ASUM

Standards of Practice

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Guidelines, Policies and Statements

ASA and ASUM joint Guidelines for Reducing Injuries to all Ultrasound Users

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1. Introduction

These ‘Guidelines for reducing injuries to sonographers/sonologists’ were written in 2001 and published by the Australasian Sonographers Association (ASA) and the Australasian Society of Ultrasound in Medicine (ASUM) to assist practitioners and employers. The document was updated in 2010 and again in 2020.

Despite progress, the incidence of work-related musculoskeletal injuries amongst sonographers remains high with over 93% of respondents to a survey of sonographers in Australia reporting in 2006 to suffering or having suffered from work-related musculoskeletal disorders since beginning to scan (4,7). A subsequent survey published by the ASA in 2014 reported 89% of respondents had experienced pain or discomfort since commencing scanning. (19) The incident rates are similar in other countries (6,7,13,16,17). The high incidence of injury is of concern to ASA and ASUM who acknowledge that the responsibility for reducing the incidence of work-related musculoskeletal injuries is shared between both employers and practitioners and recommend utilisation of this guidelines.

In 2017, together with 26 sonography-related professional organizations, accreditation bodies and manufacturers, the Society of Diagnostic Medical Sonography, based in the United States, issued its Industry Standards for the Prevention of Work-Related Musculoskeletal Disorders in Sonography. Therefore, ASUM reviewed this current Guideline to maintain its currency in relation to the international standards on the subject.

Work-related musculoskeletal injuries in ultrasound affect many sonographers, sonologists, and starting to impact in the area of point of care ultrasound. Preventing injury or managing the progression of symptoms can be achieved by improving working posture and the ergonomics of the work environment. Maintaining a neutral posture, where there is the least amount of stress on the musculoskeletal system, is one of the fundamental principles of appropriate ergonomic design in the workplace. When risk factors cannot be completely eliminated, it is important to limit the time spent in risk-producing postures in order to reduce exposure. Appropriate ergonomics must be an integral part of all aspects of the practice of sonography. The risks for injuries among sonographers include a broad range of contributing factors.

We recognise we all have a role to play in preventing or reducing the risk of injury. The employer, manufacturer, sonographer/sonologist/ultrasound user, industry organizations, and educational programs all have the responsibility to educate, train, promote and exercise best practices, and provide equipment and working conditions to prevent health and safety problems that may cause injuries.

2. The Room

2.1 Room configuration and design needs to be flexible and versatile.

2.2 The room needs to be large enough to allow the ultrasound unit to be easily manoeuvred into position for different examinations and provide an adequate working space.

2.3 Suitable flooring is required to allow easy movement of the ultrasound unit.

2.4 Ventilation needs to be adequate for the unit, patient and staff.

2.5 Lighting should be dimmable with accessible controls.

2.6 Accessories such as support pads for the patient and the ultrasound user, gel bottle holders, additional transducers and linen need to be nearby and easily accessible.

2.7 Fittings - the room needs hand washing and transducer-cleaning facilities (2) with contaminated waste and sharps disposal containers provided in the room if required.

2.8 A room set up for opposite (usually lefthanded scanning) is helpful so that the ultrasound user can alternate scanning sides.

3. The Environment

3.1. The scanning room needs to be close to the waiting areas, patient facilities and processing areas.

3.2. The ultrasound user reporting area and the data entry systems need to be set up ergonomically to allow the ultrasound users to vary their posture.

3.3. A well-ventilated area for disinfecting of equipment.

4. The Ultrasound Unit

4.1. State of the art equipment allows for better visualisation, which increases diagnostic accuracy and reduces ultrasound user fatigue. Good ergonomic design needs to be a major part of the buying decision.

4.2. Fully adjustable units, to suit the procedures undertaken and all ultrasound users using the unit, are recommended.

4.3. The unit needs to be manoeuvrable with accessible, lockable wheels.

4.4. Recording devices need to be easily accessible.

4.5. A footrest needs to be available.

4.6. Depending on the equipment size and ultrasound user build, when moving the ultrasound unit a distance, two people should be used to move the unit particularly in and out of lifts.

4.7. Height adjustable handles are recommended, to enable ultrasound users to push the unit at the correct height for their body habitus.

5. Keyboard

5.1. Keyboard (and mouse) should encourage neutral postures of the wrist, hand, and shoulders as well. Trackball mouse designs are recommended to minimize movement of the upper extremity during mouse related activities.

5.2. Height adjustable keyboards which are capable of being rotated are recommended.

5.3. The setup of the keyboard needs to be user friendly with the most frequently used functions most accessible (2). Pre-set programs allow the keys to have multi functions depending on the examination.

5.4. The keys and LEDs need to be easy to use, to minimise abduction and flexion of the arm.

5.5. Space underneath the keyboard needs to be available to allow room for the ultrasound users' knees.

6. Monitors

6.1. Need to be high definition (7).

6.2. Monitors which are height and tilt adjustable are recommended to facilitate a neutral neck posture.

6.3. On an articulated arm to allow multi-directional adjustability.

6.4. For examinations that the patient observes, a remote monitor should be fitted for patient viewing to ensure that the ultrasound user's monitor can remain ideally positioned for the ultrasound user to view it.

