Ultrasonic Probe Device and System and Methods for Generating Ultrasonic Images

Technology

Researchers at NYU have developed a versatile intracavitary probe featuring an elongated structure with a hollow channel running from one end to the other, housing a cord that can be adjusted in length. At the end of this cord is an ultrasound probe head, capable of attaching and detaching from the device's body, providing flexibility and convenience. This innovative probe would have dual functionality, serving both as a transvaginal probe for obstetrics and gynecology applications, and as a tightly curved microconvex probe for pediatric, neonatal, and procedural applications, such as guided regional anesthesia. Each probe would be sheathed in a cover for infection control during these various applications. This innovative probe is part of a broader ultrasound imaging system, which includes a central processing unit and a display screen, and includes a method for generating ultrasound images, either by inserting the probe head into a patient or scanning it over the patient's body surface. This approach produces effective and reliable ultrasound images.

Background

Point-of-care ultrasound use has grown exponentially in the medical field over the past two decades, particularly in emergency medicine and, more recently, pediatrics. This growth is largely due to the advent of more compact, portable, and affordable ultrasound machines. In the high-pressure environment of the emergency department, a diverse range of diagnostic challenges necessitates a wide variety of ultrasound probes, including transvaginal/intracavitary, phased array cardiac, curved abdominal, linear, and tightly curved array microconvex probes, each specialized for different diagnostic problems or procedures. The current limitation of ultrasound machines is their ability to only connect to a maximum of three probes. This poses a significant challenge for clinicians, who often need to switch between more than three different probes based on the diagnostic problem or ultrasound-guided procedure at hand. Additionally, in settings such as emergency departments and intensive care units where space is limited, extra probes not connected to an ultrasound machine may be misplaced or stolen. These limitations hinder the efficiency and flexibility of patient care.

Applications

Point-of-care ultrasound imaging in:

- Obstetrics and gynecology
- Pediatrics
- Reproductive endocrinology
- Emergency units
- Intensive care units
- General ultrasound diagnostics

Technology ID

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Category

Life Sciences/Medical devices

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Advantages

- **Versatility:** The technology combines the functions of two different probes into one, enhancing the capability of the ultrasound machine.
- **Efficiency:** By merging two probe functionalities into one, the number of probes required is reduced, leading to a more efficient use of ultrasound machines.
- **Risk reduction:** With fewer probes needed, the risk of loss or theft is minimized.
- **Space optimization:** Fewer probes are required so this technology allows for more efficient use of space in emergency and intensive care units.
- **Improved patient care:** The versatility of the technology enables quicker, more diverse diagnostic and procedural capabilities, contributing to enhanced patient care.
- **4D compatibility:** This technology is compatible with 4D technology, maximizing the potential and effectiveness of the ultrasound machine.

Intellectual Property

NYU has filed a US utility patent application.