

Gone Fishing

Overuse injuries in fly fishing

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To many people, fishing is a leisure activity associated with a peaceful connection with nature. For others it is a profession that has the same risk of Repetitive Strain Injuries (RSI) as other occupations that overuse certain muscle groups. It might be unbelievable that such a relaxing activity can be associated with pain in the shoulder, elbow and wrist. But recent research has shown that certain styles and methods of casting are associated with more pain. In this article, we will review this research, help you choose which casting method is best for you, and discuss how to prevent overuse injuries while fishing.

Traumatic Injuries

As with all sports, there is a potential for injuries that occur suddenly and that have devastating results. Fishing injuries now make up about 9% of all sports-related eye injuries, surpassing basketball and racquet sports that were the most common cause prior to 2005.¹ There is no documented reason for this increase, however.¹

A hook to the eye accounts for about 38% of fishing-related eye injuries.¹ A sinker or the body of a lure striking an eye causes 44% of these injuries.¹ Although it may seem that a hook in the eye is the worst possible injury, a sinker or lure striking the eye can cause the eyeball to rupture, causing permanent blindness in approximately half of the cases.¹

According to the California State Compensation Insurance Fund, the biggest hazard in the commercial fishing industry is capsizing.²

Other hazards while fishing from a boat are potential pinch points and entanglement in winches, hoists and lifts.²

There is always the risk of fire if bilges are not kept clean and there is a buildup of fuel or fumes.²



Overuse Injuries

A team of researchers is studying the biomechanics of fly-casting at Montana State University, Bozeman (MSU).³ Questionnaire studies and fly-fishing labs at the University are being used to prepare a database of fishing injury patterns. It has been acknowledged that fly-fishing in Montana will likely result in different injuries than fishing with huge rods for bigger fish in Florida.³

In one survey of 812 fly-fishing instructors by the researchers at MSU, 49.8% reported shoulder pain, 39% reported elbow pain and 36% reported wrist pain.⁴ 5% claimed to have pain all the time in their casting arms.³ 74% reported pain in at least one of these locations (i.e., shoulder,

elbow or wrist); although only 25% reported that the pain was moderate to severe.⁴ 27% reported that they had changed their casting style because of pain.⁴ Although this data is anecdotal because it relies on simple survey results, it definitely appears that there are overuse injuries associated with fly-casting.³

Location	Pain for hours	Pain for days	Pain for weeks	Pain all year
Shoulder	58%	28%	n/a	5%
Elbow	33%	42%	12%	4%
Wrist	51%	29%	6%	4%

Table data from Reference 4

Grip style

Fly-casting grip styles include thumb-on-top, V-style, 3-point and finger-on-top. The different styles vary the placement of the thumb and index finger that creates different hand rotation and positioning during the cast. Most of the fishing literature describes the 3-point and finger-on-top grip as the same grip, however the MSU researchers distinguished between these grips without providing illustrations or descriptions of the differences between these.^{5,6}



Illustrations courtesy of 6

The most commonly taught and recommended grip is the V-style grip.^{5,6} Yet researchers found that 85% of the 812 fly fishing instructors use the thumb-on-top grip style.⁴ Whatever grip you use must feel comfortable for you.

In the survey of the fly fishing instructors, those reporting use of the V-style grip indicated significantly less shoulder pain (i.e., less than 3 on an 8-point Likert scale where 0 = no pain and 7 = worst pain).⁴ 13% of the finger-on-top, 19% of the 3-point, and 7% of the thumb-on-top users reported shoulder pain with a severity of 4 or greater.⁴ As noted earlier, there appears to be some discrepancy in the terminology, so respondents may have been confused as to whether they use the finger-on-top or 3-point grip.

From an ergonomics standpoint, none of these grips are desirable for the wrist. It appears that the motions involved in casting probably favor the V-style grip as more natural for the shoulder. However, the wrist is flexed in all of the grips as shown in the above illustration; this is not a neutral position.

