

Shoulder Injury Prevention – adapted from USA Swimming by R Olson

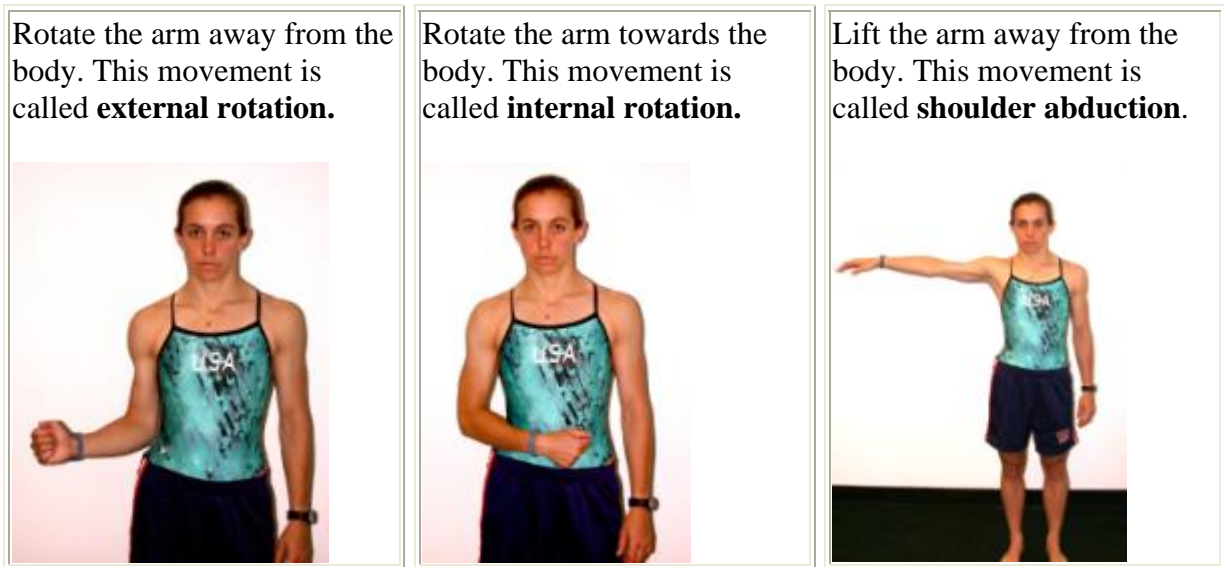
Pain in the shoulder is common in swimmers. Shoulder function is highly dependent on the coordinated function of many muscle groups, including

- 1) the rotator cuff,
- 2) the muscles that stabilize the shoulder blade, and
- 3) the muscles of the low back, abdominal, and pelvis that make up the “core.”

While it is beneficial to complete each of the exercises presented in this review each week, it is unlikely that the athlete will complete all of them every day. Try alternating different groups of exercises on different days.

Primary Rotator Cuff Exercises

The first group of exercises we want to describe is designed to strengthen the rotator cuff muscles in the shoulder. The rotator cuff is made up of four small muscles deep in your shoulder. These muscles are important for the following three movements:



Exercise #1 - External Rotation.



Use a Theraband loop that is big enough that your hands are 6-8 inches apart when your elbows are at your sides and your forearms are parallel to the floor.

Stand up straight with good posture. Do not hunch your shoulders forward. Lift your sternum and your chest towards the ceiling to help set your shoulder blades in the proper position.

Your elbows should be at your sides and should be bent 90 degrees so your forearms are parallel to the floor and your thumbs are pointing towards the sky. Perform the exercise by trying to rotate your hands away from your body like you are pulling taffy apart.

Focus on squeezing your shoulder blades together before you start this exercise. Feel this squeeze through the ENTIRE exercise. If you do not focus on squeezing the shoulder blades you will be exercising the wrong muscles.



You should take about two seconds to complete each repetition – 1 second as the muscles contract and you externally rotate the shoulders. Then take 1 second as you return to the starting position. It is time to end the set after 2 minutes or if the shoulders start to roll forward or you are unable to keep your shoulder blades squeezed together. You should rest 30 seconds between each set and strive for completing 3 sets of 2 minutes. When you can do this, move up to a higher resistance Theraband.