6.5. In a difficult procedure, such as some vascular procedures, a remote high definition monitor installed for ultrasound user's use can further reduce the need for the ultrasound user to reach and twist.

7. Transducers

7.1. Transducers should be easy to change with lightweight cables and easy-to-access cable connections (2).

7.2. Cables need to be long enough to permit unrestricted use.

7.3. It is preferable that the transducers are large enough to allow a power (palmer) grip (most only allow a pinch grip).

7.4. The transducers should be 'slip resistant' to assist grip. Handles can be fitted to some transducers to improve the grip.

8. Computer Workstation on Wheels

8.1 Cart should be height adjustable, to accommodate both seated and standing use, if applicable. It should be lightweight for ease of movement and adjustability, with a stable base and casters suitable to the type of flooring and with easily accessible braking capabilities. Multiple handle options are recommended for transport.

8.2 Monitor should be easily adjustable, independent from the remainder of the system, with anti-glare properties, and viewable from multiple angles. Wall mounted monitors should be on a height adjustable rail or monitor arm.

8.3 Keyboard/keyboard tray/mouse should be easily height adjustable, separate from the remainder of the system, with mousing surfaces on the same level as the keyboard. The keyboard and mouse should encourage a neutral position of the wrists, hands, and forearms.

8.4 Adequate cable management, for ease of movement and safety, should be provided.

8.5 Central Processing Unit (CPU) storage should be suitable for cart stability. Lightweight, minimal footprint CPU technology is recommended.

8.6 Accessories specific to the work environment, such as sharps disposal containers, hand sanitizer, bar code readers, and chart holders are recommended. Placement of accessories should not hinder neutral posture or interfere with adjustability of the system.

8.7 System should have battery capacity of at least 20 minutes with a battery status gauge.

8.8 Information security and infection control features applicable with relevant requirements should be maintained.

9. Point-of-Care Ultrasound (PoCUS)

9.1. The ergonomic challenges of such systems may overlap with other compact technologies such as smartphones, tablets, and computer workstations on wheels. The use of multiple technologies with similar risk factors has the potential to increase the frequency and duration of exposure to risks, such as awkward postures of the neck and trunk. Consequently, many of the recommendations for ultrasound systems and computer workstations on wheels are applicable to compact, handheld, and point-of care ultrasound systems. Therefore, consult the above section for Computer Workstation on Wheels recommendations.

10. The Couch

10.1. Needs to be height adjustable and tiltable (for vascular work) and be capable of going low enough to allow patients to get on and off easily and unassisted.

10.2. Needs to be movable, with wheels that are lockable and easy to release.

10.3. Needs to have 'uncluttered' sides and ends to allow the ultrasound users to place their knees and feet underneath if needed.

10.4. The covering should be made of a material that allows easy cleaning.

10.5. Needs to be narrow enough so that the ultrasound user does not have to reach any further than necessary.

10.6. Needs to have an adjustable headrest and if appropriate patient restraints (2).

10.7. For transvaginal scanning an adjustable footplate may facilitate comfortable positioning for both the patient and ultrasound user.

10.8. Have electronic foot pedal controls which are accessible and easy to use.

10.9. For cardiac work a cut out is needed to allow the transducer to be positioned for some views.

11. The Chair

11.1. Needs to be height and tilt adjustable with sufficient adjustability to suit all staff and procedures (2).

11.2. Needs to have back and thigh support and a footrest. A flat, gas lift stool is an acceptable alternative.

11.3. Needs to rotate so that the ultrasound user can rotate from the patient to the ultrasound unit whilst keeping posture aligned.

11.4. The chair needs to be mobile.

12. Accessories

12.1. Gel bottles should have large openings to reduce the strength needed to squeeze the bottle.

12.2. Support cushion should be available to support the arm in abduction.

12.3. The patient chair used for sitting procedures (e.g. shoulder ultrasound) needs to be fully adjustable, easy to rotate, lockable and armless.

12.4. For other sitting procedures, such as hand ultrasound, a height adjustable table for supporting the limb will assist in improving the ultrasound user's posture. For these a fixed chair for the patient is preferred.

12.5. A transducer wrist strap will allow ultrasound users to easily release their grip to rest and stretch during the examination.

12.6. In difficult procedures a sling installed to support the ultrasound user's scanning arm can be helpful.

12.7. Push wheelchairs and beds correctly, using steering wheels and brakes, and adjusting to a comfortable height for pushing if possible.

12.8. Push rather than pull equipment.

12.9. All equipment needs to be regularly maintained and kept in good working order.

13. The Ultrasound User

13.1. It is also the responsibility of sonographers, sonologists, students and other users (including PoCUS users) , of medical ultrasound to follow current best practices to reduce the risk of developing injuries.

