

A Novel System for Ultrasound Needle Guidance

Category

Drug Delivery; Positioning

Problem

Placement of needles during ultrasound procedures is unreliable and often cumbersome

Technology Overview

Camera-guided needle placement during ultrasonic imaging

IP Status

- ▶ Patent Pending
- ▶ Available for Exclusive or Non-Exclusive Licensing

Value Proposition

- ▶ Needle and ultrasound probe can move independently
- ▶ Projected path of needle available before and during imaging
- ▶ No reliance on ultrasonic imaging to detect the needle

Market Attractions

- ▶ Aspiration and biopsy needle market expected to reach \$1.27B by 2024
- ▶ System can be used for numerous procedures

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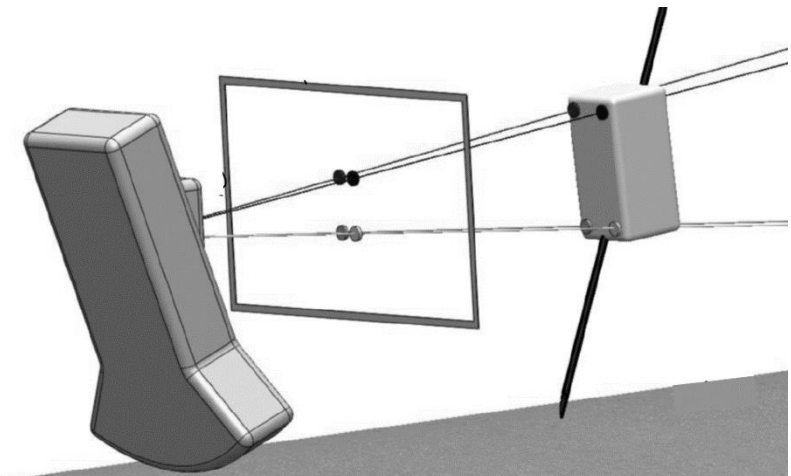
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Problem: Ultrasound transducers have often been used to position and place needles. Two systems are typically used: (1) a needle is attached to an ultrasound probe rigidly and is positioned via the probe or (2) a needle is detected by an ultrasound probe, displayed in the sonogram and positioned accordingly. These conventional methods have some drawbacks. The first method may have limitations in the angle of approach and needle position. It also restricts movement of the ultrasound probe during needle insertion and create problems maintaining a proper sonogram image. The second method only allows for knowledge of the needle position after entry. In some instances, the needle may not be visible at all until it intersects the image plane at which time it may still go in and out of visibility on the sonogram. Since ultrasound is particularly useful as a non-destructive form of imaging, there is need for a more reliable method placing needles during ultrasound imaging.

Technical Solution and Key Value Propositions: Researchers at the University of Colorado have developed a new, three-part ultrasound needle guidance system which consists of an ultrasound probe with attached HD camera, a needle holder/guide and small computer system. In this system, the needle guide has a number of fiducials placed which are detectable by the camera on the ultrasound probe. As the guide and probe are moved relative to each other during the positioning process, the camera will take note of the location of the fiducials, allowing the software to determine the angle of approach and entry position of the needle. This position will then be superimposed on the sonogram allowing the user to see where the needle will be placed upon entry. This system is suitable for guiding and confirming placement of central and peripheral venous access, performing biopsies and aspirations, placing catheters and other situations requiring imaging of the body and guidance of needles or other objects.



The camera on the ultrasound probe (left) detects the position of the fiducial marks on the needle guide (right) and transfers the position onto the sonogram.

Key Documents and Sources:

US provisional patent application filed; available under NDA.