Exercise #2 – Full Can Scaption/ Full Can Straight Arm Lifts

The Full Can Scaption Exercise gets its name because performing it is like lifting a can without spilling its contents. Start this exercise using no weight. As you progress and get stronger you can use very light weights, such as water bottles, but even the strongest athletes should not lift more than 5 pounds.



Stand upright with your feet shoulder width apart and do not allow the shoulders to slump forward. Lift your chest towards the ceiling to help set the shoulder blades in the proper position. Focus on pinching your shoulder blades together and you should feel tension in these muscles for the entire exercise. The figures to the left show the proper posture and starting position.

Raise your arms so that they extend straight out to your sides. Move your hands forward about 1-2 feet so they are now slightly ahead of your shoulders to get in the proper exercise position. This will actually allow you to perform the movement in the same plane of the shoulder blade. Keep your thumbs turned up so they are facing the sky. (See figures to the right).



Lower your hands to your side and then lift them up again so your hands end up level with the top of your head

Maintain a steady cadence – Take 1 second to lift your hands to head level and one second to lower the hands back to your sides. Remember to keep your hands and arms ahead of your shoulders and keep your shoulder blades together.

Continue this exercise for 2 minutes or until you are unable to lift your arms while keeping your shoulder blades pinched together. Perform 3 sets in this way taking 30 seconds rest between each set.

Exercise #3 - Ball on the Wall

Equipment: One tennis ball or light medicine ball.

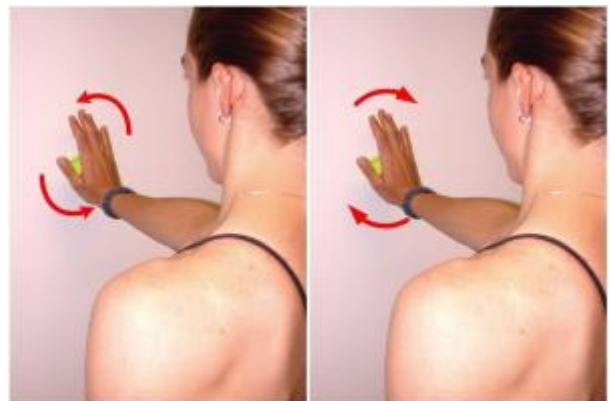
The Movement: The Ball on the Wall exercise is designed to strengthen the muscles that stabilize the shoulder blade (scapula) as well as those that internally and externally rotate the shoulder. You will need a tennis ball or a light medicine ball to perform this exercise.



Facing the wall, stand up straight with one arm extended in front of you so that your palm almost touches the wall. Keeping the elbow straight, “pin” the ball between your hand and the wall. Pinch your shoulder blades together and feel that contraction through the entire exercise.

Roll the ball in small circles in a counter-clockwise motion for 15 seconds. Each circle should take about 1 second to complete. Without stopping, switch directions and make small circles in a clockwise direction.

Control the cadence so that you make one circle each second. Continue this exercise, switching between making clockwise and counter-clockwise circles, until you become fatigued, or 2 minutes, whichever ever comes first.



You know you are fatigued if you can not keep your shoulder blades squeezed together, if you hunch your shoulders, or if you can not hold the ball against the wall. Perform 3 sets, but do not go longer than 2 minutes for each set.

Repeat this procedure for the other arm.

Primary Shoulder Blade Stabilizing Exercises

The second group of exercises, the Shoulder Blade Stabilizers, is designed to strengthen the muscles that control how your shoulder blades move. If these muscles are weak, you can put too much stress on the rotator cuff when you swim.

Exercise #4 – Theraband Rowing

First, make a loop with the Theraband and tie the ends together. The loop should be about 2 feet long. Attach the loop to a doorknob or some other stationary object that will not move when you pull on the Theraband. Sit on a bench or at the edge of a chair. Position the chair so that when your arms are extended in front of you the Theraband is just taut.



Sit with an upright posture, and lift the chest to help set the shoulder blades in the proper position. Do not hunch the upper back or shoulders.

Pull your hands toward your body. Keep your elbows in and pull your hands to a point between your belly button and your rib cage. Make sure you lead the pull with your elbows. Your palms should be facing upward when you pull towards your chest. See the figure below for proper start, middle and finish positions.



blades pinched together.

