You and your paddling buddies are having a great day on the river, shredding everything in sight. Unfortunately, one of your friends gets thrashed in a hole and ends up swimming. When you reach him, he’s sitting on shore and says, “it hurts to move my arm”. Did he dislocate his shoulder, or do something else? Should you start tugging on his arm? How do you decide? These are important questions, because shoulder injuries are common among whitewater paddlers. Most of the time, shoulder injuries are simple sprains and strains that are easily treated. However, more significant injuries, including fractures and dislocations, can also occur. Appropriate management of shoulder injuries reduces pain and shortens recovery time, but requires an ability to accurately diagnose the injury. In particular, recognizing fractures and dislocations is important because both require specific treatments and appropriate follow up after the injury. Treatment for a dislocated shoulder includes reducing the dislocation (i.e., putting the shoulder back into joint) as quickly as possible, and protecting the shoulder from further injury. In a hospital, most health care providers X-ray potentially dislocated joints before trying to reduce them. However, X-ray machines are tough to find on a riverbank! A variety of wilderness medical programs (e.g., Wilderness Medical Associates, SOLO, Wilderness Medical Institute) teach how to decide whether or not to attempt reductions. The article below describes one protocol (Table 1), and explains the underlying rationale. Physical examination of the shoulder and actual techniques for reduction are discussed elsewhere. As with paddling, these techniques are best learned in a hands-on class.

When a paddler injures his shoulder, four questions should be answered before deciding to attempt a reduction. First, and most important, are there any other more serious injuries? Shoulder dislocations are painful, but they aren’t life threatening. Before focusing on an obviously dislocated shoulder, make sure the paddler’s airway, breathing and circulation are secure, and look for other injuries. If a rescuer pays attention only to the obvious injury, it is easy to miss more subtle, and more serious, injuries. Rescuers treating patients with shoulder injuries should carefully look for other injuries, including damage to nerves, blood vessels, and bones, including the collarbone (clavicle), the ribs and the cervical spine (neck). In addition, hypothermia should always be a concern with any paddling-related injury.
The second question is “How did the injury occur?”. Muscle strain generally occurs over time, due to overuse or poor technique. Strained shoulders hurt, but should have essentially normal strength and range of motion. Most shoulder dislocations (both while paddling and everywhere else) occur when the upper arm is lifted away from the body, with the hand oriented palm forward and held above and behind the elbow – exactly like a high brace gone bad \(^7,^{11}\). In this position, rearward pressure applied against the hand and forearm (e.g., by a paddle while bracing with poor technique) levers the upper arm forward, out of the shoulder socket. This is an indirect mechanism of injury, and is unlikely to cause a significant fracture. Typically, a shoulder dislocated this way will be deformed, when compared to the uninjured side (Figures 1 and 2). The affected shoulder loses its rounded contour and a depression between the humerus (upper arm bone) and the point of the shoulder (the acromioclavicular, or AC, joint) often can be felt. The patient generally holds their arm somewhat away from the body, and they are almost completely unable to move the shoulder. On the other hand, a direct blow to the shoulder (such as falling off a mountain bike or smacking your shoulder against the bottom of the river) is much more likely to break a bone. Direct impact injuries are common in whitewater paddling \(^4,^6\), and the patient’s physical appearance is not always enough to distinguish between fractures and dislocations (especially when the victim is wearing 2 layers of fleece, a drytop and a PFD). Shoulder injuries caused by direct impact, and associated with severe pain or loss of function should therefore be treated as fractures. Manipulating a broken bone near the shoulder joint could damage blood vessels and nerves, and cause permanent loss of function in the arm \(^9\).

Distinguishing a direct vs. an indirect mechanism of injury thus can make a significant difference in treatment.

The third question is “Where did the injury occur?”. If a shoulder injury occurs on a river like the Ocoee, it may make sense to simply apply a sling to the injured shoulder and evacuate the patient to the medical center 20 minutes away. Once at an emergency department, someone who previously has treated dozens of shoulder dislocations can care for the patient. On the other hand, evacuation could take days on rivers like the Middle Fork of the Salmon, and in that case a patient would clearly benefit from field reduction. After a reduction, the victim may not be able to paddle, but they likely will be more comfortable. In addition, evacuation probably will be easier, and recovery time likely will be reduced \(^11,^{12}\). Wilderness medicine programs suggest that if definitive care (e.g., a hospital) is more than an hour or two away, field reduction of dislocated joints should be considered \(^12\).
The final question to consider is “Do the rescuers know how to examine and treat shoulder injuries?” Reducing a dislocated shoulder is relatively straightforward, but do you really want someone to manipulate your shoulder if they’ve only read about the procedure? Would you let someone who had only read about paddling lead you on your first trip down the Gauley? Table 2 lists contact information for several well-known wilderness medicine programs. All of them teach how to examine shoulders, how to find injuries to blood vessels and nerves, and how (and when) to try to reduce dislocated shoulders. As paddlers, we choose to go to places where calling 911 isn’t an option, and it’s in our best interest to learn these skills so we can take care of each other.

Once you decide to reduce a potentially dislocated shoulder, remember that if the patient has significant pain when the reduction is attempted, you should stop and reconsider what you’re doing. Early reduction of a dislocated shoulder eases pain and simplifies evacuation, and is often the appropriate course of action. However, manipulating a broken bone causes severe pain, and could damage nerves, lung tissue and blood vessels, or even drive bone shards through the skin to create an open fracture. Reduction immediately after injury should help with pain, so if reduction attempts cause more pain, it suggests that something else may be going on. Remember that shoulder dislocations aren’t fatal injuries. On the other hand, punctured lungs or lacerated arteries, caused by manipulating a broken bone in the shoulder, could be life threatening. If you’re not sure what is going on, applying a sling and evacuating the victim is the way to go. A sling is the correct treatment for severe muscle strain and fractures around the shoulder, and will help protect any injured shoulder whenever there are doubts about appropriate treatment. In any event, remember that after a shoulder is reduced, the victim may not be able to paddle, and will be at much higher risk for a repeat dislocation.

Shoulder dislocations are one of the most common significant injuries for whitewater boaters. Field reduction reduces pain, eases evacuation and improves long term recovery, but reduction attempts are not always appropriate. Any paddler with a serious shoulder injury, including a successfully reduced dislocated shoulder, should follow up as soon as possible in an emergency room or with an orthopedic specialist. In an emergency department, the shoulder can be stabilized and other injuries can be treated, whereas an orthopedic specialist can help the victim begin physical therapy and, if necessary, perform surgical repairs. Appropriate follow up after a shoulder injury will speed recovery, reduce the risk of future injuries, and help the boater get safely back in their boat as soon as possible.
References


Table 1: Criteria for field reduction of a dislocated shoulder

1) Treat life-threatening injuries first.
2) Indirect mechanism of injury.
3) Wilderness environment (more than 1-2 hours from definitive care).
4) Trained personnel on hand.
5) When in doubt, apply a sling and treat as a fracture.

Table 2: A short list of wilderness medicine educational programs. There are at least 30 other programs in the United States that offer similar training, but these are the largest and best known.
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