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Spinous Process Fractures

If you run your hand down your neck and back, the thin bony projections you feel are the spinous process. A fracture of the spinous process of a lower cervical (neck) or upper thoracic (middle back) vertebra is sometimes called clay-shoveler's fracture because the injury occurs primarily in workers who shovel heavy loads for long periods. Doctors originally coined the term in 1940 to describe isolated spinous process fractures occurring from C6 to T3. Once a common occupational injury during the 20th century, it has become relatively rare since the introduction of earth-moving machinery. Today, spine orthopaedists diagnose this fracture pattern in a variety of patients, including football players, power-lifters, golfers, skiers, and trauma patients.

Anatomy

The cervical spine is made up of 7 vertebrae, which are numbered C1 through C7. The first cervical vertebra C1, the atlas, has no vertebral body and no spinous process. C1 is a ring-shaped vertebra that supports the head and sits on top of the second cervical vertebra, C2, which is the axis. The axis has a bony projection called the dens that fits into the ring of the atlas and allows for head rotation. The remaining five cervical vertebrae, C3 through C7, are similar in structure and function (**Fig**). They have small bony projections called spinous processes that extend out from the back of each vertebra. These processes serve

Side view of full normal spine

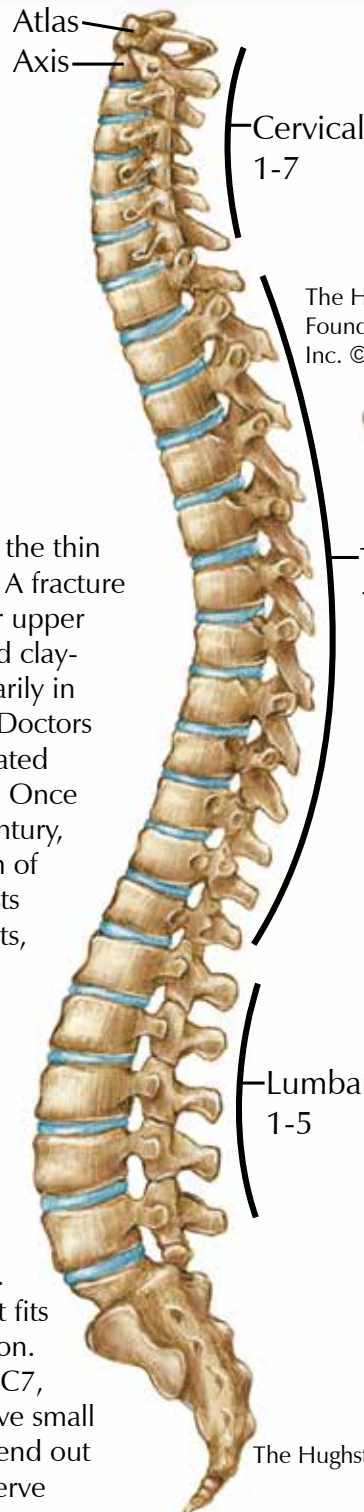
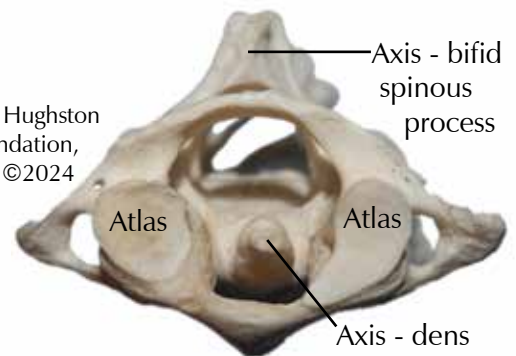


Fig. Spine components and fracture

Top view of Atlas and Axis



Side view of cervical spinous process fracture



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as attachment points for muscles and ligaments that control the movement of your head and neck. The spinous processes of C2 to C6 vertebrae are bifid (split into 2). The C7 vertebra, which is the most common fracture site, has a much larger and singular spinous process, known as the vertebra prominens, and is similar to those of the thoracic vertebra.

Type of injury

Typically, this type of injury is a stress-type avulsion (ripping or tearing away) fracture involving the spinous processes of the lower cervical or upper thoracic vertebra. Often, the injury occurs when the end of the spinous process fractures either by physical impact or from the muscle pulling so hard that it breaks the bone. The bone can fracture and remain in place or it can displace and tear off part of the spinous process. The fracture usually occurs midway between the spinous tip and lamina and it does not cause any structural, functional, or neurological impairments. Although C7 and T1 are the most commonly involved spinal levels, an avulsion fracture can occur at any lower cervical or upper thoracic level, as solitary or multiple fractures.

