

Ultrasound probe holder to facilitate peripheral nerve block procedures

PRODUCT DESIGN SPECIFICATIONS

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FUNCTION: Ultrasound imaging is used by many physicians and technicians in the medical field to place nerve blocks. Unfortunately, to simply place the block requires both of the hands of the physician. If any other job needs to be done at this time, such as to thread a catheter, the physician is unable to do so without putting something else down. This device should act as an additional hand in that it should securely hold the ultrasound probe in one place and be able to withstand the resistance pressure of the patient's body when placed against the body.

CLIENT REQUIREMENTS:

- The device needs to be attached to the articulating arm produced by Wellan Medical (known as the Ultrastand)
- It needs to be able to hold probes of varying shapes and sizes (manufactured by Sonosite and GE)
- Must be small enough to be easily gripped with one hand
- It must produce a force large enough to prevent rotation or movement of the probe (within the holder) upon placement at the target site without causing deformation to the probe itself

DESIGN REQUIREMENTS:

1. Physical and Operational Characteristics

a. *Performance requirements:* The device will be used several (10+) times every day. It will be operated in a sterile environment. Releasing the clamp should be an intuitive procedure to allow for the use of different probes during procedures.

b. *Safety:* Due to the fact that this device may have direct contact with patients, there may be several FDA or hospital rules that we need to follow.

c. *Accuracy and Reliability:* The holder should provide enough force to prevent unwanted motion of the probe within the clamp without damaging the probe itself.

d. *Life in Service:* Provided that this holder is able to stand up to heavy everyday use (10+ times a day, 5 days a week), a big factor in its life in service will be its ability to adapt to the changing technologies. For example, the introduction of new ultrasound equipment may require the design of a different clamp for attachment to ultrasound probes.

e. *Operating Environment:* The device will be used in a hospital; therefore, it will constantly be in a sterile environment and won't be exposed to dirt or any other weather-related

hazards. The biggest concern here is that it will need to be cleaned after every use so it should be made of something that does not corrode with the regular use of neutral disinfectants.

f. *Ergonomics*: The device should be able to be used comfortably by the physician, so the probe holder must not be so large around that it cannot be easily gripped. The clamp holding the ultrasound probe should be ergonomically designed if it is to be manipulated by the physician (instead of the technician contacting the probe itself).

g. *Size/Weight*: The device should be small and light enough so as to not throw off the balance of the ultrasound cart that it's attached to. Also, it should be unobtrusive enough so as to not hinder the abilities of the physician.

h. *Materials*: The device needs be made of or covered with a material that can be sterilized.

i. *Aesthetics, Appearance, and Finish*: The finish should allow for cleaning and be visually appealing.

2. Production Characteristics

a. *Quantity*: We are going to focus on producing one prototype of the device, with the final goal of implementing at least three throughout the hospital [two Sonosite machines are in use at UW Hospital and one GE machine is used at the Madison Surgery Center].

b. *Target Product Cost*: Client has not specified at this time.

3. Miscellaneous

a. *Standards and Specifications*: The design must meet any requirements imposed on devices to be used in the hospital.

b. *Patient-related concerns*: The probe holder should include parts that are safe (i.e. corners should be rounded).

c. *Competition*: Articulating arms (most notably, the Ultrastand produced by Wellan Medical) are available, but the associated probe clamps do not meet the needs and desires of our client [especially with respect to size and obtrusiveness].