

The 21st Century Virtual Surgical Amphitheater



Real-time surgical collaboration in between surgeons
(in two operating rooms at a hospital)
with remote participants (over the Web)
via TIMS Consultant interactive video & audio
Source: TIMS Medical

Article 7 in the “Reimagining Telemedicine” Series

by **Mark D. Mariotti**

President & CEO

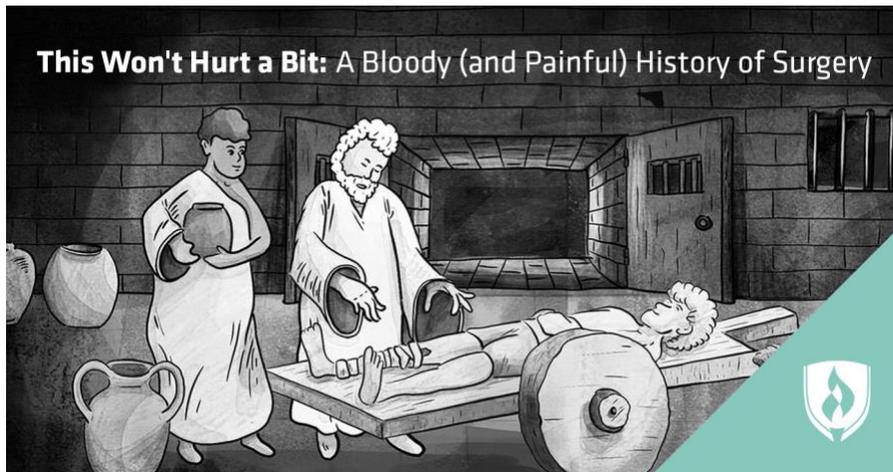
TIMS Medical

www.tims.com

<https://www.linkedin.com/in/markdmariotti/>

As I've written in prior articles for my [“Telemedicine Reimagined” series](#), new medical imaging technologies are transforming a widening range of medical tests and procedures, expanding opportunities for telecollaboration, telementoring, and remote medical education. In this post, I'd like to explore the history of operating theaters and suggest that live, interactive medical video has enabled **“The 21st Century Virtual Surgical Amphitheater.”**

The website of **Rasmussen University** (which offers surgical technology degrees) hosts a somewhat gruesome animation titled [“This Won't Hurt a Bit: A Bloody \(and Painful\) History of Surgery.”](#)



Featuring a narrator whose voice recalls Vincent Price, the animation covers the bloody and gory evolution of surgery from barbaric practices of the Neolithic period (ca. 4500 BC) to the surgical scene of today: “...sterile room, bright lights, instruments clean...” As writer **Kristina Erikson** describes in some detail: “Surgeries weren’t always so neat and clean,” instead “risky, terrifying ordeals” until the second half of the 19th century brought the advent of anesthesia, germ-theory, rubber gloves, and sterilization of instruments.

With more than 5,000 medical imaging systems deployed around the world, my company ([TIMS Medical](#)) has seen our fair share of the inside of operating theaters and procedure rooms. Looking over the roster of our customers, I realized that many of our current hospital customers, were literally and figuratively at the cutting edge of what was in their time “state of the art” in operating theaters.

Centuries ago, rooms dedicated to surgeries were dubbed **“operating theatres”** because that’s exactly what they were: theaters with rows of seating for audiences of medical and public observers who’d watch all sorts of procedures, from autopsies to amputations, and more.

For fellow fans of medical history, here’s a gallery of five innovative TIMS Medical clients who’ve evolved from using germ-ridden public surgical theaters to what I call **“The 21st Century Virtual Surgical Amphitheater.”**

Pennsylvania Hospital (Philadelphia, PA)



Image: Oldest surgical amphitheater in the US (Philadelphia Hospital)

Source: *Pennsylvania Hospital*

[Pennsylvania Hospital](#) (the nation's first) was founded in 1751 by Benjamin Franklin and Dr. Thomas Bond. Given its tradition of innovation, it's not surprising that the hospital constructed [the oldest surgical amphitheater in the United States](#) in 1804. This theater hosted clinicians and medical students from the University of Pennsylvania School of Medicine from 1804 until 1866. Today, TIMS Medical systems are in daily use for a wide range of applications at several Penn Medical facilities.