Symptoms

The first symptom is immediate pain between the shoulder blades or base of the neck with reduced head or neck range of motion. Patients often describe a burning or stabbing pain, muscle tightness, and sharp pain that increases with repeated activity and movement. The area of the fracture and nearby muscles are often tender. If only the spinous process is injured, you will not have any neurologic symptoms, such as tingling or numbness. You may lose head, neck, and shoulder motion since movement can cause the muscles to pull directly on the site of injury and limit your desire to move.

Diagnosis

An orthopaedic spine doctor will perform a physical exam and order x-rays or magnetic resonance imaging (MRI, a scan that shows bones, muscles, tendons, and ligaments). During the physical exam, the doctor will look for localized swelling, tenderness, and crepitus (a grating sound or sensation produced during movement of the fractured bone). The doctor will also complete a neurovascular exam. Your doctor may confirm your diagnosis using x-rays; however, if the fracture is suspected but no evidence of injury is found on radiographs, MRI images can show the soft-tissue avulsion of the spinous process.

Treatment

The treatment is often conservative, involving rest, immobilization using a collar, pain medication, and activity modification for a period of 4 to 6 weeks. The orthopaedist may recommend surgical treatment if there is nonunion (failure to heal) of the displaced fracture. With nonoperative treatment, patients can often return to sports by 4 months after injury. For a spinous process fracture, data shows high union rates and excellent clinical outcomes.

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AI in Medicine

Artificial Intelligence (AI) is the study of teaching technology to think and act like humans. Although AI has been around since the 1950s, after the release of ChatGPT in November of 2022, it has quickly become a household topic. You already use AI in a number of ways. For example, AI helps write emails, finishes sentences, organizes the photos on your phone, and even chooses which online ads to show you. Autocorrect, driving navigation, and virtual assistants like Siri and Alexa are also common examples of how AI can be helpful in your daily life. As AI continues to grow as a field, it is important for us to understand how it affects our medical care as well.



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How does AI advance healthcare?

Healthcare providers already use AI to make many aspects of your medical care more personalized and effective. AI helps hospital systems improve workflow and efficiency, allowing you to spend less time waiting. Chatbots and virtual health assistants powered by AI provide instant medical advice and support to patients. AI can also help to reduce paperwork and allow your doctor to spend more time with you (**Fig**).

In surgery, AI helps surgeons with precision, enhancing the success of procedures and reducing recovery time. Robotic-assisted surgery simply means that the robot is a tool that surgeons can use to perform a more precise and reproducible surgical procedure. The robot does not do the surgery without the surgeon. However, the robot provides invaluable information and technology that helps the surgeon perform the procedure. Overall, AI in medicine enhances efficiency, accuracy, and individualized care, contributing to better outcomes for patients.

Can AI diagnose an illness or injury?

AI can significantly help doctors in diagnosing illnesses or injuries through various applications. An example of this is in medical imaging analysis. Studies have shown that AI algorithms can quickly and accurately review large numbers of medical images including x-rays, magnetic resonance imaging, or MRI (test that shows the bone, muscles, tendons, and ligaments), ultrasound (uses soundwaves to view inside the body), and computed tomography, or CT scans that creates a series of x-rays to show bones and soft tissue. AI can find patterns and abnormalities that may be challenging for the human eye to identify, helping in the early detection of diseases or injuries. Moreover, AI systems can help to interpret pathology slides, helping doctors diagnose conditions like cancer earlier and with more efficiency.

AI can also take your entire medical picture into account by analyzing large amounts of patient data, including medical records, genetic information, and lifestyle factors. By identifying patterns within the data, AI can assist doctors in making more informed and personalized diagnoses. Additionally, AI-powered diagnostic tools can provide decision support, offering recommendations to physicians based on the latest medical research and knowledge. Using wearable devices and sensors can help your doctor monitor you at home rather than going to a clinic or staying in the hospital. These smart devices can monitor glucose levels, heart rate, weight, body temperature, plus much more and report the information to your doctor in real time. The AI automatically records the information in your medical record and it informs your physician if you experience an abnormal occurrence.