Remember to focus on squeezing the shoulder blades together with each row and maintaining this contraction for the entire exercise.

Maintain a comfortable cadence, taking one second for the contraction and 1 second as you return to the starting position. Perform 3 sets of this exercise. Each set should end when you become fatigued or reach 2 minutes of exercise. Take 30 seconds rest between sets and strive for completing 3 sets of 2 minutes each. Like the other exercises, fatigue is indicated when your posture slumps, or you cannot keep your shoulder

Exercise #5 – Hitch Hiker

Equipment: No equipment is needed for this exercise, but as you get stronger, you can use some very light weights. You can make your own weights by filling two small water bottles with sand. These should weigh less than 2 pounds, even for the strongest swimmers.

The Movement: The Hitch Hiker exercise strengthens the muscles that control your shoulder blades as well as your rotator cuff muscles. You can exercise both sides of body at the same time, or choose to do one arm at a time.

Lay on your stomach on the floor. Relax your head and keep it in line with your spine. Put your arms straight out to your sides with your thumbs pointing to the ceiling (It looks like you are hitch-hiking).



While squeezing your shoulder blades together, lift your hands up off the floor and move them slightly towards your head. Use both arms at the same time. You should end up in a position that looks like a “Y” at the end of the exercise. Hold this position for 1-2 seconds and then relax to the starting position. Repeat.

Try to perform this exercise for 2 minutes. If you cannot continue the exercise for 2 minutes, that’s okay. When you become fatigued and can no longer maintain your form, rest for 30 seconds. Perform your second and third sets the same way.

If you reach the point where you can complete 3 sets of 2 minutes, perform the exercise while holding some small weights (less than 2 pounds) in your hands. Remember, you can make your own weights by filling small water bottles with sand, and you can also perform this exercise with one arm at a time.

Exercise #6 – Push Ups with a Plus

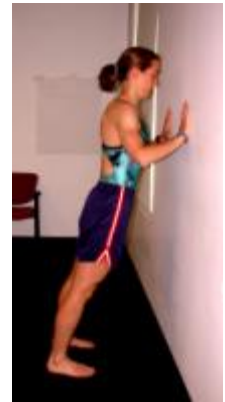
Equipment: None.

The Movement: This push up exercise strengthens your chest muscles like a normal push up, but there is an added motion at the end that strengthens one of the muscles that stabilizes your shoulder blades. There is a progression to this exercise, which means you will first perform the exercise against a wall while standing. As you get more advanced you can do this exercise while on your knees and then finally in a traditional push-up position.



To start this exercise, stand at arms length away from a flat wall. When you stand up straight your palms should touch the wall. The hands should be shoulder-width, or slightly wider than shoulder-width, apart.

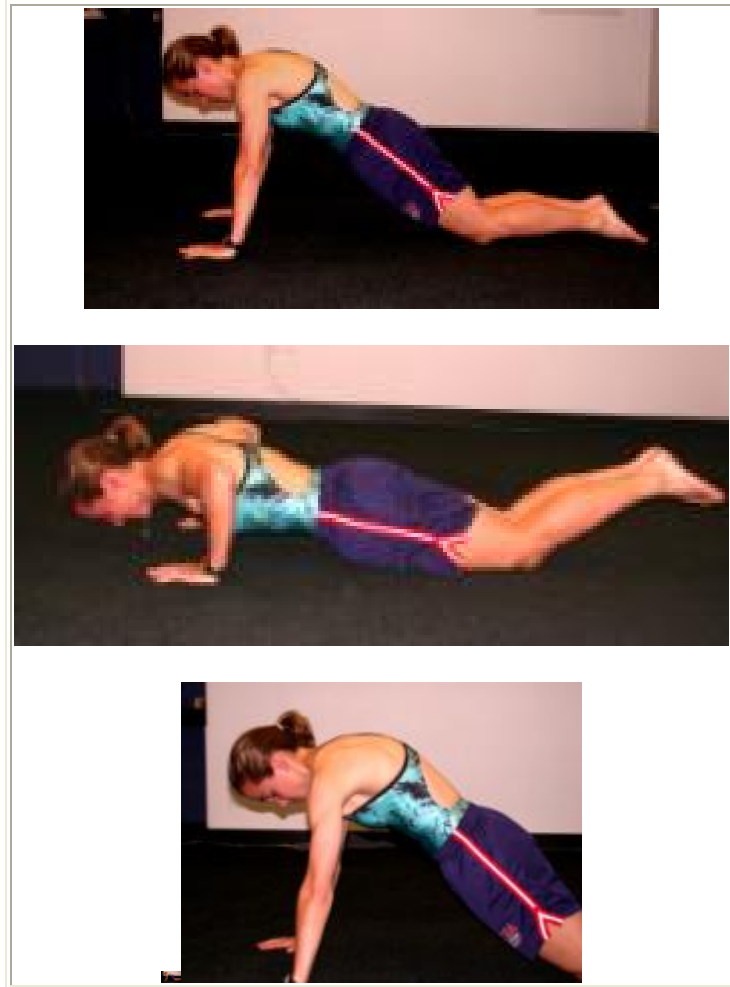
Allow your chest to move towards the wall, as you would into a normal push up position. Once you are in the "down position" push away from the wall. It is important to do this slowly so your hands never lose contact with the wall.