Mass General Hospital (Boston, MA)



Image: 'First Operation Under Ether' - 1893 Painting by Robert C. Hinckley of 1846 surgery at MGH.
Source: *Wood Library-Museum of Anesthesiology*

Located just 40 minutes from my office in Chelmsford, MA is the historic [“Ether Dome”](#) at Boston’s [Mass General Hospital](#) -- the room where more than 8,000 operations were performed between 1821 and 1868. Depicted in the 8X10-foot painting above, the most famous operation that took place there was on October 16, 1846, when William T.G. Morton demonstrated the first public surgery using anesthetic. To the amazement of the audience, as he was “knocked out” from ether, the patient felt no pain, and made no sounds during a complex surgery for tumor of the jaw. Today, MGH is an award-winning clinical, research and teaching hospital (affiliated with Harvard Medical School) and a long-time user of TIMS Medical systems.

Thomas Jefferson Hospital (Pennsylvania, PA)



Image: Keen Surgery Clinic at Jefferson Medical College (1899)

Source: *Thomas Jefferson Hospital*

Originally formed in 1825 as the Infirmary of the Jefferson Medical College, the [Thomas Jefferson University Hospital](#) serves patients in Philadelphia and residents of the Delaware Valley and New Jersey. On December 15, 1887 (in the hospital's amphitheater pictured here), Dr. W.W. Keen became the first surgeon to successfully remove a benign brain tumor. I'm very proud that TIMS Medical imaging systems are used at such a prestigious healthcare center.

Bellevue Hospital (New York, NY)



Image: NYU Medical School students observe surgery at Bellevue Hospital Operating Theater (1921)
Source: <https://holdthisphoto.tumblr.com/post/21119819900/1921>

Founded in 1736, [Bellevue](#) is the flagship public hospital of New York City – it was its first and biggest public hospital. In the modern era, TIMS Medical systems are used at Bellevue Hospital, and at the 5-star rated [NYU Langone Medical Center](#), both of which are affiliated with the NYU Grossman Medical School.

Ascension St. John Hospital (Tulsa, OK) *Example of a 21st Century Virtual Surgical Amphitheater*



Image: Remote surgical collaboration during kidney transplant between surgeons in two ORs at an Oklahoma hospital with thousands of remote urologists who participated over the Web. (March 2021)
Source: *Urologic Specialists of Oklahoma*

Having admitted its first patients in 1924, the now-named [Ascension St. John Medical Center](#) is considerably younger than the aforementioned hospitals. Despite its youth, this Tulsa-based healthcare center (largest in Oklahoma) belongs among the other innovators for its participation in a recent moment in surgical history.

Since 1950, members of the **Oklahoma State Urological Association (OSUA)** have gathered in person each year. Given COVID restrictions, on March 6, 2021, OSUA was forced to conduct its annual meeting via a virtual conference format. Coincidentally, on that same day, surgeons from [Urologic Specialists of Oklahoma](#) (who have privileges there) were scheduled to conduct a kidney transplant operation at St. John.

To make the most of the occasion, OSUA's immediate past President, [James L'Esperance, MD](#) arranged for [TIMS Consultant](#) medical imaging systems to be installed in two ORs at the hospital to stream live video from the procedures (kidney harvest and kidney transplant) to participants of the OSUA meeting in real-time via the Web.

