

AVOIDANCE OF MUSCULO-SKELETAL DISORDERS DURING ULTRASOUND SCANNING.

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BACKGROUND

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Work related musculoskeletal disorders (WR MSDs) are now well documented and recognised as an occupational hazard for sonographers (1-5).

Because of the resultant loss of working time and depletion of the workforce, the Government takes WR MSDs very seriously, and new guidelines urge the need for an integrated and holistic approach to minimise WR MSDs (6,7).

WR MSDs in ultrasound have been related to;

- posture
 - force or pressure used in scanning
 - repetition of movements
 - sustained isometric muscular contraction
 - joints frequently used beyond 50% of their range of movement
 - long reaches
 - inefficient grips
- (6, 8-11).

Equipment that is not ergonomically designed may cause or aggravate these problems (12). All components, including couches and chairs as well as ultrasound machines, should be fully adjustable to accommodate different sized sonographers and patients, so that scanning movements are within the safe joint ranges, with support for the sonographer's back, forearms and feet, and sufficient knee space.

To counteract neck pain, the monitor height and tilt should be positioned so that when looking straight ahead the sonographer can see right over the monitor top (13).

The transducer should be of optimum size for an efficient "power grip" which uses maximum strength but is only possible when holding objects of around 2 inches (14). Too large a probe is difficult to grasp, while too small a transducer requires increased muscular effort and results in inefficient gripping (10).

Work and recovery patterns are also important; shorter and more frequent mini-breaks have been found to be more effective in reducing strain than less frequent but longer rests (14).

CONCLUSION

ACKNOWLEDGEMENTS RECOMMENDATIONS

To minimise strain and tiredness during scanning and prevent long term MSDs, we recommend the following precautions:

Before you start;

- Organise your workspace by moving equipment so that controls and consumables are within easy reach.
- Adjust the height of the chair and bed so that;
 - Your back is supported in the lumbar region.
 - Your knees are level or slightly lower than your hips and your feet are well supported; shorter people may require a footrest.
 - Your shoulders are relaxed and comfortable.
 - Your elbows are relaxed by your side and your forearms are supported where possible; both the left arm for keyboard operation and the right arm for scanning.
- Reposition the monitor screen height and tilt to suit your line of sight.

During scanning;

- Encourage the patient to assist by moving closer to you or rolling on their side.
- Try and face your work area; avoid twisting or leaning to one side.
- Avoid movements that cause your joints to exceed the illustrated ranges for prolonged periods (see diagrams).
- Adopt more of a power grip around the transducer and avoid a pinch grip
 - Ridges or other markings generally indicate the area for gripping.

Organising your list;

- Rotate tasks so as to change positions frequently.
- Take breaks at appropriate times; not too close to mealtimes or end of session.
 - Two breaks of 10 minutes are better than one break of 20 minutes.
- Take mini breaks: bring your arm back to your side, your wrist back to neutral and relax your grip on the probe.
 - 10 seconds recovery per minute worked.

Considering equipment;

- Ergonomically adjustable equipment must be a high priority for purchasers.

By following these guidelines a high proportion of WR MSDs in Sonographers could be prevented.