When you reach the normal ending position for a push up you want to keep going. This is where the extra action comes in. Continue pushing so that your shoulders rotate forward a bit. It should feel like the center of your back is farther away from the wall than your shoulders, as if you are raising your back like an angry cat. This is the extra motion that strengthens the stabilizers of your shoulder blade.

Hold this position for 2 seconds and repeat the action. Continue each set until you fatigue and start to lose form or until you reach 2 minutes, whichever ever comes first. Complete 3 sets, resting 30 seconds between each set.

As you become stronger, perform the same exercise when kneeling on the floor.



And eventually you will be able to perform normal push-ups with the extra motion.





Primary Core Strength Development

The third series of exercises focuses on developing strength in your abdominal and lower back muscles. These are some of the **core** muscles of your body. The muscles in the core of your body are essential for helping you maintain balance in the water when you swim. Balance is one of the most important skills you can develop. With weak abdominal and lower back muscles you will not be able to achieve a sufficient level of balance using your core. If you are like most swimmers, you will then try to achieve balance by changing your arm position or your stroke pattern. This places added stress on the shoulder and can lead to shoulder problems. There are many abdominal and lower back exercises you can do to strengthen these muscles. We will show you two of these exercises.

Exercise #7 – Dead Bug

Equipment: None.

The Movement: The Dead Bug exercise strengthens your abdominal muscles and gets its name because if you do it correctly you will look like a bug that is flipped over on its back waving its legs in the air.



Lay on the floor and put your hands under your tailbone.

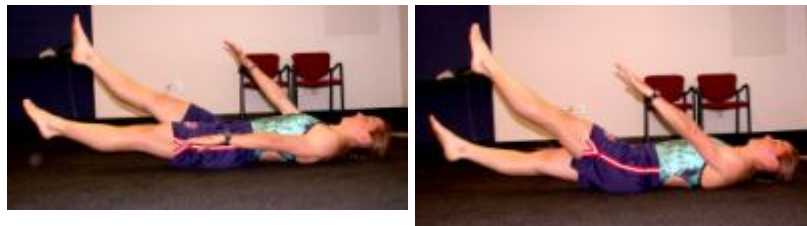
Tighten up your lower abdominal muscles by trying to pull your belly-button in towards your spine. This will help you avoid excessive arching in your lower back. It is important to keep your back FLAT on the floor at all times.



Lift your legs off the floor and perform a light "flutter kick." Continue this movement for 2 minutes or until you can no longer keep your lower back flat. See the figures below for proper positioning.



When you master this technique, you can remove your hands from under your tailbone and perform a flutter kicking like movement with your straight arms.



This form of the exercise (using the arms) is more difficult. You must make sure you do not allow the lower back to arch very much to avoid injury and work the appropriate muscles.

Exercise #8 – Quadruped

Equipment: None.

The Movement: It's called the Quadruped exercise because initially you resemble an animal walking on all fours. When performing this exercise you will strengthen muscles in the lower back and abdominal region and foster strength development between the two sides of your body.



