ASCEND®
CARDIOVASCULAR

Revolutionizing Multi-Disciplinary Collaboration in Healthcare:

Exploring the Power and Potential of Virtual Telepresence

CATALYST LIVE

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Breaking Barriers:

The Impact of Virtual Telepresence in Healthcare

Collaboration is a cornerstone of evidenced-based, complex patient care[i]. Collaboration initiatives in healthcare have existed since the 1980's and continually result in notable impacts such as decreased crisis response times, reduced complications and readmissions, and lower rates of unnecessary interventions, with one collaboration initiative in Michigan estimating roughly 1.4 billion in saved healthcare costs[ii]. Yet, in a digital era where connection, communication, and interaction are seemingly more achievable than ever, collaboration among healthcare teams continues to be encumbered by geographical barriers, privacy concerns, and burgeoning licensing and support costs for expanded access to specialized applications. These challenges manifest in several ways, impacting program scalability, provider compensation, access to care, and ultimately, patient health outcomes.

To combat these challenges virtual telepresence, broadly described as "a mental state in which a user feels physically present within a computer-mediated environment"[iii], is quickly emerging as an indispensable tool in remote collaboration and communication. Extending beyond basic video conferencing, telepresence also seamlessly integrates multiple media and communication mediums, such as direct video, spatial audio, and interactive streaming from multiple imaging sources and medical devices to create an immersive and life-like virtual experience that simulates connection, experienced realism, collaboration, and emotional consequence.

In a virtual telepresence environment, healthcare providers can dynamically navigate through virtual spaces and interact with media as if they were physically present to create a heightened sense of presence and foster meaningful professional connections. As organizations continue to embrace remote work and global collaboration becomes the norm, the innovative and transformative features offered by virtual telepresence allow healthcare enterprises to create a virtual ecosystem that enhances communication, fosters engagement, and mirrors the richness of face-to-face interactions.

The uses for virtual telepresence span the breadth of the healthcare continuum from routine continuous improvement initiatives such as remote educational sessions, multi-disciplinary team meetings, or virtual proctoring to complex care situations such as live interventional or surgical guidance or real-time monitoring of intensive care patients. For example, during an electrophysiology procedure, cardiologists, or technicians can, from any location, exchange expertise over direct video, while instantly visualizing and interacting with real-time fluoroscopy and peripheral physiological devices to provide instant feedback and guidance or engage in dynamic problem-solving as challenges arise.

Behind the Scenes:

Understanding the Technology Driving Virtual Telepresence

Virtual telepresence combines multiple state-of-the-art technologies to integrate engaging communication tools such as audio and video, live streaming from medical devices, threaded chat, on-demand conference calling, push notifications, and image and document sharing. Some of the core components and functionalities of virtual telepresence include:

Communication Technology:

- **Audio and Immersive Video:** Enables live-streamed audio and video from remote controlled cameras, fostering an immersive, highly collaborative environment for the entire care team
- **Live Streaming from Medical Devices:** Integrates with numerous combinations of physiologic, imaging, reporting devices to provide remote care team members with real-time access to critical diagnostic information
- **Threaded Chat:** Includes threaded chat so that, when necessary, topics can spawn dedicated threads where related replies and interactions are grouped together, distinct from another conversation flow

Compatability and Accessibility:

- **Enterprise Integration:** Seamless integration with the EHR, physiologic and procedural devices, and a variety of image sources creates a highly collaborative environment across routine and complex care environments
- **Cross-Platform Compatibility:** Cloud-based technology ensures that virtual telepresence works effortlessly on Mac, PC, iOS, and Android devices to provide reliable access across the entire enterprise
- **Simple Start Interface:** The application is launched with a single button click, offering an intuitive, straightforward user experience

Security and Compliance:

- **Secure:** Adheres to stringent security standards with multi-party, cross-organizational permissioning, providing a secure, zero-footprint application for safeguarding patient data.
- **Robust Privacy Framework:** Incorporates a multi-faceted privacy and security framework meeting HIPAA and CIS IoT requirements, ensuring confidentiality and data integrity.