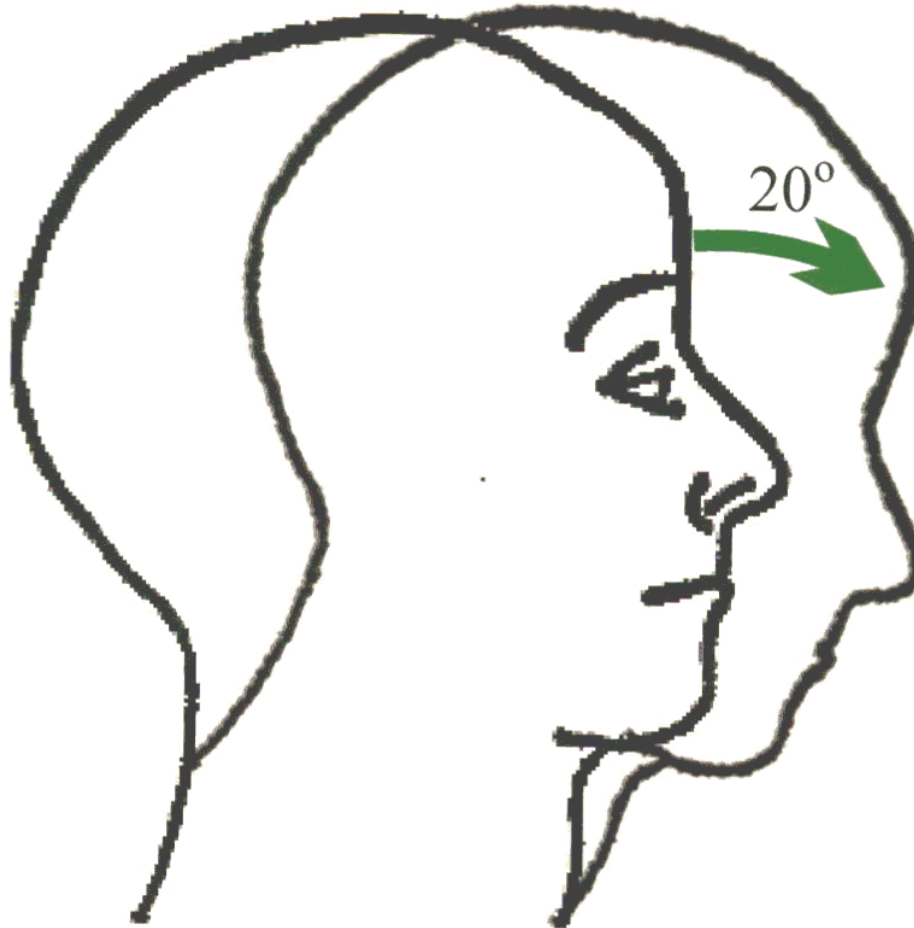
Brenda Plant and Sonographers, Royal Oldham Hospital, UK.
Julie Nightingale, Lecturer, University of Salford, UK.
West Midlands Sonographers Action Group, UK.

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The Following Drawings
illustrate extension limits
which should be avoided.