AI and the future of medical research

AI is set to revolutionize medical research in several ways. AI will play a massive role in analyzing large amounts

of information quickly and accurately. AI algorithms can sift through large datasets like patient records and genetic information to identify patterns and correlations that humans might miss. This helps researchers understand diseases better, discover potential risk factors, and develop more targeted treatments. AI can also play a crucial role in drug discovery by predicting how different compounds may interact with the body. This will speed up the research process and can lead to the development of safer and more effective medications.

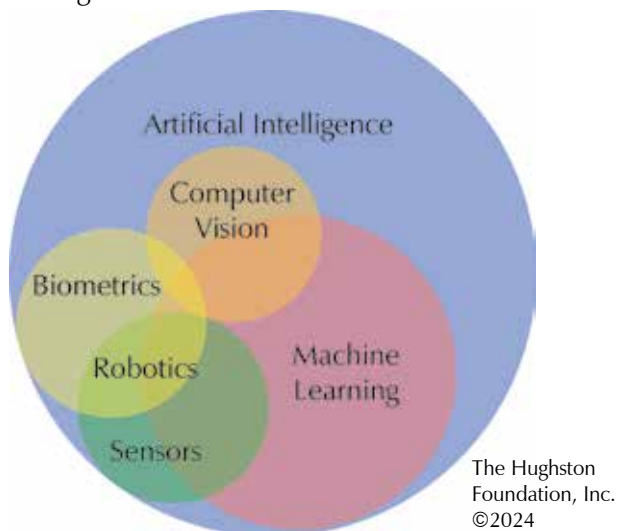
Overall, AI is a powerful tool in medical research, enabling scientists to make groundbreaking discoveries and advancements in healthcare. While AI presents tremendous opportunities for medical research, it also comes with challenges such as ensuring data privacy, addressing biases in algorithms, and establishing ethical guidelines. Collaborative efforts between AI experts, healthcare professionals, and regulatory bodies are crucial to harness the full potential of AI in advancing medical research responsibly.

The good comes with challenges

Using AI in healthcare presents both unique advantages and challenges. On the positive side, AI can enhance the speed and accuracy of disease diagnosis, aiding healthcare professionals in identifying illnesses at early stages and recommending personalized treatment plans. Machine learning algorithms are good at analyzing extensive medical information, offering valuable insights for research and medication development. Additionally, AI can perform routine tasks automatically, improving overall efficiency and reducing the workload on healthcare staff and providers. AI can also help with remote patient monitoring and telemedicine, providing timely healthcare access while also reducing the burden on healthcare facilities. However, there are also challenges that we must also consider when using AI.

Privacy concerns with the analysis of sensitive patient data, healthcare provider training, and the potential loss of jobs are all understandable concerns without easy answers. In addition, AI is unable to provide human empathy and cannot replace the relationship that you have with your doctor and medical team. Just as your doctor might caution you about the dangers of using online searches for your medical care, patients also need to be cautious about using AI. You should consider AI as a tool that can assist you and your doctor and not a replacement for your healthcare team. The goal, therefore, should be on achieving a balanced and appropriate use of AI to maximize benefits while minimizing drawbacks.

Fig. Various industries overlap and build to generate artificial intelligence.



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Quadriceps Tendon Autograft for ACL Reconstruction — The Cutting Edge