Gripping the rod or line too tightly will cause muscle tension and pain, nerve compression in the hands, and loss of sensitivity. In addition, it puts too much energy into the cast, causing the rod to vibrate and to send waves down the fly line.⁵

Casting styles

In fly casting, there are 2 motions for each cast.⁴ The back cast motion of the cast moves the line from the front to behind the caster.⁴ The forward cast motion moves the line from behind the caster forward.⁴

There are several casting styles that can be used: overhead, sidearm, elliptical, or a combination of these.⁴




	<p><i>Overhead casting</i> has both a back and forward cast near 90° from the horizontal plane. It begins with the rod tip touching the water and the line straight.⁷</p>
	<p>In the back cast, the rod is brought back and paused until the line straightens behind the caster.⁷</p>
	<p>In the forward cast, the rod is tapped forward, flicking the line out over the water. The hand stops at the 10 o'clock position.⁷</p>

Illustration courtesy of Reference 7

In *sidearm casting*, the forward and the back cast are at a 45° angle from the horizontal plane.



Illustration courtesy of Reference 8

Elliptical casting is a combination of overhead and sidearm styles with a back cast at a 45° angle and a forward cast at a near 90° angle.⁴

A study looking at pain ratings in relationship to casting style found no significant difference between casting style and shoulder pain.⁴ However,

- Elbow pain was significantly less in casters who used multiple casting styles.
- Elbow pain was significantly less for the overhead style compared with the elliptical style.
- Wrist pain was significantly less for those who used the overhead style instead of either the elliptical or sidearm styles.
- Wrist pain was significantly less for those who used multiple styles.

Casting kinematics

In studies analyzing arm movement during casting, researchers found that the relative time delay between peak shoulder and elbow velocities increased significantly as line length increased.^{9, 10} Specific increases are made in the motion of the shoulder, elbow and wrist to accommodate the demands of casting greater lengths of line.⁹ Overall, the total range of motion increased with the length of the line cast.⁹

This research also examined casting experience as a variable in kinematics. Guides with an average of 18 years experience and 200-plus days fishing per year showed significantly better abilities to hold their form when casting greater lengths of line, generating much greater line velocity by utilizing the transfer of velocity from shoulder down the arm.⁹ The non-guides with an average of 6 years of experience and 30 days fishing per year showed deterioration in their casting motion and loop formation as line length increased. The non-guides reverted to a full-arm “waving” motion when the line length became too great. This motion could lead to shoulder, elbow, or wrist complications over time.⁹

Overall, it appears that casting greater line lengths increases the demands on the shoulder, elbow, and wrist, but this may be ameliorated with greater skill and practice.

Hauling

Hauling is a method of loading the rod to increase the line speed and casting distance. This is achieved by pulling the fly line with the non-casting hand in the middle of the fly-casting stroke. In the single haul, the non-casting hand pulls down on the line while the rod is being lifted during the back cast. In the double haul, the non-casting hand pulls down on the line both during the back cast and during the forward cast.^{4, 11, 12} A great animated illustration of the double haul is shown on the website of letsflyfish.com.¹²

The survey of fly casting instructors found that those who used a haul in casting reported significantly more pain. 74% using either or both the single or double haul techniques reported some shoulder, elbow, or wrist pain after fly casting, whereas only 33% of those who used neither hauling technique reported pain.⁴ In contrast to the findings reported in another survey⁹, no association was found between the length of the cast and pain symptoms.⁴ This may be because the data in both cases was self-reported, or it may be because the strain is actually a result of the haul rather than on the casting distance.⁴

Shooting heads and sinking weight

Weight is often added to the fly line by adding pieces of weight to the end of the fly line or by using a fly tied with extra weight (sinking fly).⁴ Another option is to use a weighted shooting head which is a short length of heavier fly line designed with a weighted core that is used at the end of the fly line.⁴ Any of these methods adds weight and produces more distance to the cast, but it also increases the mechanical stress to the arm during the fly cast.⁴

Almost 62% of those surveyed routinely use shooting heads while casting. 79% of this group reported shoulder, elbow, or wrist pain after casting.⁴ 66% of those who do not use sinking heads reported pain in these areas, a statistically significant difference.⁴