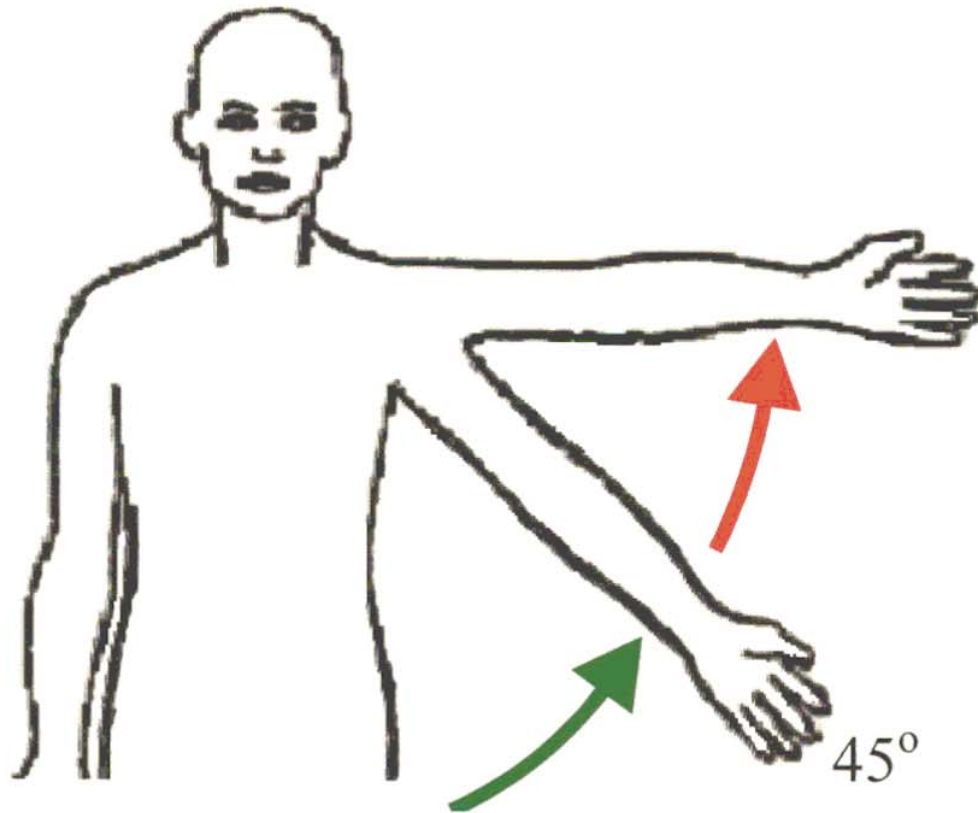


Neck

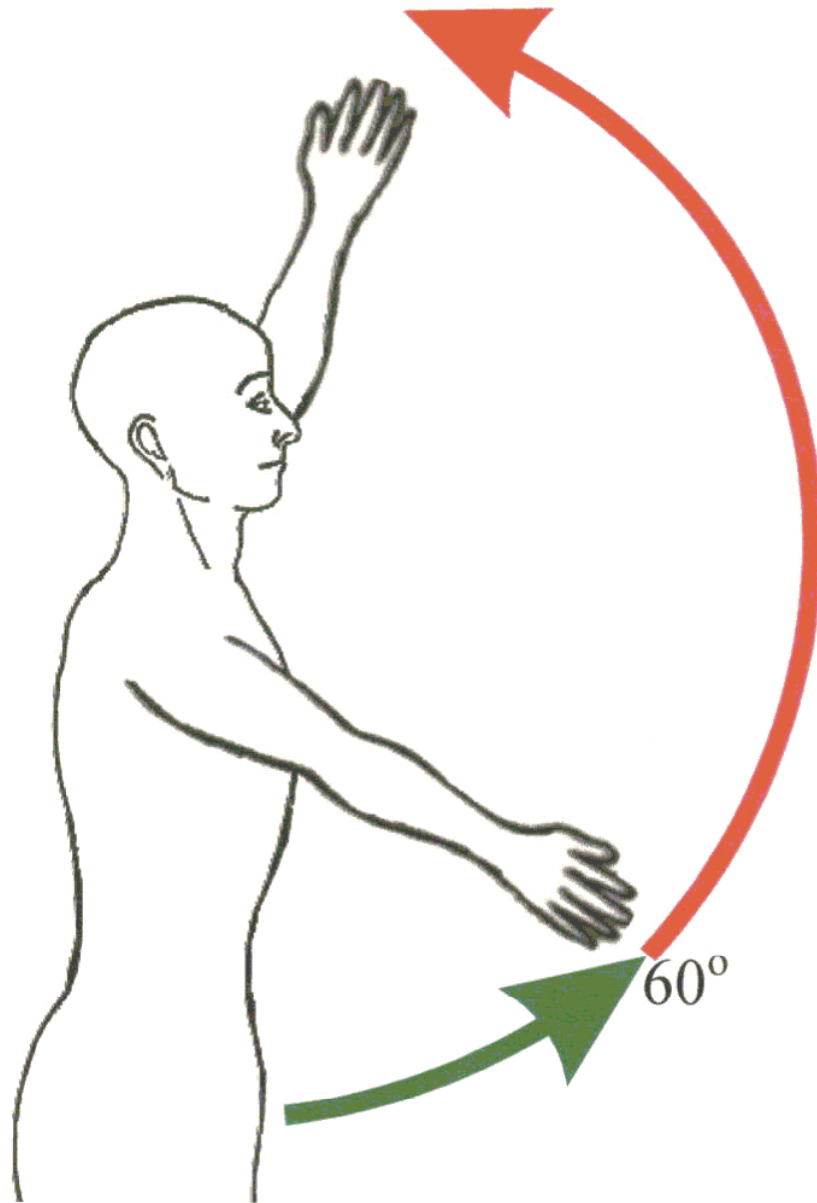
Neutral position-head erect, neck neither extended nor flexed