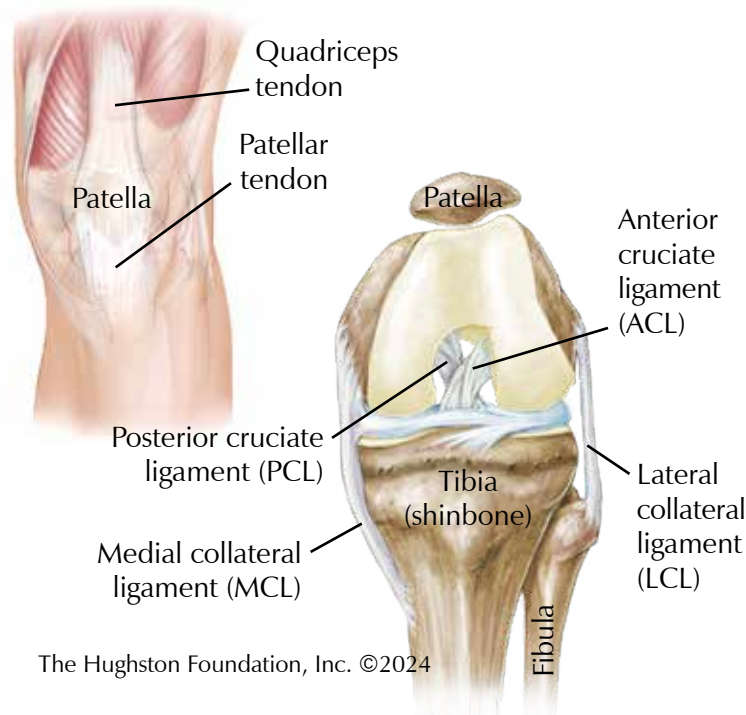
Anterior cruciate ligament (ACL) injuries are common among athletes and active individuals. Injury to the ACL can lead to significant functional limitations and decreased quality of life. There are 4 main ligaments (tissue that connects bone to bone) that help stabilize the knee. The medial (inner side) and lateral (outer side) collateral ligaments resist side-to-side motion. The cruciate ligaments, the anterior (front) and posterior (back), form a cross shape in the center portion of the knee and resist forward and backward motion. The ACL provides most of the support that prevents the tibia (shinbone) from slipping forward against the femur (thighbone) (Fig).

The standard surgical treatment for ACL injuries is reconstruction by replacing the injured ligament using an allograft (tissue from a tissue donor) or an autograft, which uses the patient's own tissue. When the decision has been made to use the patient's own tissue, the hamstring tendons, or the central portion of the patellar tendon with bone plugs on either end have historically been the options. However, harvesting from these sites carries significant risk of patella (kneecap) fracture, pain while kneeling, hamstring weakness at the back of the thigh, and possible sensory nerve injury. More recently, the quadriceps tendon has gained popularity as a graft choice for ACL reconstruction and has even been called, "the graft of the future!"¹ by researchers.

Quad tendon ACL

Why has the "quad tendon ACL" become so popular? For one, the quadriceps tendon is a very robust tissue that contains more collagen, strength filaments, than the patellar tendon and actually can withstand 70% more of a load compared to a patellar tendon graft of similar width.² Additionally, the biomechanical properties of the quad tendon are more similar to the native ACL when compared to the hamstring and patellar tendon, which optimizes the function and stability of the reconstructed tendon.³ Patients often notice the cosmetic benefits of quad tendon graft versus other grafts because the incision is typically much smaller. Harvesting a patellar tendon graft typically involves a large midline incision over the knee and cutting blocks of bone on both sides of the tendon, which can lead to significant pain and even fracture of the residual bone in that area. Alternatively, harvesting the quad tendon can be done through a very small 1 ½ cm incision, does not involve any cutting of the bone, and consistently results in similar patient outcomes and success rates when compared to other graft types.^{4,5} Patients often report less pain with quad tendon harvest versus other graft types as well.

Fig. Left knee anatomy (front view)



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The "quad tendon ACL" is a viable option for active patients who may be interested in using their own graft tissue rather than an allograft. Scientific studies published in the medical literature provide evidence that an ACL reconstruction using a quad tendon graft can result in comparable outcomes to historical graft types with comparably lower complications to the patient.⁶ However, as with any surgery you should discuss the benefits and risks of all graft options for ACL reconstruction with your surgeon.

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References:

1. Xerogeaneas JW. Quadriceps tendon graft for anterior cruciate ligament reconstruction: THE GRAFT OF THE FUTURE! *Arthroscopy*. 2019 Mar;35(3):696-697.
2. Shani RH, Umpierrez E, Nasert M, et al. Biomechanical comparison of quadriceps and patellar tendon grafts in anterior cruciate ligament reconstruction. *Arthroscopy*. 2016 Jan;32(1):71-75.
3. Hart D, Gurney-Dunlop T, Leiter J, et al. Biomechanics of hamstring tendon, quadriceps tendon, and bone-patellar tendon-bone grafts for anterior cruciate ligament reconstruction: a cadaveric study. *European Journal of Orthopaedic Surgery & Traumatology*. 2023;33(4):1067-1074.
4. Sherman SL, Hogan DW, Geeslin DW, et al. Comparison of bone-patella tendon-bone (BTB) and quadriceps autograft for ACL reconstruction in patients under 18 years of age. *Orthopaedic Journal of Sports Medicine*. 2020 Apr;8 (4 suppl3):2325967120S00278 PMID: PMC7225818.
5. Cohen D, Slawaska-Eng D, Almasri M, et al. Quadriceps ACL reconstruction techniques and outcomes: an updated scoping review of the quadriceps tendon. *Current Reviews in Musculoskeletal Medicine*. 2021;14(6):462-474.
6. Dai W, Leng X, Wang J, et al. Quadriceps tendon autograft versus bone-patellar tendon-bone and hamstring tendon autograft for anterior cruciate ligament reconstruction: a systematic review and meta-analysis. *American Journal of Sports Medicine*. 2022;50(12):3425-3439.

