

Rapidly Adjustable Flexible Positioning Arm for Ultrasound Probes ("Clinician's Third Hand")

Summary

A Vanderbilt team led by anesthesiologist Dr. Rajnish Gupta has developed a rapidly adjustable flexible positioning arm that can precisely position the ultrasound probe in such a way that it can be adjusted and fine-tuned with the flip of a switch. Upon fixing the probe in position, both of the clinician's hands are free to perform ultrasound guided procedures without the need for a second person to hold the probe.

Addressed Clinical Need

Performing clinical procedures under real-time ultrasound guidance is gaining popularity due to its ability to visualize internal anatomy during procedures that were previously performed without such visualization by relying on surface anatomical landmarks, anatomical diagrams from texts, and prior experience. Several procedures are currently ultrasound assisted, including venous and arterial cannulation, peripheral nerve blocks, biopsies, body cavity and cystic fluid aspiration, joint injections, and multiple radiological procedures.

Addition of the ultrasound, however, has added complexity to these procedures by requiring the practitioner to manipulate the ultrasound probe with one hand while performing the procedure with other. To handle this added complexity, practitioners either have another person assist them with the procedure, or use the ultrasound intermittently throughout the procedure (pick up and drop) or only use the ultrasound to evaluate the anatomy before performing the procedure. Additionally, even in cases where another person is holding the ultrasound probe, maintaining stable positioning for prolonged times is challenging and results in operator fatigue and poor quality imaging due to motion artifacts.

Currently available ultrasound probe positioner designs are limited either by non-adjustable

resistance (which either provides too much resistance for rapid adjustment or too little resistance to maintain adequate skin contact) or rely on manually generated tension at the base of the arm, which requires leaving the sterile field for adjustments.

Technology Description

This invention reduces the complexity of ultrasound guided procedures by providing the practitioner with a tool to place the ultrasound probe in the ideal position and then lock that position via a simple electrical switch. The specific design and electrical components provide the flexible resistance that facilitates free and easy manipulations of the ultrasound probe to the desired position and a rigid positioning function, allowing it to maintaining its manipulated form upon locking. In addition, if repositioning is required, this can be easily achieved by the same switch.

Technology Features

- » Allows for hands-free use of ultrasound to guide procedures
- » Capable of quick fine tuning adjustments with the probe attached to the arm
- » Facilitates sterile handling and adjustment of the ultrasound probe
- » Modular design provides additional flexibility for use with a wide range of devices of varying thicknesses and/or widths

Technology Development Status

- » Working prototypes have been built and are undergoing testing in clinical environments
- » Additional design refinements are being performed

Intellectual Property Status

- » Vanderbilt has filed a U.S. Patent Application for this technology

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VU REFERENCE: VU13143

Link to Vanderbilt technologies
available for licensing