Danger zones

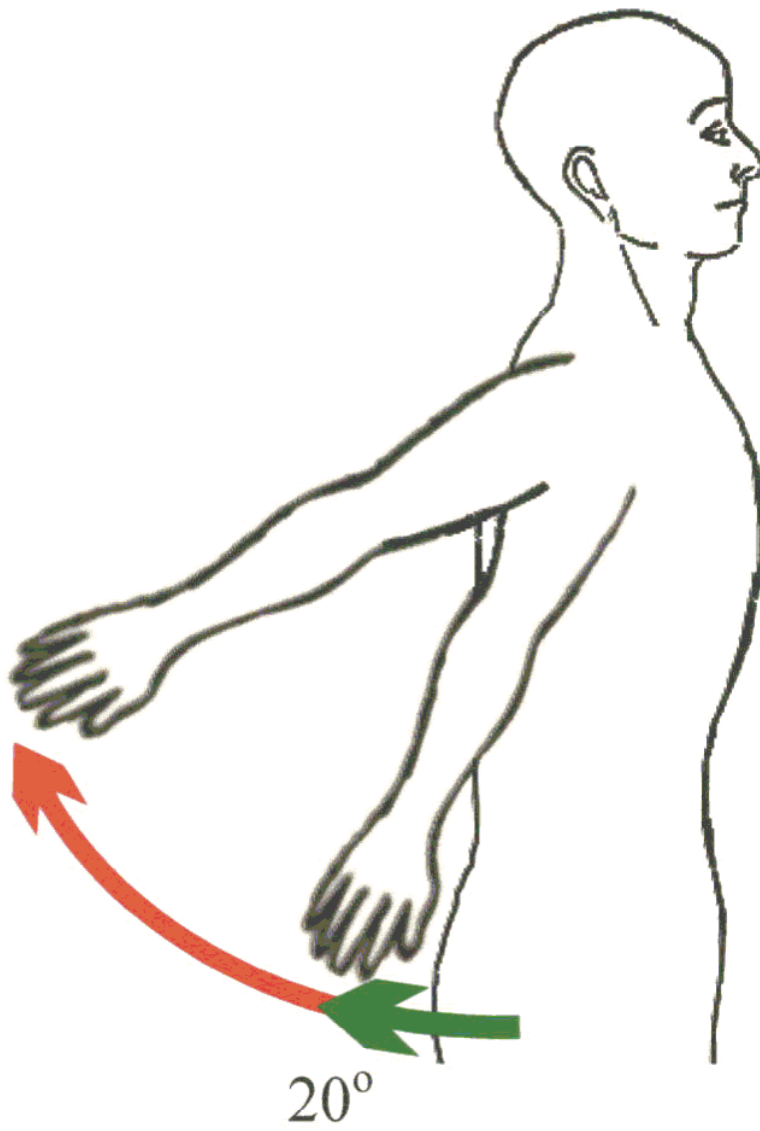
- any neck extension
- neck flexed more than 20 degrees