Integration and Affordability:

- **Flexible Integration:** Offers simple plug-and-play integration with a variety of imaging sources and medical devices, reducing complexity and enabling swift implementation within any imaging IT ecosystem.
- **Cost-Effectiveness:** Low upfront and support costs make telepresence a viable and sustainable technology investment for healthcare enterprises of all sizes and profiles.

Limitless Potential:

Exploring the Multifaceted Use Cases of Virtual Telepresence

Interventional, surgical, or hybrid procedures are a fundamental aspect of complex patient care. Radiologists, cardiologists, surgeons, and other specialists each possess their own unique imaging modalities, procedural devices, and expertise that make virtual, multi-modal collaboration absolutely essential. Through virtual telepresence, any number of specialists and technologists can collaborate in real-time, making critical decisions based on the combined information from imaging sources and procedural device data. This immersive collaborative experience facilitates on-the-spot decision-making and discussion which not only reduces repeat procedures, but enhances the skills of the entire care team, leading to an overall elevation of healthcare standards and improved patient outcomes.

Telepresence in Action:

A community-based hospital network in the mid-western United States is revolutionizing cardiovascular imaging and invasive procedures by leveraging telepresence to enable real-time collaboration between diagnosticians and procedural teams, improving workflow and empowering medical specialists to make better-informed and quicker care decisions for their patients.

Virtual Conferences:

Virtual telepresence opens new avenues for collaboration through fully engaging remote, multi-disciplinary participants in live meetings and case demonstrations. This is particularly relevant in medical imaging, where collaborative case reviews, continuous quality improvement, and interactive training are paramount. By transcending geographical boundaries, virtual conferences foster a global network of expertise, enriching the collective knowledge base in medical imaging and beyond.

Virtual Proctoring:

The concept of virtual proctoring revolutionizes the evaluation, supervision, and instruction of fellows, residents, technicians, and procedures. Live, remote assessments support continuous improvement of staff while mitigating the challenges associated with travel and scheduling. With an attending physician's oversight, potential errors or complications during procedures can be minimized, while simultaneously optimizing physicians' time and contributing to patient safety. Attending physicians can remotely supervise and support multiple residents or fellows without being physically present in each location which not only enhances overall productivity, but provides an experience that is both interactive and immersive to ensure all parties still feel a connection that is akin to in-person practice.

Ultrasound and Stress Echo:

In ultrasound and stress echo procedures, virtual telepresence allows supervisors and physicians to remotely support sonographers to both improve study quality and facilitate real-time feedback during training sessions. Healthcare facilities, especially in remote areas, can access cardiologists and provide them with complete procedural visualization, so that specialized care is available even in regions with limited access to specialized staff. For example, a remote cardiologist could oversee transesophogeal echo (TEE) procedures, allowing anesthesiologists or fellows to perform these procedures with live, specialized guidance. As well, for complex patients, cardiologists can be conferred in an instant, leading to improved diagnostic accuracy and patient care.

Telepresence in Action:

A luminary pacific coast academic children's hospital is leveraging virtual telepresence for pediatric ultrasound exams to enable live collaboration between sonographers and radiologists, expanding access and accelerating specialized care and treatment.

CT and MRI

Virtual telepresence extends its benefits to cardiac CT and MRI by enabling cardiologists to oversee protocoling and image acquisition from any location so that technologists can receive instantaneous guidance. By ensuring that imaging protocols are efficient and optimized for accurate diagnoses, particularly during critical situations, such as acute cardiac events, remote oversight in cardiac CT and MR provides an exceptional opportunity for improved health outcomes, workflow optimization, and resource utilization in the cardiology imaging space.

Transfer of Care

Efficient and effective transfer of cardiac patients is critical for timely intervention and improved outcomes. Virtual audio-video consultations within and between institutions streamlines care-focused handoffs, reducing total transfer time and associated costs. Cardiologists at the receiving facility can remotely guide the transferring team to ensure patient stability in pre-transfer, enroute, and post-transfer activities. Using virtual telepresence, cardiology teams can assess imaging in concert with physiologic monitoring devices to establish care plans, coordinate medication, discuss interventions or emergent procedures, prepare specialized equipment, and enable ongoing discussion between the transferring and receiving facilities for a seamless handoff. The integration of virtual telepresence in patient transfers ensures that critical information is shared in real time, contributing to a more coordinated and patient-centric approach.