79% of those surveyed used sinking weights. 78% of this group reported shoulder, elbow, or wrist pain after casting compared with 60% of those who do not use a sinking weight, again a statistically significant difference.⁴

Rod weight and length

In the survey of fly-casting instructors, fly rod weight and length was associated with pain ratings. The weight ranged from 2 to 15 pounds with a median of 5. Rod weight was significantly correlated with the amount of wrist pain (i.e., lighter rods were associated with less wrist pain).⁴

Rod length varied from 4 to 15 feet with a median and mode of 9 feet. Each additional foot of length increased the odds of reporting some pain in the shoulder, elbow, or wrist by 46%.⁴ No significant associations were found between rod action and the pain measures.⁴

Type of fish

Those who fish for heavy saltwater fish have a higher prevalence of severe pain after casting.⁴ Fishing for large fish requires the most strength and power. Fly casting for tarpon involves periodic long casts with heavy flies and heavy equipment.



31% of those who fish for heavy saltwater fish reported moderate-to-severe shoulder, elbow, or wrist pain after casting as compared to 19% of those who have not fished for heavy saltwater fish, a significant difference.⁴ This significant difference persisted in statistical control for casting style and pain caused by other activities.⁴

Injury Prevention

Traumatic Injuries

To avoid eye injuries, cut the line if a lure gets caught rather than trying to pull it free.¹ Wear fishing glasses and a ball cap that can grab a lure before it reaches the face.¹

If you are planning to fish while on a boat:

1. Make sure you have a seaworthy boat that is properly configured and equipped for the water and weather you may encounter.²
2. Load the boat so it is stable and do not exceed the carrying capacity of the boat.
3. Carry plenty of fuel, tools, and spare parts on board.²
4. Make sure there are enough functional life vests, floats, emergency lights, and/or immersion suits for everyone on board.²
5. Brief all passengers about safety procedures and equipment. Always have a first aid kit on board.²
6. Bring a radio, satellite or cellular phone to communicate your location and status to other vessels or coastal authorities.
7. Carry enough food and water to last the trip.

To avoid entanglement, do not wear loose clothing or jewelry, and keep long hair back.²

Overuse Injuries

1. Grip style

Many casters vary their grip to suit the cast being used.⁵ Also, by modulating the grip during a cast, it is possible to reduce oscillation when the rod is stopped.⁵ Intensifying the grip just as the rod is stopped and relaxing the grip the rest of the time allows the caster to feel the cast and the straightening of the line in the air. This technique also allows the caster to feel when to start the forward cast and to smoothly control the line.⁵

We were happy to find a rod that allows the wrist to remain in a straight position. Users of this rod report very successful fishing with the rod/reel combos. Various types of rods are available for spin casting, ice rods, and bait casting rods.¹³



Illustration courtesy of Reference 13

If a straight rod must be used, use the V-style grip.