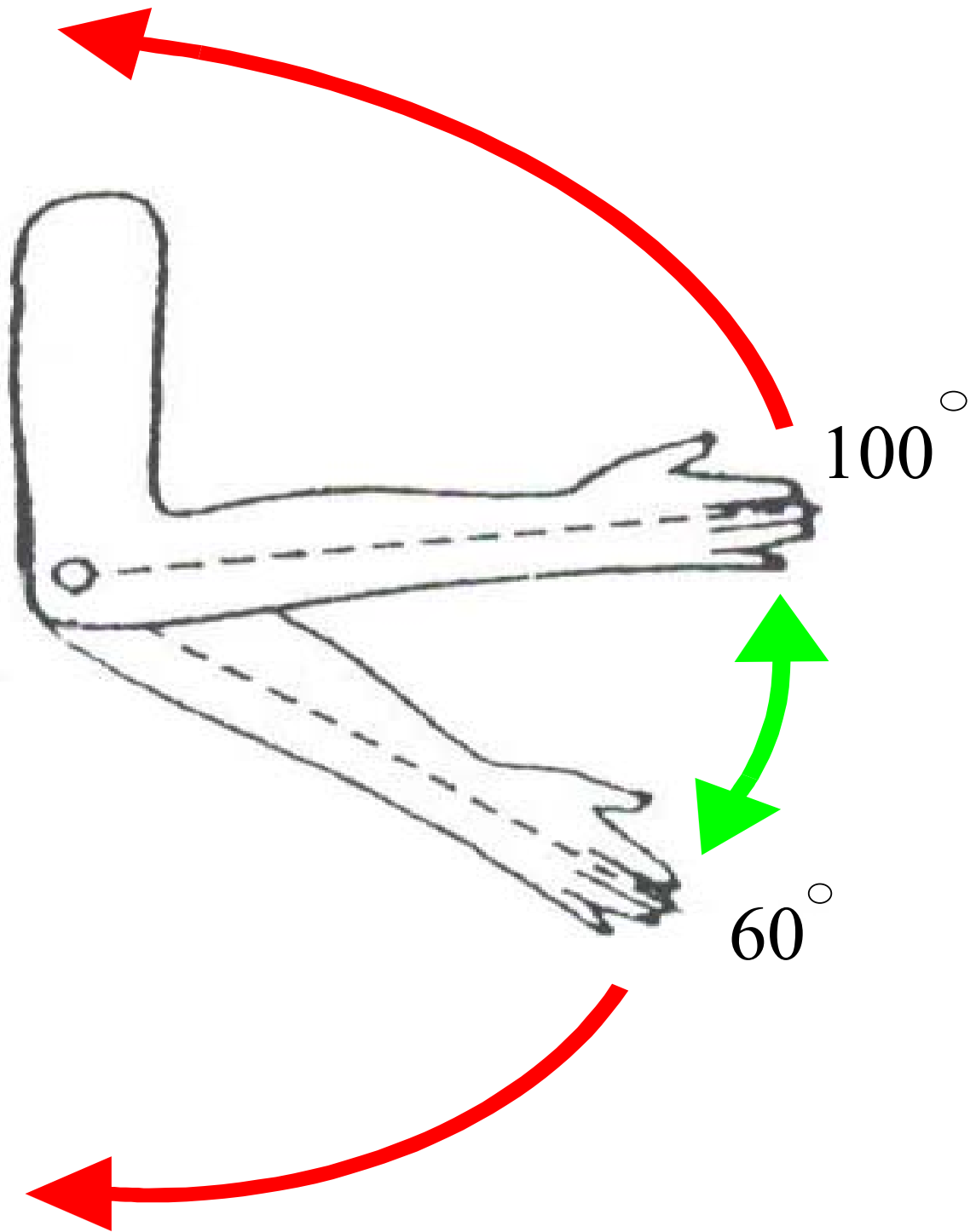
Shoulder Abduction
Neutral position-arm down by side
Danger zone- more than 45 degrees of abduction



Shoulder Flexion
Neutral position-arm down by side
Danger zone-more than 60 degrees flexion



Shoulder Extension
Neutral position- arm down by side
Danger zone-more than 20 degrees behind the body