Start this exercise with your hands and knees on the floor. Get into a “table-top” position by flattening out your back.

There should not be an arch in your back, nor should there be a dip. This will require tightening up your abdominal and lower back muscles. Think about pulling your belly-button in towards your spine.



Once you’ve achieved the proper starting posture, simultaneously lift your left arm and right leg – straightening them out so they are parallel to the floor. Hold in this position for a second making sure you maintain a flat back.

Slowly bring the hand and knee back to the floor. Repeat the action lifting the right arm and left leg.



Alternate in this fashion for 2 minutes or until you become fatigued. You are fatigued if you cannot lift the arm or leg parallel to the floor or if you are not able to maintain your flat back posture. Perform 3 sets with 30 seconds rest between each set.

As you become more experienced, try performing the exercise while closing your eyes. This will force you to use your postural muscles to a greater level while developing balance and stability.

Stretching

We have talked a lot about strengthening muscles so far. However, stretching is also important to make certain you can use your newfound strength.

Strengthening + Stretching = Function.

By combining the strengthening and stretching exercises, you will help reduce the likelihood of shoulder injury when you swim.

Exercise #9 - Hamstrings Stretch

Equipment: Towel

The Movement: The Hamstrings Stretch engages the group muscles in the back of your thigh. These muscles, the hamstrings, help you bend your knee and also are involved in straightening out your hip. They have a lot of control over the position of your pelvis and therefore impact your body position and balance in the water. You are much better able to control your balance in the water if your hamstrings are loose. This exercise is designed to help you stretch these muscles.

Lay flat on your back on the floor.



Keeping the leg that is not going to be stretched flat on the floor, loop the towel around the ball of your foot. Gently straighten your leg, and pull it towards your body. Do not lock your knee. A slight bend in the knee is necessary for safety reasons, but it should not be bent a lot.



Keep your pelvis on the floor and do not rotate your body to help you get your leg closer to your torso. Pull until you feel a moderate stretch in the back of your thigh and hold that position for 30 seconds.



Perform the stretch 2 times on each leg. You should not feel pain in this stretch or in any stretch. If you feel pain stop the stretch immediately.

Exercise #10 – Upper Back Stretch

Equipment: None.

The Movement: The Upper Back Stretch targets the trapezius (tra-pee-zee-us) muscle, which connects your neck and your middle back to your shoulder blades. Good flexibility is needed in this muscle in order for the shoulder blades to move normally. This exercise is designed to stretch the upper part of the trapezius muscle since it tends to get tight in swimmers, and a tight muscle may contribute to shoulder pain.



Stand up straight and push the palms of your hands together in front of your chest.

Push your hands straight away from your body while continuing to squeeze your palms together. Try to keep your shoulders from moving upward towards your ears by pushing straight away from the body. Continue to push your hands away from your body until you feel a moderate stretch in your upper back and between your shoulder blades. See the front, side and back views of the stretch below.



Hold this position for 30 seconds and repeat after a 15-second rest. Be sure to breathe (do not hold your breath!) as you perform this exercise.

Exercise #11 – Neck Stretch

Equipment: None.

The Movement: The Neck Stretch is another way to stretch the muscles of your upper back. This stretch targets the upper trapezius muscle.

Stand up straight and do not roll or hunch the shoulders. Place one arm in the small of your back. The elbow should be bent so that the forearm is parallel to the floor. Press your arm into the small of your back to provide some stability for the movement, but you do not have to "grab on" to anything.





Place the other hand on the top of your head. Gently guide your head towards your shoulder, bending it to the side until you feel a moderate stretch on the opposite side of your neck. Remember, bring your head to your shoulder and do not raise the shoulder to meet the head.

Hold this position for 30 seconds. Rest 15 seconds, then repeat.

You can also stretch a different part of the muscle by looking at the armpit of the pulling arm.

Try both to stretch as much of the muscle as possible.



Perform the same stretch on the other side of your body.

We hope that you will find time to incorporate the exercises described above into your training routine.

If you have difficulty performing a specific exercise or if you have pain while doing an exercise, it is best to stop that exercise and seek advice and an evaluation from a medical professional who has expertise in this area. Call 681-WELL to make an appointment at Duke Student Health.