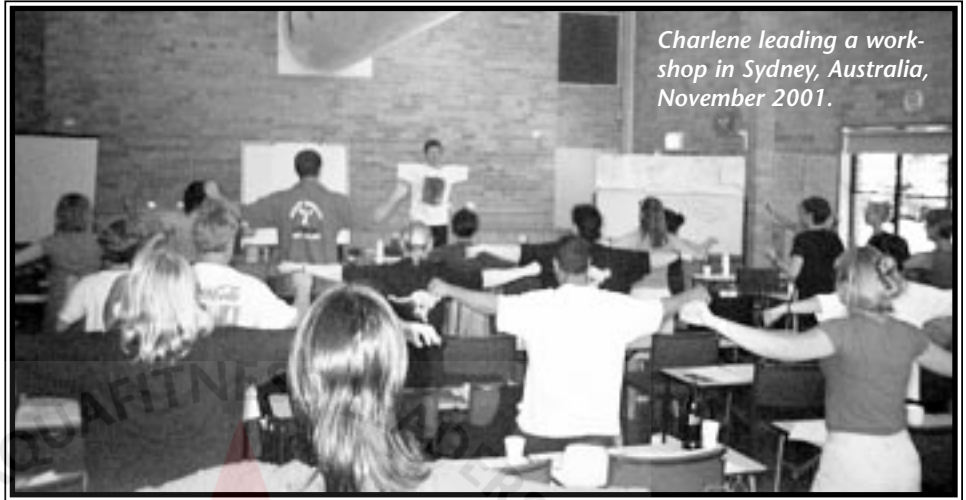


POTENTIAL FOR SHOULDER INJURIES WITH AQUATIC EXERCISE

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Bettina is an aquatic exercise specialist who has over 10 years experience as a national and international presenter. Bettina lectures at Victoria University of Technology on Aquatic Exercise in Australian and has a specific interest in "special populations". Bettina is also the Director of H2Oz, which is The Australian Aquatic Exercise Association.



Charlene leading a workshop in Sydney, Australia, November 2001.

The extreme range of motion of the shoulder complex, combined with the inherent instability of the region and the nerve network in the axillary space below the shoulder, makes the shoulder susceptible to a variety of injuries. The shoulder is an unstable ball and socket joint that is rather flat, described by Knopf as being similar to a golf ball sitting on a golf tee. While this joint structure offers great movement, if abused injury can result from performing simple every day tasks.

SHOULDER IMPINGEMENT

During everyday movement, the muscles of the rotator cuff are susceptible to repeated microtrauma (submaximal trauma) that may result in structural damage. Many times the source of damage is impingement against the coracoacromial arch when the glenohumeral joint is abducted and flexed. Impingement syndrome, which is not limited to rotator cuff problems but includes bursitis and bicipital tendinitis, is a very common shoulder problem. Rasch states that rotator cuff problems afflict more than 15% of the general population 40 to 50 years of age.

Basically, shoulder impingement results because of the limited space below the coracoacromial arch for passage of certain parts of the rotator cuff. The impingement may be that of the supraspinatus or bicipital tendons. With the painful arc syndrome, the greater tubercle impinges against the coracoacromial arch. Impingement can be produced if the volume of the musculature is increased by either hypertrophy or edema resulting from injury (usually a time-dependent process associated with repeated microtrauma).

So how can this type of injury occur in aquatic exercise? By suspending participants with aquatic dumbbells for prolonged periods of time, the shoulder girdle

and shoulder joint muscles must contract intensively to support the body in this position. The magnitude of the contractions and the various directions with which they act place great stress on the shoulder complex. Basically, the human body is not designed to be suspended by the shoulders. The shoulder joint functions as a co-ordinated unit, if one aspect of the biomechanics of this unit is altered, the efficiency of the joint is decreased and problems can start to occur.