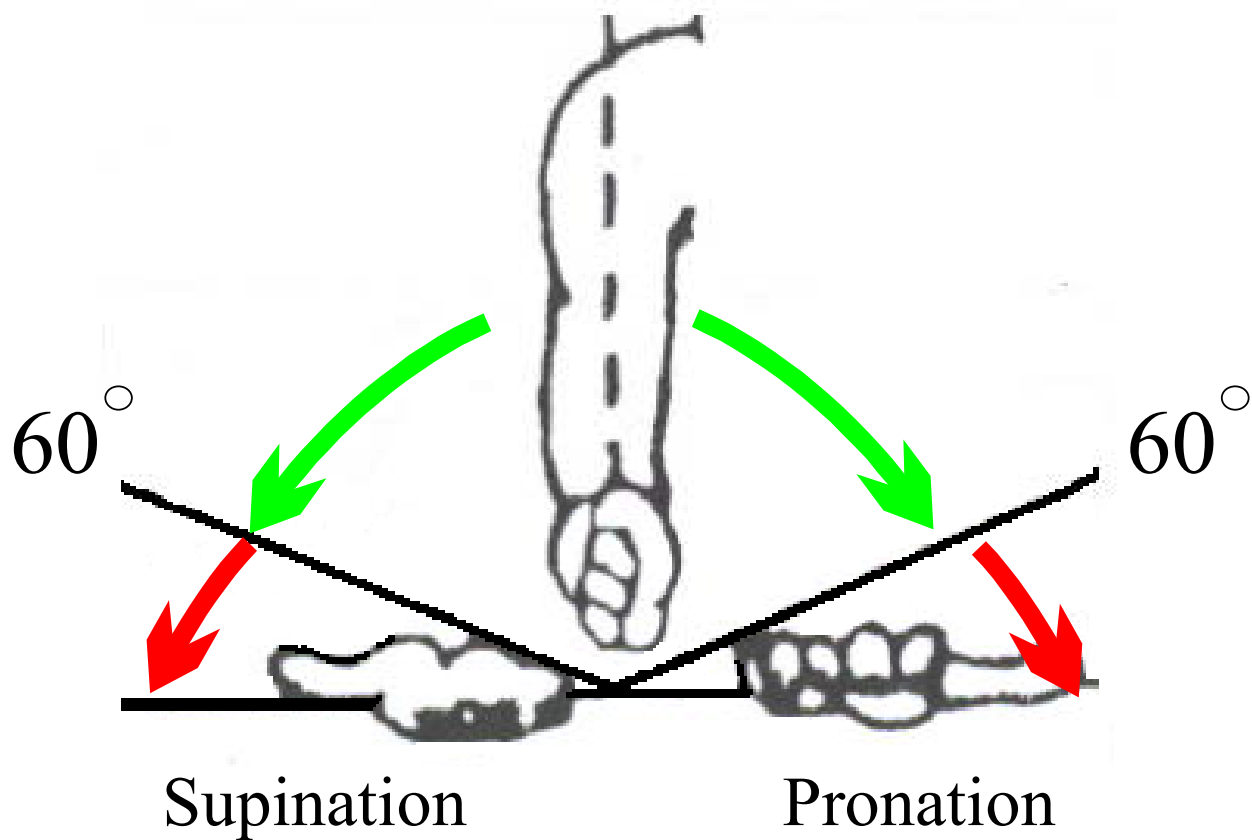


Elbow Flexion

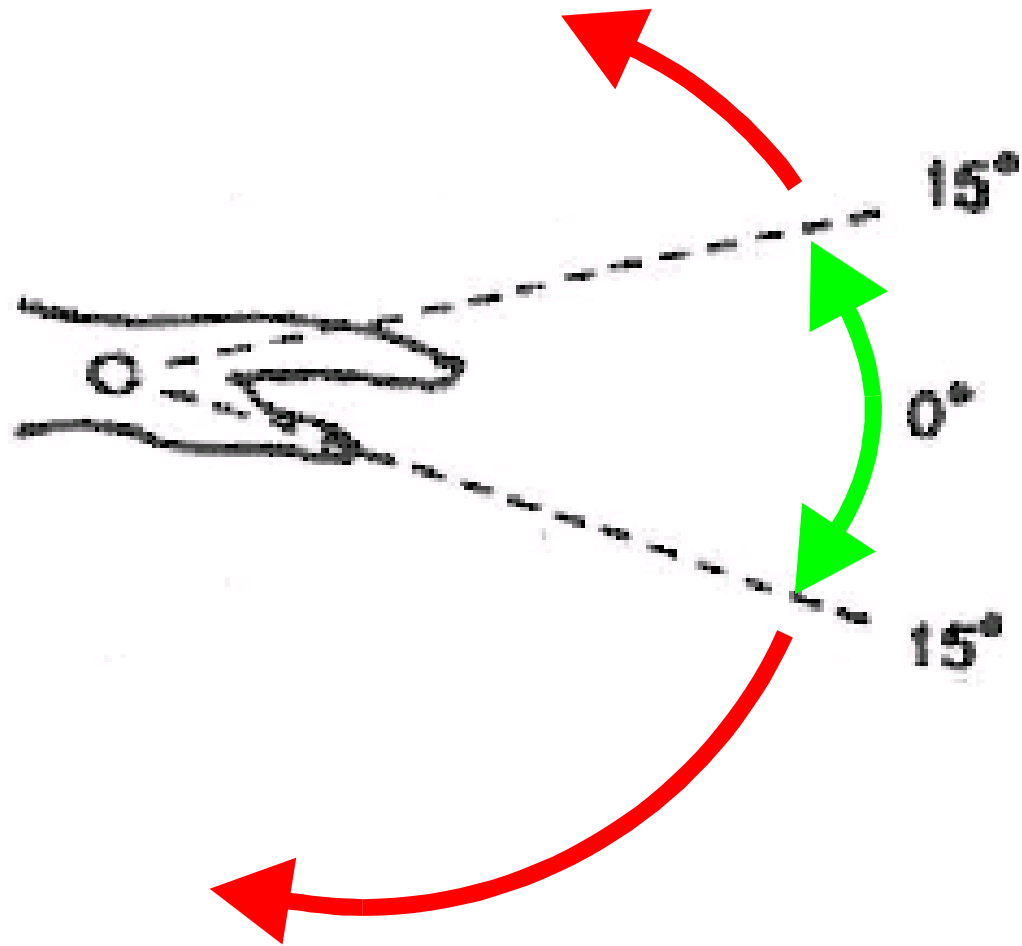
Neutral position- arm down by side

Should not be flexed less than 60 degrees or more than 100 degrees

Danger zones - elbow flexed less than 60 degrees
- elbow flexed more than 100 degrees



Forearm Supination/Pronation
Neutral position- hand held thumb upwards
Should not be supinated or pronated more than 60 degrees
Danger zone - more than 60 degree supination
- more than 60 degree pronation