Pull-up Bar Injuries

Pull-up bars have become an increasingly popular piece of exercise equipment, as they offer easy access to strength training for the entire upper body. There are numerous products on the market for home use with a variety of installation options including freestanding, mounted within a door-frame, and wall or ceiling mounted (**Box**). While the benefits of pull-up exercises to one's overall health are numerous, poor installation, improper usage, and not maintaining the equipment can lead to serious injury.



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Hughston research

Hughston research fellows recently analyzed injuries seen in emergency departments associated with pull-up bar use. The aim of this retrospective study (data collection using patients' history) was to assess the population most at risk for injury when using pull-up bar exercise equipment and to identify the most common cause for these injuries.

Data collection

The research team completed a retrospective study using the National Electronic Injury Surveillance System (NEISS) database of the Consumer Product Safety Commission (CPSC) which collects consumer product-related injuries presenting to emergency departments in approximately 100 hospitals across the United States. Trained data

coordinators collect NEISS records at participating healthcare centers and researchers use the data extensively in the examination of orthopaedic injury trends and patterns associated with sports and exercise equipment.¹⁻⁵ The database provides statistically valid sampling weights that are representative of national estimates of these injuries.

Results of their study

Demographically, pull-up bar related injuries were more common in males (74.3%), and the highest incidence of cases was reported in ages 19 to 44 (50.4%) followed by patients less than 18 years old (36.0%). Additionally, pull-up bar injuries were 1.5 times more likely to occur in a "home" setting rather than "places of recreation." Equipment malfunction was responsible for 20.6% of the injuries. Most reported injuries included sprains, strains, and contusions; however, there were 566 weighted cases (a statistical estimate) of fracture due to pull-up bar injuries.

What causes the injuries?

The mechanisms of injury can include improper technique, overuse, or not being physically able to safely perform the exercise. A sprain involves stretching or tearing a ligament while a strain results from stretching or tearing a muscle or tendon. Both injuries can lead to pain and swelling with healing time dependent on the severity.

Using an improper form or doing too many pull-ups too soon can lead to pain or injury, as well. Straining the neck or excessive pulling on the bar, such as with kipping, can not only lead to injury from improper technique but also cause equipment malfunction. Other injuries may be caused by twisting or bending of the neck and back, as well as direct blows to the top of the head. Damage from falling equipment can cause compressive forces through the head and neck causing injury to the spine and soft tissues. A herniated disc is another injury that can result from a fall. Further, a fractured vertebra from a fall can cause debilitating pain that requires immediate medical

Box. Types of Home Pull-up Bars

- **Inside doorframe bar.** The bar mounts inside a standard doorway. The bar pushes against the doorframe on both sides. Some are fixed-mounted using screws; others use suction cups to hold it in place. It can be adjusted for safer heights, but must be snug inside the doorframe to prevent failure.
- **Free-standing pull-up bar.** This requires floor space in your home. It's a good choice if you have a designated area for exercise.
- **Wall-mounted pull-up bar.** It screws into the wall. You must attach it to studs and it must extend out from the wall for adequate use.
- **Ceiling-mounted pull-up bar.** This requires finding wood studs for secure installation. It is often higher than other products.
- **Leverage-mounted pull-up bar.** This requires no drilling or fixed mounting. It is hung on the door frame and secured with the leverage of your bodyweight.

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attention. Numbness, tingling, or loss of feeling in your hands, fingers, feet, or toes, back pain, or pressure in the neck, head, or back can be a sign of a serious injury. If you experience these types of symptoms after a fall, your physician or an orthopaedic spine specialist should evaluate your injury. Numbness or paralysis can happen quickly or can come on gradually; therefore, the time between injury and treatment is critical.