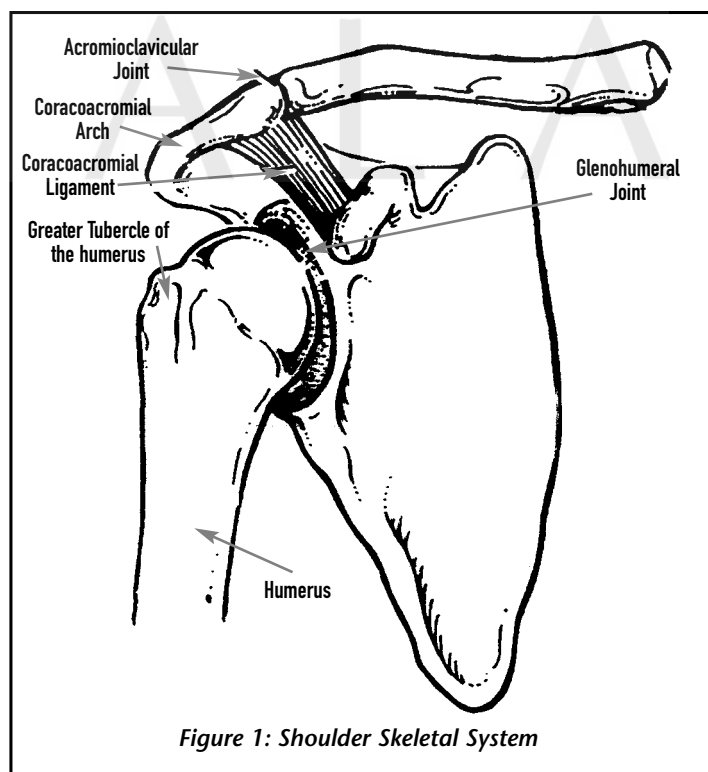


Figure 1: Shoulder Skeletal System

DAMAGE TO THE BRACHIAL PLEXUS

The group of nerves that innervate the upper limb is called the brachial plexus. These nerves are derived from the anterior rami of the 5th-8th cervical and 1st thoracic spinal nerves (C5-T1). This network of nerves are found buried in the deep lateral muscles of the neck, under the clavicle and in the axillary space below the shoulder. In the axilla three cords are formed: the lateral, the medial and the posterior. The lateral cord supplies the lateral aspect of the limb and some superficial muscles in the back. The medial cord supplies the anterior aspect of the limb, and the posterior cord supplies the posterior aspect of the limb and two posterior muscles of the back. The major nerves are the musculocutaneous, ulnar, median and axillary. Damage to these nerves can result in loss of muscle function in the back, arm, hand, or fingers.

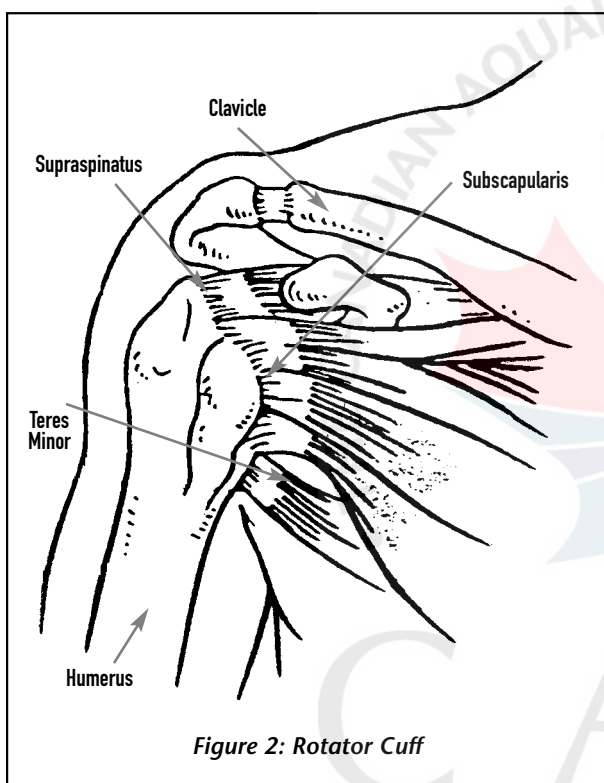


Figure 2: Rotator Cuff

These nerves can be damaged by force being placed under the arm. For this reason when hospitals issue crutches, they instruct patients to hold the crutches into the body placing the pressure on their hands and not under their arms. In hospital emergency rooms, there is a syndrome called "Saturday Night Syndrome." Damage to the brachial plexus occurs as members of a party will often carry a drunken member of their party by supporting them under his/her arms.

So for this reason, when using aquatic dumbbells it is very important for aquatic exercise instructors to avoid encouraging participants to place the aquatic dumbbells or barbells under their arms. Encourage participants to rest in another manner or if seeking support under the arms select an alternative product like a woggle or noodle.

INJURY PREVENTION GUIDELINES FOR USE OF AQUATIC DUMBBELLS

- 1 limit suspended activities with aquatic dumbbells in the hands to approximately 10 minutes for healthy participants if in the vertical position only, assess older participants and adjust accordingly
- 2 vary the plane of the hand suspended dumbbell activities to decrease the stresses through the shoulder joint: vertical, horizontal, anterior, posterior and lateral
- 3 avoid hand suspended aquatic dumbbell activities if a participant has an existing shoulder injury or severe arthritis in the shoulder joint/s
- 4 encourage participants with shoulder arthritis to closely self monitor when using aquatic dumbbells and provide alternatives like aquatic cuffs if necessary (Note: CALA recommends a flotation belt rather than cuffs)
- 5 "an ounce of prevention is worth a pound of cure" so incorporate rotator cuff strengthening exercises into your participants exercise regime
- 6 be aware that not all aquatic dumbbells have the same buoyant qualities, some are far greater due to increased size of the discs, double discs or the fact that they are more like barbells which results in greater forces through the shoulders
- 7 where possible select aquatic dumbbells with buoyant qualities that suit the strength and capabilities of class participants
- 8 avoid encouraging participants to place aquatic dumbbells under their arms
- 9 ensure when using aquatic dumbbells that joints are kept soft and slightly flexed at all times
- 10 encourage participants to release their grip of the aquatic dumbbell shaft regularly in a safe and effective manner to avoid cramps in the hand and fingers
- 11 always continually assess the performance of participants in the water

AQUATIC LITIGATION

There appears to be a far greater awareness by aquatic facility users that they have the potential to file claims against aquatic facilities in Australia. Over the last few years I have heard random comments on various issues to this effect. And late last year I was involved in a claim by a participant for slipping on an access ladder. In America, Osinski states that juries are awarding previously unheard sums of money for damages resulting from lawsuits involving aquatic related activities or the use of aquatic facilities and equipment.

Over the past 18 months I have heard two antidotal reports of claims being filed regarding shoulder injuries. One against an aquatic equipment manufacturer in America for lack of instructional product support and another against an aqua exercise instructor in England.

So it is important for the aquatic exercise instructor to be aware of these trends in aquatic litigation. By implementing the previously suggested guidelines, the potential of shoulder injury with aquatic exercise is greatly reduced, as is the chance of litigation.

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