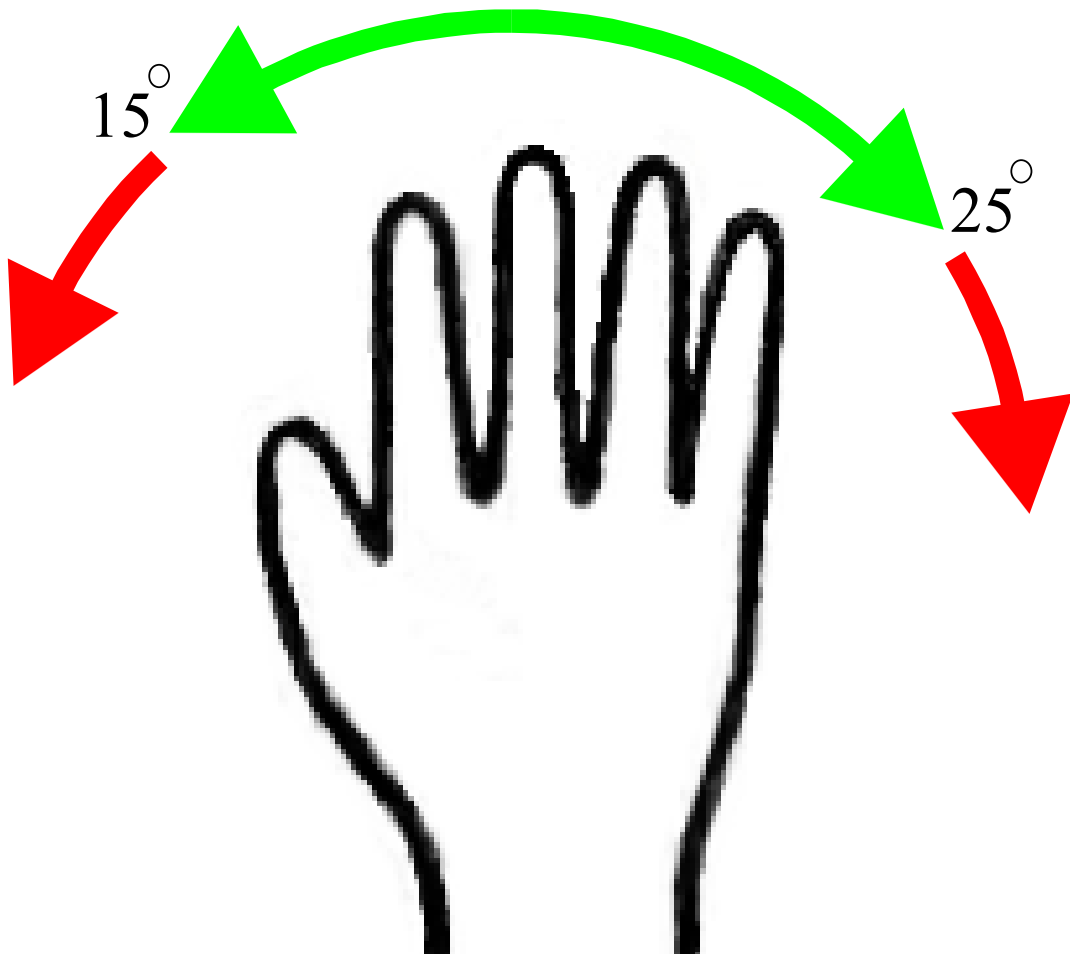
Wrist Flexion/Extension

Neutral position- wrist straight

Should not be flexed or extended more than 15 degrees

Danger zone- flexion of more than 15 degrees

- extension of more than 15 degrees



Wrist Radial/Ulnar Deviation

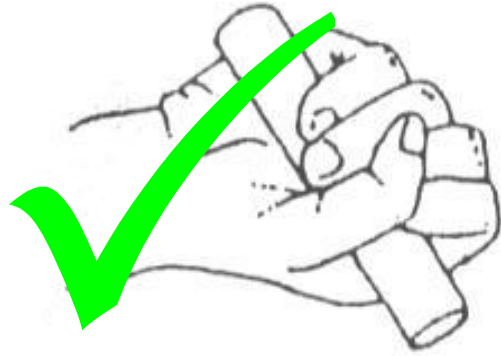
Neutral position- wrist straight

Should not be radially deviated more than 15 degrees

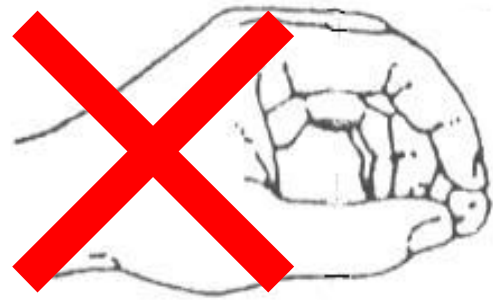
Should not be ulnar deviated more than 25 degrees

Danger zone-radial deviation of more than 15 degrees

-ulnar deviation of more than 25 degrees



The Power Grip
Try to adopt a power grip around the transducer. This allows the hand to develop the utmost strength. The thumb is in direct opposition to the fingers which totally enclose the object and curve around the shape



The Pinch Grip
Try to avoid the pinch grip. The thumb is opposed to the distal joints of the fingers. This only develops 25% of the hands total grip strength. It is intrinsically at greater risk.

Ridges or other markings indicate the area for gripping
(if not refer to individual equipment manual)