



# Internet Journal of Medical Update

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## App Review

### Touch Surgery™

**The Operating Room in your Pocket: a Surgical Simulation app**  
**Publisher: Touch Surgery Labs, 230 City Road, London, EC1V 2QY, UK**  
**Available for Android and iOS**

With regard to the teaching of undergraduate surgery, there is a lot of uncertainty as to how much operative technique a student should know. The consensus would be that the requirement is inversely proportional to the complexity of the procedure: with urethral catheterization for example, the student would probably be required to be able to demonstrate the procedure on a dummy; for an appendectomy, to describe it step-by-step; while for a Whipple's pancreatoduodenectomy, being able to assemble the jigsaw puzzle on paper would be commendable. All this obviously varies with local curricular dictates. However, it comes as a surprise to many laymen (and some policy makers) that undergraduate students of surgery are not really taught how to operate. Indeed, the Royal College of Surgeons prescribes just one skill for undergraduate students: skin suturing, one safely and easily learnt in a skills lab. Moreover, given the climate of short-fuse litigation and patients' rights awareness, the traditional practice of off-record student involvement in active patient care is dwindling. At most, today, it is expected that fledgling doctors be aware of what is done during common operative procedures, enough to be able to learn them under guidance and supervision during subsequent formal training.

Undergraduate students have traditionally learned about operative techniques by observation in the operation room. While this has been the practice in many medical schools worldwide and is considered ideal, in reality this translates to peering over shoulders at live surgery while trying to maintain a 'sterile' distance from the operation field. First, the view is hardly ever good, the limited exposure being directed towards the surgeon; most of what the student sees is a busy surface of gloved hands, bloody sponges, and clanking instruments. Even if transferred to a monitor screen, it would compare poorly to YouTube; unless narrated and displayed stepwise, students would barely follow the goings-on. Also, the real-time extent of many operations allows students to see only a few steps before their lectures call.

Students cause crowding and obstruction to movement in the OR and, possibly, disturbance or breach of sterile protocol. Some surgeons dislike

demoing or any distraction whatsoever; students are regularly and routinely evicted from ORs for 'being a nuisance'. It can be stressful too, if a surgeon gets aggressive with questions or there is a complication. So, a lot of the benefits of an OR posting are in the fun of scrubbing up for surgery, getting a chance to retract, drive a lap camera or even throw a stitch, but very little in learning the steps of an operation.

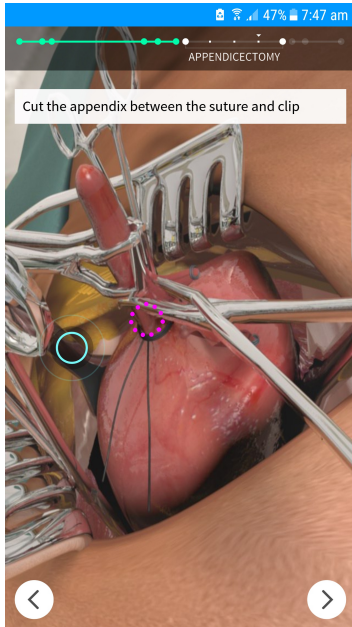
There have been always been alternatives, from animal models to manikins and, nowadays, computer simulators. The latter are more like childish games, some avowedly so, in which a mad surgeon has to race against time to scrounge out cartoonish organs from a rapidly flooding abdomen. Until now.

We now have Touch Surgery™, an app available for the iOS and Android platforms. This is a surgery simulation medical app that teaches and tests operative procedures step-by-step, using 3D graphics that depict realistic surgical environments. The procedures have been developed by surgeons working with VR teams, often with the sponsorship of industry leaders; scientific accuracy has been vetted by leading medical institutions. The specialties covered stretch from oral and maxillofacial surgery to interventional radiology to orthopedics, with modules on hemostasis, hernia anatomy, healing and stapling, with more being constantly added.

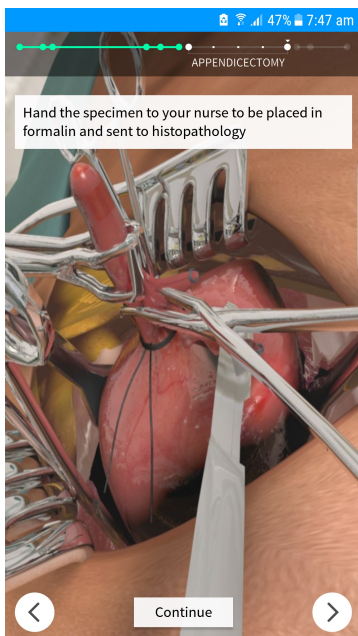
This app is a cognitive delight. With clear graphics, authentic enough to convey a sense of atmosphere, one can perform any of a large array of downloadable procedures. These can be repeated and previous scores improved upon. You can build a personalized library of operations, track your progress, and learn additionally about instruments and tissues. Each procedure (over 50 at last count) is accompanied by a brief and relevant article on background, indications/ objectives, pre- and post-operative considerations, patient positioning, complications and references. This nicely rounds up the app into a complete learning resource.

While the procedures necessarily have the linear progression of a role-playing game (or a fluent surgical operation), there is an element of decision-making built in. The app does not pretend to teach

skills – all one really does is drag a finger across the screen (**Figure 1**) to initiate a video clip of the next step of the procedure (**Figure 2**). However, the interactivity is immersive and the feeling of performing the procedure is visually as authentic as it can get on-screen.



**Figure 1: Screenshots of steps while ‘performing’ an appendectomy. The ‘surgeon’ would proceed by dragging the green circle on the screen to the pink one.**



**Figure 2: This would initiate a video clip of the appendix being transected by the scalpel, and further on-screen instructions would follow.**

The real-life performance of a surgical procedure requires orchestration of knowledge, judgment and dexterity. The first two are cognitive acquisitions, and Touch Surgery™ can help a trainee surgeon gain familiarity, procedural drilling, and confidence in a procedure he is about to embark upon (assist or perform), anytime, anywhere. Indeed, many residency programs have incorporated appropriate modules and their virtual expertise as a qualification requirement. For undergraduate students, this app could be the best way to visualize and understand the nuts and bolts of an operative procedure.

Also, unlike so much teaching today, it is great fun. I have whiled away many hours dabbling in procedures outside my field and enjoyably learned so much of what it is that my professional colleagues do; how else would a general surgeon really understand what goes on during a trabeculectomy or how to replace a knee? With respect to my own teaching, I have learned to see an operative procedure as a series of interdependent cascaded steps (a didactically useful perspective), not only as a coalesced performance exercise.

To get unlimited access to the app (which includes early access, collaboration on module design, and verification of progress badges) one requires online authentication of professional standing which is limited for users in most countries. The use of the app, however, for an individual learner, is entirely free.

Those of my students who use Touch Surgery™, love it, and I know doctors-in-training who would pace through a procedure on their smartphones or tablets while waiting, say, for the x-ray film before inserting a chest tube, or when scheduled to assist on a major case like a laparoscopic hernia repair. Personally, stepping through familiar procedures has helped clarify so many of my concepts, and the ability to explore so widely outside my own field makes this app truly an OR in my pocket.

As you read this, you are probably at a computer with Internet access. Check out the app by clicking on <https://www.touchsurgery.com/>. Download it from the Google Playstore (for Android devices) or the App store (for iOS devices) for free. Browse the exhaustive list of procedures classified by specialty, choose whatever intrigues you, and scrub in.

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