Tomorrow's *Healthcare Today:*

Exploring the Multifaceted Use Cases of Virtual Telepresence

As technology continues to advance, the potential for virtual telepresence in healthcare is boundless. Enhanced clinical collaboration and improved access to remote care providers pave the way for a more interconnected and efficient healthcare system today, but virtual telepresence has several exciting and innovative advancements on the horizon, such as:

Augmented Reality (AR) and Virtual Reality (VR) :

- **Field- of -View Overlays & Remote Guidance:** AR provides the ability to overlay relevant information directly within the clinician's field of view. This can be used to provide immediate, distraction-free access to key patient data or images during a complex procedure, or allow specialists to virtually participate during remote surgeries or interventions by offering live guidance to local clinicians.
- **Enhanced Training and Education:** AR and VR can simulate realistic medical scenarios, allowing healthcare professionals to train in immersive environments. Surgeons can practice complex procedures, and students can experience routine, complex, and rare cases first-hand.

Artificial Intelligence (AI) Integration:

- **Diagnostic Support:** AI algorithms can work in conjunction with virtual telepresence, analyzing real-time data and images during consultations. This assists in faster, more accurate diagnoses by offering real-time decision support to healthcare providers.
- **Automated Workflow Optimization:** AI-powered tools integrated into telepresence systems can streamline workflows, automate documentation, and enhance the efficiency of remote consultations.

Remote Patient Monitoring and Home Care

- **Telepresence-enabled Home Care:** Incorporating telepresence into remote patient monitoring will allow healthcare providers to remotely assess patients in their homes to promote proactive care and reduce the need for unnecessary hospital visits.
- **Wearable Technology Integration:** Devices such as smartwatches or health-monitoring wearables could integrate with telepresence systems, providing real-time health data during virtual consultations.

Patient Engagement:

- **Connecting the circle of care:** Engage with patients and their families or primary care givers by enabling real-time, live interaction from any environment - within or outside the hospital.
- **Enhancing engagement:** Engaged patients are more likely to adhere to treatment, rehabilitation, or wellness programs. Live telepresence allows everyone in the circle of care to connect meaningfully with patients, enriching the patient experience and fostering engagement like never before.

Embracing Change:

Why Forward-Thinking Healthcare Demands Virtual Telepresence

In today's interconnected world, the geographical barriers that once hindered access to specialized care are being dissolved by the power of virtual telepresence. It's not merely a conduit for remote consultations; rather, it's a conduit for expertise, collaboration, and innovation. It revolutionizes patient care, extending the reach of specialized expertise to the farthest corners, ensuring that every individual receives the highest standard of care, irrespective of their location.

The future of healthcare demands efficiency, precision, and inclusivity, all of which virtual telepresence effortlessly encapsulates. It enriches medical education, refines procedural precision, accelerates decision-making, and extends the frontiers of collaborative care.

As the healthcare industry progresses into an era defined by interconnectedness and knowledge-sharing, embracing virtual telepresence isn't just an option; it's a strategic imperative. Forward-thinking healthcare demands a robust, adaptable framework that transcends physical limitations and fosters a global ecosystem of care. It's not just about technological advancement; it's about enhancing the human touch within healthcare, ensuring that expertise knows no bounds, and quality care is accessible to all. The adoption of virtual telepresence isn't just a step forward; it's a leap toward a more inclusive, efficient, and patient-centric future.

[i] Martin RL, Bryant JA. Collaboration. [Updated 2023 Jul 24]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK535400/

[ii] Howard, R., Leyden, T., & Englesbe, M. (2022, March 16). Operations And Supply Chain Management: How Collaboration Can Drastically Improve U.S. Health Care. Harvard Business Review. https://hbr.org/2022/03/how-collaboration-can-drastically-improve-u-s-health-care

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