

## **AUGMENTED REALITY HEADSET FACILITATES EXPOSURE FOR SURGICAL STABILIZATION OF RIB FRACTURES.**

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**Introduction:** Recent advances in augmented reality (AR) technology have made it more accessible, portable, and powerful. AR headsets differentiate themselves from virtual reality in that they allow the wearer an unobstructed view of the “real world” but with an image superimposed upon it. The technology has many potential applications in medicine, including surgical planning, simulation, and medical education. The aim of this project was to provide proof of concept that using an AR headset during surgical stabilization of rib fractures (SSRF) is feasible. We theorized that the use of AR could allow for more precise localization of fractures, allowing for smaller incision and less invasive procedures.

**Methods:** A cadaver was donated from our school of medicine. Three right lateral ribs were fractured post-mortem, and the cadaver underwent computed tomography (CT) of the chest with 3D reconstruction of the rib cage. Then, using a proprietary software developed by our advanced visual data analysis team, the images were imported into the Microsoft © HoloLens. The surgery was then done on the cadaver in a simulated environment.

**Results:** After successful import of the imaging into the AR headset, we were able to manipulate the 3D reconstruction of the patient’s rib cage in real-time during a simulated surgery. The images were able to be fixed in space overlying the cadaver’s chest by the surgeon. Because the headset responds to hand gestures, the surgeon can move and alter the image without breaking sterility. We were able to place our incision directly over the rib fractures and thus simplify the exposure.

**Conclusion:** Utilization of an augmented reality headset intraoperatively can enhance the surgeon’s ability to identify rib fractures pre- and intraoperatively. Further trials will explore the utility of AR during SSRF and whether the use of this technology results in decreased wound size and improved morbidity.



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