these keyword searches were reviewed and analyzed. Videos were categorized by practitioner specialty, technique, duration of video, age of video, and total views. Videos with clear demonstration of femoral artery access were included in the analysis. All industry videos were excluded from the analysis. Categorical variables were compared using Fisher's exact test, and continuous variables were compared with the Student's *t*-test.

## RESULTS

A total of 2460, 4680, and 1800 videos were found for the respective keyword searches of "femoral artery access," "femoral access," and "angiography." Of the top 500 videos viewed for each search term, only 33 videos (6.6%) clearly demonstrated femoral artery access technique. The Table presents the characteristics of the videos.

Vascular specialists, compared to interventional cardiology and radiology, had fewer and older videos ( $3.5 \pm 2.1$  y vs.  $2.25 \pm 0.5$  y,  $p < 0.05$ ). All videos from vascular specialists demonstrated ultrasound-guided access whereas interventional cardiology and radiology videos predominantly demonstrated landmark-guided access (100% vs. 7%,  $p < 0.05$ ). No videos were affiliated with the Society for Vascular Surgery's Official YouTube channel.

The top-ranked video when searching for "femoral artery access" and "femoral access" was a video demonstrating landmark-guided access from a neurosurgeon. In addition, the top-ranked video for a search of "angiography" was a video with over 800,000 views demonstrating landmark-guided access from a cardiologist.

## DISCUSSION

Medical students are increasingly using YouTube as a reference for medical education including surgical procedures.<sup>7</sup> Barry et al.<sup>6</sup> found that 78% of medical students had used YouTube as their primary source of anatomy-related video clips. In addition, the use of video technology has been increasingly utilized in surgical training.<sup>16,17</sup> A recent survey evaluating surgical preparation that included surgeons, residents, and medical students found that most respondents used videos to prepare for surgery and that students and residents use YouTube more than faculty.<sup>18</sup> YouTube offers many advantages to surgical learners including its affordability and convenience.

However, there remain several limitations with YouTube as a resource for surgical education. The sheer volume of material available on YouTube can be overwhelming for the student. In our searches, less than 10% of the videos demonstrated a clear femoral artery access technique. Additionally, the source of the material being shown is not clear in the majority of the videos. We also encountered videos with a variety lengths and number of views. We also encountered videos with a variety lengths and number of views. It is not clear from our analysis what confounding factors precipitated this variability. Possible explanations include referencing of YouTube videos by formal medical education curriculums, or peculiarities in YouTube's search algorithm.

Even though a minority of medical students will be exposed to vascular surgery, let alone arterial access, the best common practice utilizing adjunctive imaging technology

**TABLE.** Video Characteristics

	Vascular Surgery and Medicine (n = 4)	Interventional Cardiology and Radiology (n = 14)	Neurosurgery (n = 2)	Unknown (n = 13)
Ultrasound guided	100%	7%	0%	62%
Landmark guided	0%	93%	100%	38%
Duration (min $\pm$ SD)	6:33 $\pm$ 3:41	15:06 $\pm$ 35:95	3:94 $\pm$ 4:82	4:50 $\pm$ 5:02
Age (y $\pm$ SD)	3.5 $\pm$ 2.1	2.25 $\pm$ 0.5	4.5 $\pm$ 0.7	3.5 $\pm$ 1.1
Views (total $\pm$ SD)	1077 $\pm$ 913.5	50,370 $\pm$ 159,476	23,298 $\pm$ 31,554	14,392 $\pm$ 35,693

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