

# Diving

**C**ompetitive springboard and platform divers start training and competing at an early age. Many Olympic and world champions are 18 years of age and younger.

Diving is considered a collision sport because of the impact with the water on entry. A diver entering the water from the 10-meter platform is traveling almost 40 miles per hour. These forces are enough to break bones and dislocate joints. Divers are also at risk of injuries from hitting the board or platform as well as overuse injuries similar to gymnasts from frequent jumping, back arching, trunk flexion, and back twisting. Injuries can also occur from training on “dry land.” This type of training usually includes weight lifting and the use of spotting belts, trampolines, and springboards.

While injuries do occur in competitive diving, unsupervised or recreational diving is associated with a far greater risk of serious injury or even death. The following is information from the American Academy of Pediatrics about how to prevent diving injuries. Also included is an overview of common diving injuries.

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## Injury prevention and safety tips

- **Rules.** Swimmers should follow *pool rules* at all times, including
  - **Never swim alone.** The pool should be supervised.
  - **Don't run on pool decks and wet areas.** Abrasions and contusions (bruises) commonly occur from careless falls.
  - **Don't dive in shallow water or any water where the depth is not known.** Swimmers should know how deep the pool is and avoid diving into shallow pools less than 3 feet deep. This will help prevent serious head and neck injuries.
- **Equipment.** Safety gear includes
  - **Swim caps**
  - **Sun protection** (sunscreen, lip balm with sunblock) when outdoors
- **Emergency plan.** Teams should develop and practice an emergency plan so that team members know their roles in emergency situations in or out of the water. The plan would include first aid and emergency contact information. All members of the team should receive a written copy each season. Parents also should be familiar with the plan and review it with their children.

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## Common injuries

### Shoulder injuries

Shoulder injuries typically occur during water entry when arms extended overhead get forced back. Athletes usually feel the shoulder pop out of joint when their shoulders are dislocated. Most of the time the shoulder goes back into the joint on its own; this is called a *subluxation* (partial dislocation). If the athlete requires help to get it back in, it is called a *dislocation*. Risk of dislocation recurrence is high for youth participating in these sports. Shoulder strengthening exercises, braces and, in some cases, surgery may be recommended to prevent recurrence.

Chronic shoulder pain is usually due to a pinching of the rotator cuff (the tendons around the top of the shoulder). This is more common in athletes with weak shoulder blade muscles. Symptoms include a dull pain or achiness over the front or side of the shoulder that worsens when the arm is overhead. Treatment involves exercises to strengthen the shoulder blade muscles and the rotator cuff.

### Neck injuries

Repetitive extension of the neck on water entry can cause an irritation of the neck joints. This results in muscle spasms and stiffness when rotating the neck or looking up. Athletes with tingling or burning down the arm may have a cervical disc herniation or “stinger” and should see a doctor. Stingers are stretch injuries to the nerves in the neck and spine. Because the force of impact is greater with 10-meter platform diving, there are more complaints of neck problems with tower divers.

### Elbow injuries

Elbow pain can occur when an athlete's elbow hyperextends on entry into the water. The ulnar nerve (“funny bone”) can be stretched and cause pain, numbness, or burning down the arm into the fingers. If the ligament of the elbow is stretched, it can cause pain, weakness, and instability of the elbow. Athletes with pain on the outside of the elbow may have a condition called *osteochondritis dissecans*. This condition can cause an inability to straighten the elbow and locking, catching, or swelling of the elbow. X-rays may be needed to confirm diagnosis.

### Wrist/hand injuries

When divers enter the water, they grasp their hands one on top of the other with the palm facing toward the water. As they try to “punch” a hole in the water, the

wrist gets bent backward. Doing this repetitively causes pain, swelling, stiffness, and irritation of the wrist joint. This can be treated with rest, ice, and nonsteroidal anti-inflammatory drugs. Taping or bracing the wrist can also prevent further injury.

When divers reach for the water and attempt to grasp their hands for entry, they occasionally hyperextend the thumb. This causes a sprain to the base of the thumb. Symptoms include pain, swelling, instability, and weakness of the thumb. This can be treated, and may be prevented, by taping the thumb while diving. Occasionally, a custom thumb splint or even surgery is necessary to stabilize the thumb.

### Low back pain

*Spondylolysis*, stress fractures of the bones in the lower spine, is due to overuse from arching or extending of the back. Symptoms include low back pain that feels worse with back extension activities. Back or reverse dives are often more painful. Treatment of spondylolysis includes rest from diving, physical therapy to improve flexibility and low back and core (trunk) strength, and possibly a back brace. Athletes with low back pain for longer than 2 weeks should see a doctor. X-rays are usually normal so other tests are often needed to diagnose spondylolysis. Successful treatment requires early recognition of the problem and timely treatment.

*Disc injury* may cause low back pain that occurs with flexion—including pike and tuck dives. The pain is usually worse on one side, extends into the buttock, and occasionally down the leg. Disc-related pain can also occur with sitting, lifting, jumping, and twisting. Successful treatment requires early recognition of the problem and timely treatment.

### Knee injuries

There are thousands of jumps in practice for each dive seen in competition. Jumping causes pressure on the kneecap and can result in pain in the front of the knee. Patellar tendonitis (also called jumper's knee) causes pain just below the kneecap. Treatment requires identifying and addressing the causes of the pain.

The number of dives performed; dry land training; poor flexibility; strength imbalances; and malalignment of the hips, knees, and feet can also contribute to knee pain. Because corrective shoes, orthotics, and knee braces aren't practical while diving, physical therapy, patellar taping, and training modifications are the mainstays of therapy.

### Other medical issues

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Divers are at risk for a variety of medical concerns as well, including

- Swimmer's ear and sinusitis from too much water in the ear
- Ruptured eardrums from impact in the water and acute pressure changes
- Cuts, scrapes, bruises, fractures, and head or facial injuries from hitting the board, platform, or pool deck
- Sunburn or rashes from the sun

### Remember

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Diving injuries can be prevented when safety guidelines are followed.

### NOTES

The information contained in this publication should not be used as a substitute for the medical care and advice of your health care professional. There may be variations in treatment that your health care professional may recommend based on individual facts and circumstances.

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