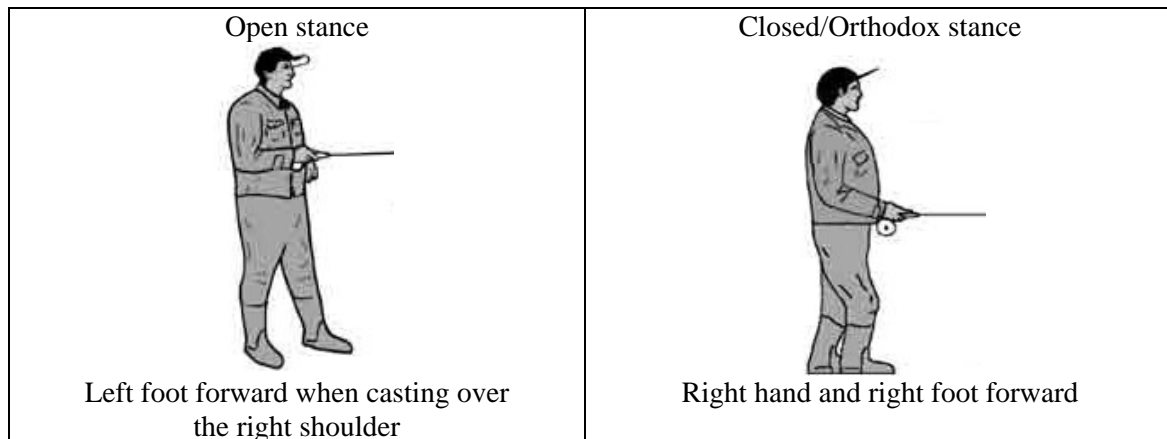
2. Stance

The research to date has not addressed injuries as they relate to stance; however, there are principles which are normally accepted in ergonomics and are taught in good fly casting schools.⁵

⁶ Using your hands and arms between waist and shoulder height, and using the powerful upper arm muscles to cast, provides the most efficient accelerating and stopping power.

In all cases, the feet should be slightly apart for a comfortable, well-balanced, relaxed and stable stance allowing the caster to transfer body weight between the feet during the cast.⁵

In an open stance, the left foot is forward when casting over the right shoulder or vice versa for left-handed casting. The shoulder must not turn during the forward casting stroke because that will cause the rod tip to make a curved path.^{5,6} This stance is used in distance casting. It allows the angler to turn his/her head to watch the back cast without moving or turning the shoulders.⁶



Illustrations courtesy of Reference 6

The closed or orthodox stance places the right foot forward for right-hand casting or vice-versa for left-handed casting.⁵ This stance allows the angler to cast a fly in a motion somewhat like throwing a dart by sighting along the hand.⁵

If the cast is made using the right hand over the left shoulder, or backhanded, the left shoulder and left foot should be forward.⁵

2. Casting techniques

Vary casting styles and favor the overhead style which is associated with less overall pain than the elliptical or sidearm styles.⁴ Excessive wrist use will result in injury.⁵ The wrists can be used to fine-tune a motion, but they are not capable of making good casts on their own.⁵

Inexperienced casters should cast shorter distances until casting style is mastered to avoid injury to the shoulder, elbow, and wrist.⁹ Also, since single and double haul techniques are so commonly practiced in distance casting, we suggest caution, varying the cast, and taking frequent breaks to reduce the possibility for injury.

Avoid using shooting and sinking weights if possible. They are associated with shoulder, elbow, and wrist pain.⁴

Use as light and as short a rod as possible.


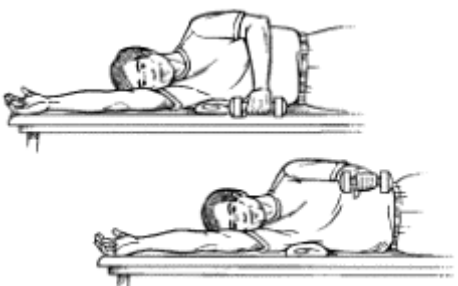
3 Rotator Cuff Exercises

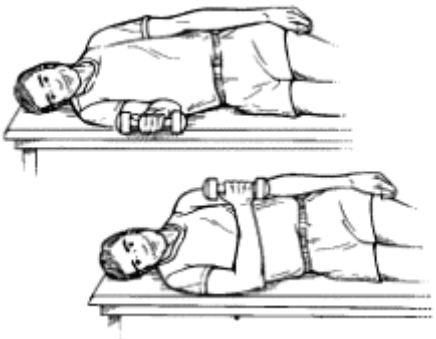
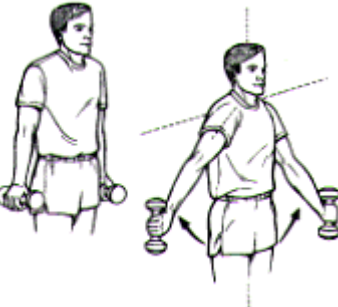
Strengthening the muscles in the shoulder, specifically the rotator cuff, is a good way to help prevent shoulder injuries. These exercises should be done in preparation to fish, not after pain has developed. These exercises should not cause you pain!¹⁴ If they do, stop immediately and try again later with a lighter weight.¹⁴

Warm up your muscles prior to fishing by bending at the waist, letting your arms hang down completely relaxed, and slowly swinging your arms left and right in a pendulum motion.¹⁴

Start your strengthening program with very light weights (2 oz. the first week, 4 oz. the second week, 8 oz. the third week, etc.).¹⁴ You should be able to do 20-30 repetitions of each movement.¹⁴ If this is not possible, lower the weight.