Meeting Coordinator Managing Interaction Between Attendees & Surgeons

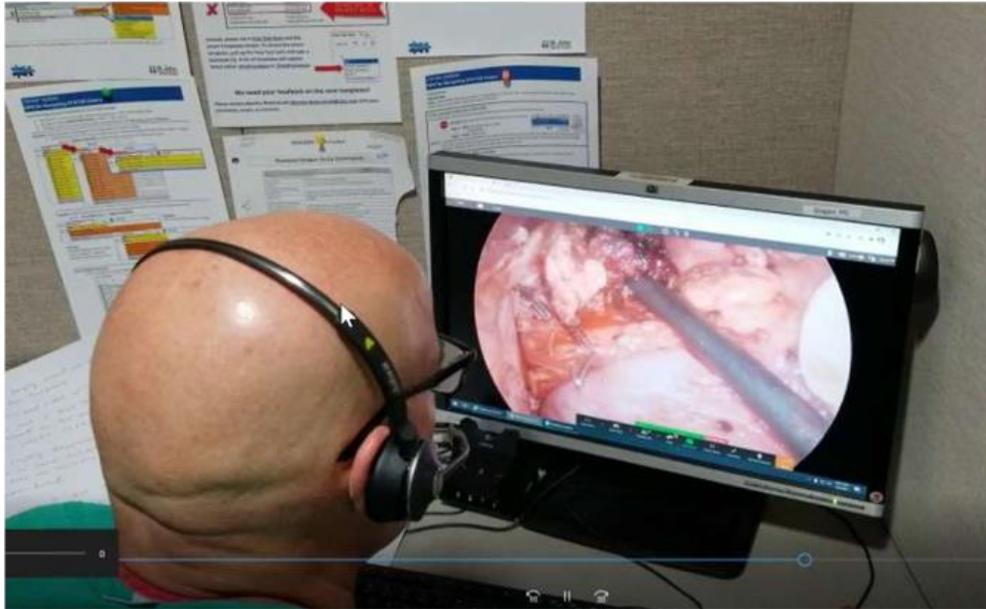


Image: James L'Esperance, MD serving as moderator of shared surgical footage and live audio/video interactions between surgeons at Tulsa's Ascension St. John Medical Center with remote attendees of the 2021 Annual Meeting of the Oklahoma State Urological Association (March 6, 2021)

Source: *Urologic Specialists of Oklahoma*

Over the five hours of the donor/recipient surgeries, online attendees were able to watch live in-body and external video via laparoscopes, surgeons' headcams, and mounted external cameras during portions of the procedures. Additionally, via real-time audio interactions with the *in-situ* surgeons, these remote participants were more than just conventional conference attendees. Instead, they were active collaborators who could give their professional feedback to the surgeons via **Dr. L'Esperance** (who functioned as moderator).

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Crowded and unsanitary, surgical amphitheaters of the past were far from perfect.

The confines of physical space in operating rooms limited the number of observers (e.g., collaborators/mentors/students) and thwarted their ability to interact (e.g., ask questions of surgeons).

Transcending the confines and constraints of traditional operating rooms, the capabilities for live, interactive medical video and audio furnished in the Ascension St. John procedures/OSUA conference enabled a “21st Century Surgical Amphitheater” that demonstrated these proven benefits:

- Highly cost-effective platform
- High quality interactive audio/video
- Makes medical conferences more interactive, less passive
- Teleconsultations for additional expert advice and concurrence
- Telementoring and teleproctoring
- Review in-progress status and final operative results
- Valuable ability to record and review surgeries (Post-Op)
- Facilitate peer review and self-peer review
- Provide valuable resource for training and remote learning
- “See One, Do One, Teach One” 21st century medical education

A retired urologist who joined the OSUA meeting described it as a “game changer.”

Stay Tuned. I look forward to sharing other application stories with you in the future.

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This original article “The 21st Century Virtual Surgical Amphitheater” is the seventh in a series of educational “[Telemedicine Reimagined](#)” posts by [Mark D. Mariotti](#), President/CEO of TIMS Medical & Foresight Imaging (Chelmsford, Mass. USA).

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TIMS Medical - By Foresight Imaging

1 Executive Drive, Suite 202

Chelmsford, MA 01824 USA

W: www.tims.com P: (978) 458- 4624

E: info@tims.com

Follow us on Twitter at <https://twitter.com/TIMSMedical>

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