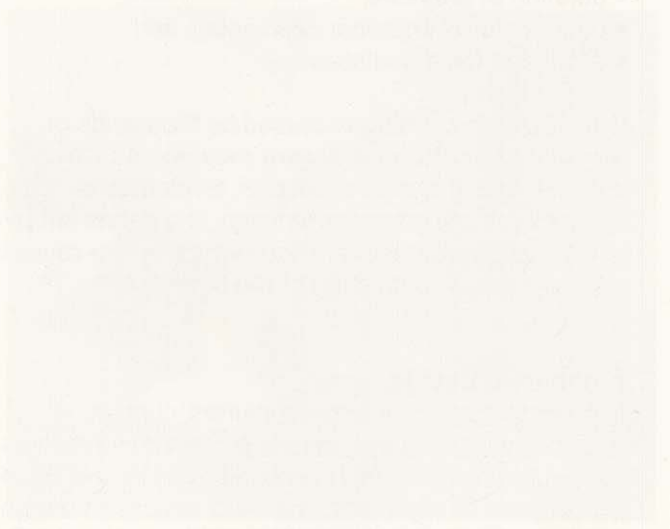
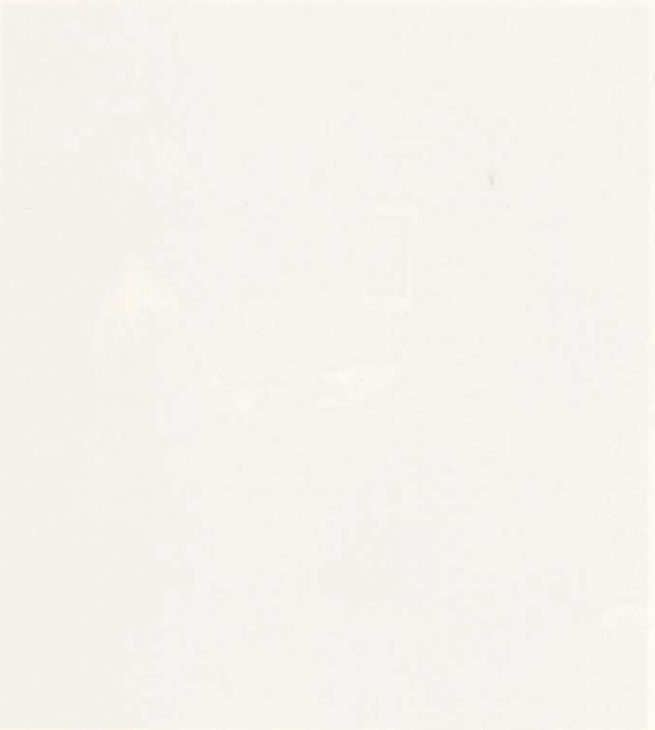


Ultrasound Ergonomics

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Occupational injury among sonographers is increasing significantly as a result of increased workloads due to skilled labor shortages, lower reimbursement rates, obese patient populations, equipment design, poorly designed scanning environments and an aging workforce. The Occupational Safety and Health Administration (OSHA) recently published national statistics for work-related injury and its costs. Work related musculoskeletal disorders (WRMSD) account for 650,000 work related injuries annually at a cost to business of 20 billion dollars¹ according to the Department of Labor. The average compensation is 29,000 dollars per injury².

Occupational Injuries

According to many surveys, the average incidence of sonographers scanning in pain is more than 80 percent, with 20 percent of these cases involving career ending injuries. According to the Society of Diagnostic Medical Sonography benchmark study involving over 10,000 responses, 28.2 percent of sonographers affected by these occupational injuries have been forced to change their working environment.

Some of the causes of WRMSD as defined by OSHA are:

- repetitive motions,
- forceful or awkward movements,
- duration of pressure,
- poor posture / improper positioning, and
- excessive force and strain.

WRMSDs are conditions caused by thousands of repetitive, forceful, or awkward movements which produce microtrauma in muscles, tendons and ligaments, leading to inflammation. The debris left by inflammation creates scar tissue which in turn causes adherence and contracting of the soft tissues.

Ergonomic Design

In order to help reduce these injuries, ultrasound equipment is being designed to protect sonographers against having to contort their bodies and involve them in poor postural alignment. Improved equipment design will help significantly in small scanning rooms and



Proper control position minimizes hand and arm movements and improves workflow



Height-adjustable systems adapt easily to any sonographer's preference, preventing poor posture alignment

during bedside examinations by allowing for optimal equipment positioning.

In an ideal environment, the sonographer's body should be as close as possible to both the patient and the equipment, reducing the need to reach or adopt poor postural alignment. This is more easily achieved when ultrasound systems are developed with the smallest footprint possible. The system should also be light-weight, making it easily maneuverable. In addition, the system should be equipped with small, light-weight transducers that have slim and flexible cables. These features would optimize the ergonomics and reduce the risk of injury to the sonographer.