Lift your arm to a slow count of 3, then lower your arm to a slow count of 6.¹⁴

	Lie on your stomach on a table or a bed. Put your left arm out at shoulder level with your elbow bent to 90° and your hand down. Keep your elbow bent, and slowly raise your left hand. Stop when your hand is level with your shoulder. Lower the hand slowly. Repeat the exercise until your arm is tired. Then do the exercise with your right arm.
	Lie on your right side with a rolled-up towel under your right armpit. Stretch your right arm above your head. Keep your left arm at your side with your elbow bent to 90° and the forearm resting against your chest, palm down. Roll your left shoulder out, raising the left forearm until its level with your shoulder. (Hint: This is like the backhand swing in tennis.) Lower the arm slowly. Repeat the exercise until your arm is tired. Then do the exercise with your right arm.

	<p>Lie on your right side. Keep your left arm along the upper side of your body. Bend your right elbow to 90°. Keep the right forearm resting on the table. Now roll your right shoulder in, raising your right forearm up to your chest. (Hint: This is like the forehand swing in tennis.) Lower the forearm slowly. Repeat the exercise until your arm is tired. Then do the exercise with your left arm.</p>
	<p>In a standing position, start with your right arm halfway between the front and side of your body, thumb down. (You may need to raise your left arm for balance.) Raise your right arm until almost level (about a 45° angle). (Hint: This is like emptying a can.) Don't lift beyond the point of pain. Slowly lower your arm. Repeat the exercise until your arm is tired. Then do the exercise with your left arm.</p>

Illustrations and exercises courtesy of 14

4. Other injury prevention tips

Fishing can be hard physical work and often involves extreme weather conditions.² Maintain a healthy lifestyle with adequate rest, regular exercise to maintain fitness, and plenty of fluids to stay hydrated.²

Use neutral postures; keep your back straight and conduct your tasks as close to your body as possible.²

Use proper lifting techniques and avoid lifting extreme loads.²

Injury Treatment

If you are experiencing frequent or chronic pain or discomfort following fishing, you should seek professional advice from a health practitioner. As with any sport, you should never continue to fish if you experience pain.

Please read our article on Repetitive Strain Injuries: Muscle and Tendon Disorders: http://working-well.org/articles/pdf/RSI_muscles.pdf. This article covers the usual problems associated with the shoulder, elbow, wrist and hand including self-care and treatment for more advanced cases. In any case, heat should never be applied to inflamed tissues. Ice packs can be used to help decrease inflammation during this phase. Ice no longer than 20 minutes and allow 30 minutes between icing sessions. After inflammation has subsided, alternating heat and ice can be used to help flush the area with blood. Use heat for 20 minutes, rest for 20 minutes, ice for 20 minutes. End with ice if your body is prone to swelling.¹⁵

Fly-casting symptoms should not be treated as typical overhead throwing injuries such as those seen in pitchers and tennis players.⁴ Because the fly-casting stroke involves both a back and forward cast, it affects the front and back of the shoulder.⁴ In theory, there is equal torque and force with both the back cast and the forward cast, leading to symptoms on both planes of the shoulder, elbow, and wrist.⁴

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This article and all of our articles are intended for your information and education. We are not experts in the diagnosis and treatment of specific medical or mental problems. When dealing with a severe problem, please consult your healthcare or mental health professional and research the alternatives available for your particular diagnosis prior to embarking on a treatment plan. You are ultimately responsible for your health and treatment!

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