13.2. Neutral posture is a seated or standing posture balanced around the sonographer/sonologist/ultrasound user's centre of gravity. This posture reduces strain on the musculoskeletal system. When leaning, bending, or reaching out of this balanced

posture, postural imbalances occur, along with increased muscle strain and uneven loads on the bones and joints. Prolonged exposure to imbalances causes muscles to become overstretched, tendons to fray, and skeletal structures to deviate from their normal alignment.

13.3. Should minimize risk by avoiding non-neutral and static postures, such as sustained reach, bending and twisting of the trunk; excess neck flexion, extension, and/or rotation; excess reach and abduction of the scanning and non-scanning arm; working with the arm behind midline; excess grip force and transducer pressure; prolonged awkward or static posture; and uneven seated or standing weight distribution.

13.4. Need to think posture all the time.

13.5. Relax the muscles of the hands, wrists, shoulders, and neck.

13.6. This is difficult, but alternating sitting and standing may assist with this, as well as varying scanning techniques and transducer grip.

13.7. Need to take time to ergonomically optimize all equipment to suit individual postural requirements and have accessories on hand before beginning to scan (2).

13.8. Get the patient to move as close to them as possible.

13.9. Lower the couch to reduce arm abduction. This also allows gravity to assist when applying pressure with the transducer and allows for a more comfortable transducer grip.

13.10. If the arm is abducted, support it either by a cushion or rest on the patient.

13.11. Should rest then stretch their hand and wrist during procedures to relax stressed muscles throughout the day.

13.12. Refocus eyes onto distant objects every few minutes reduces eye fatigue.

13.13. Do not perform successive similar ergonomically difficult examinations.

13.14. Take regular breaks from scanning throughout the workday, including micro breaks throughout the exam.

13.15. Stretch before commencing work, during, in between examinations and at the end of the day.

13.16. Ensure that meal breaks are taken, to completely relax.

13.17. Ultrasound user who suffers any pain or discomfort should seek competent medical advice. Musculoskeletal injuries caused by the repetitive task of scanning are often not apparent until the end of the day, or at night. These injuries often take a long time to manifest and a long time to resolve, if ever. The severity of an acute injury may be exacerbated by an existing chronic musculoskeletal injury.

13.18. Report and document any pain and discomfort to employers.

13.19. Appropriate exercise may lessen the chance of getting injured and may reduce the severity of any injury.

13.20. A good level of fitness is necessary for the demanding work tasks a ultrasound user performs.

13.21. Undertake a stretching, strengthening and aerobic exercise program.

13.22. Discuss various techniques with colleagues. Exchange and 'brainstorm' ideas to develop scanning techniques to reduce stress on the body and thus musculoskeletal injuries.

13.23. Become multi-skilled, to vary work tasks. Vary procedures, tasks, and activities as often as reasonably possible.

13.24. Where possible, adjust hours of work to give your body time to rest and avoiding shifts greater than eight hours.

13.25. Follow infection control protocols at all time to prevent cross infection (8).

13.26. Read literature available on workplace injuries, back care and specifically musculoskeletal injuries in sonography as they contain information of use. There are several web sites with relevant information.

13.27. If the patient has a difficult body habitus, know when to stop scanning to avoid injury to the sonographer.

There are always cases requiring ultrasound user to work around a patient which may result in them adopting awkward postures. This is sometimes unavoidable especially with seriously ill patients. When doing such procedures take frequent breaks to reduce the incidence of fatigue and injury. Do not perform successive difficult examinations without a break.

14. The Patient

14.1. Explain the procedure fully to the patients and ask them to move by themselves as much as possible.

14.2. Get the patient to move as close as possible to reduce arm abduction.

14.3. Seek permission to lean on the patient for arm support if required.

15. Workload and Scheduling

15.1. Needs to be organised to avoid the ultrasound user performing repetitive examinations.

15.2. Adequate staffing levels are needed to allow the ultrasound user to take scheduled breaks from scanning.

15.3. Introduce task rotation into the workplace to reduce the repetitiveness of the work the ultrasound user performs.

16. The Employer

16.1. The employer has responsibilities to prevent health and safety problems that cause injury or illness at work (10). The following points will improve the work conditions for ultrasound users.

16.2. Provision of ergonomically safe equipment and a work environment with adequate room, lighting and ventilation is required.

16.3. Employers need to ensure that staffing levels and scheduling allow for ultrasound users to have adequate work breaks, so they do have a rest from scanning and do not perform repetitive tasks.

16.4. A system for staff to report and document any injuries, whether acute or chronic, needs to be in place. These reports must be investigated.

16.5. Consultation with ultrasound users is recommended to discuss and resolve any problems. Involve consultants with expertise in workplace design and ergonomics if required.

16.6. Read literature available on musculoskeletal injuries among ultrasound users. This will help to ascertain the enormity of the problem among ultrasound users.

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Web sites

Australasian Society for Ultrasound in Medicine: https://www.asum.com.au/

American Institute of Ultrasound in Medicine: https://www.aium.org/

Society Of Diagnostic Medical Sonographers: www.sdms.org and go workzones

Auntminnie chat line: www.auntminnie.com and go to discussions - technologists

Australasian Sonographers Association: www.sonographers.org

Soundergonomics: www.soundergonomics.com

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