Correct Equipment in the Scanning Environment

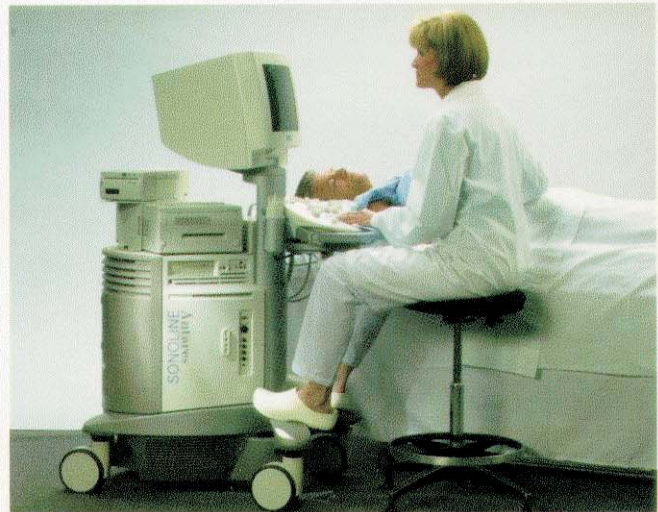
The most common site of injury is to the neck. Injuries could be reduced by using a height-adjustable control panel, keyboard, and a monitor that can be tilted and swiveled into the proper position. While the ultrasound unit must be ergonomically designed, other contributing factors to WRMSD are poorly designed chairs and tables, heavy cables, poor transducer scan-head design, and the lack of support cushions and footrests.

There are also techniques and procedures that can cause symptoms and put sonographers at risk for injury. The shoulder should not be abducted more than 30 degrees. The scan head should not be held with a tight grip. Patient scheduling should be arranged to provide a variety of examinations. Stretching exercises are beneficial if performed on a regular basis. Sonographers also need to take the time necessary to adjust the equipment and set up the workspace correctly.

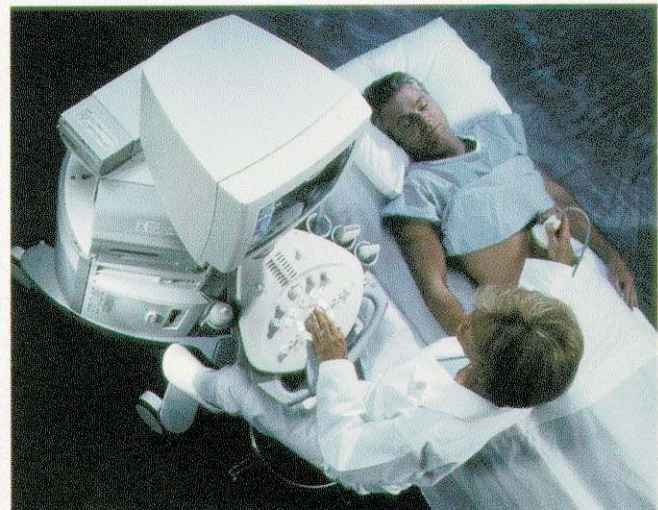
The cost of these injuries is significant both in temporary or permanent replacement of personnel, as well as loss of revenue. The profession cannot afford to lose 20 percent of its workforce to occupational injury.

Conclusion

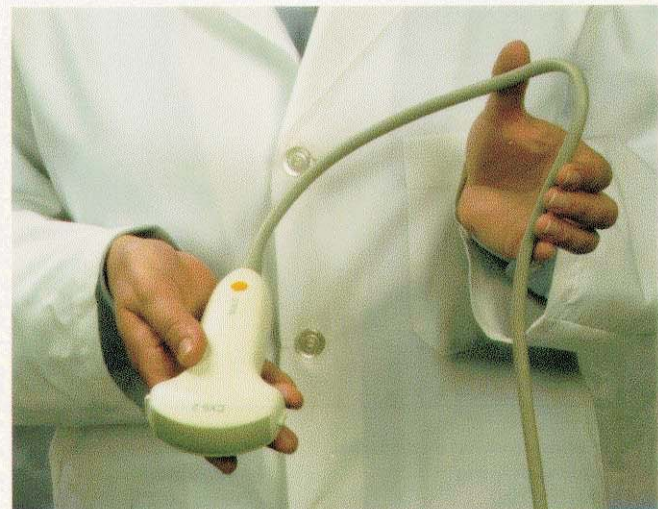
There is documentation that a poor work environment and equipment design is producing occupational injury not only in the United States, but also in China, England, Italy, Australia and Canada. The technology and know-how exists to make ultrasound equipment "sonographer friendly" and ergonomics is increasingly becoming a part of the purchasing decision.



The correct ergonomic position for a sonographer is to sit with a straight back close to the patient with properly abducted arm and shoulder (not more than 30 degrees)



The optimal ultrasound work environment provides easy access to the system and its controls from all angles



Small, light-weight transducers, as well as slim and flexible cables, reduce strain on muscles and tendons in the arms, wrists and hands