Home exercise equipment and doorframes

Pull-up bar injuries from equipment malfunction or poor installation were 11 times more likely to occur in the “home” setting in comparison to places of recreation (gyms, playgrounds, etc.) Proper installation of pull-up bars to create a safe exercise location can be challenging. For those that require door frame installation, most product manufacturers recommend a thorough inspection of the doorframe prior to using the pull-up bar. Additionally, factors such as the composition, age, and whether the doorframe is glued or nailed into the wall can dramatically alter the amount of weight the doorframe is able to safely hold.²

Follow instructions and lower the bar

Though there are risks of at-home pull-up bar installation and use, the risk of injuries can be decreased by carefully following the installation recommendations in the product’s user guide. Most user guides will recommend that you inspect the bar for damage or for parts that may have worked their way loose before beginning your exercise routine. You should always follow the recommended weight limit for the pull-bar and only use the bar as intended. Padding may be placed under the bar is for additional protection. With attention to equipment instruction and proper technique, you can reduce your risk of a serious injury while getting all the health benefits of at home pull-up bars in your strength training routine.

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References:

1. Graves JM, Iyer KR, Willis MM, Ebel BE, Rivara FP, Vavilala MS. Emergency department-reported injuries associated with mechanical home exercise equipment in the USA. *Injury Prevention*. 2014;20(4):281-5.
2. NET, WCMA. “Will a Pull up Bar Break My Door Frame?” WCMA NET, 16 Sept. 2021, www.wcmanet.org/doorway-pull-up-bar-damage/ Last accessed January 2024.
3. Holdsworth, FW. "Fractures, dislocations, and fracture-dislocations of the spine." *Journal of Bone and Joint Surgery, British*. 1963;45(1):6-20
4. Faigenbaum A, Westcott W. Youth strength training. Champaign, IL: *Human Kinetics*; 2009:139-165.
5. Faigenbaum AD, Myer GD. Resistance training among young athletes: safety, efficacy and injury prevention effects. *British Journal of Sports Medicine*. 2010;44(1):56-63.

Dehydration: Balancing Water and Electrolytes

Water is essential to your health because it forms the basis of all body fluids, including blood and digestive fluids; it helps with the transport and the absorption of nutrients, and it helps eliminate waste. Dehydration can be defined simply as losing more fluids than you take in.

Illness, diarrhea, vomiting, urination, and excessive perspiration can cause dehydration because your body often expels more fluid during illness and activity. Symptoms of dehydration include a dry or sticky mouth; low or no urine output, or very dark urine; the inability to produce tears; sunken eyes; and, in severe cases, a lethargic feeling or comatose state. A person who is dehydrated can have low blood pressure or blood pressure that drops rapidly when changing from sitting to standing, a rapid heart rate, poor skin elasticity, delayed capillary refill, and shock.

Box. Electrolytes

- Minerals in blood, tissues (cells), and body fluids that carry an electrical charge.
- Balance is critical for normal functions of cells and organs.

Sodium (Na⁺)

- Regulates the total amount of water in the body.
- Excess sodium is excreted in the urine.
- The movement in and out of cells generates electrical signals which play a critical role in brain, nervous system, and muscle functions.
- Extreme levels (high or low) can be fatal.

Potassium (K⁺)

- Proper levels are essential in regulating the heart beat and muscle function.
- Extreme abnormal levels can effect the nervous system, cause an irregular heart beat, muscle weakness, and in some cases it can be fatal.

Chloride (Cl⁻)

- Helps maintain a normal balance of fluids in the body.
- Excess is lost in urine, sweat, and stomach secretions.
- Significant level changes can have harmful or fatal consequences.
 - Increased levels from diarrhea and certain kidney diseases.
 - Excessive loss from heavy sweating, vomiting, kidney and adrenal gland disease.

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Don't forget your electrolytes

Electrolytes, which include sodium, potassium, chloride, sulfate and other minerals, are necessary for cellular metabolism and proper kidney, brain, and heart function (**Box**). To maintain a proper water and electrolyte balance, you must replace lost fluids and electrolytes. Sometimes our bodies lose too much water and electrolytes which results in dehydration. Water and electrolytes are consumed

normally in food and beverages over the course of a day. A healthy body adjusts normally to the intake of water and electrolytes using hunger and thirst mechanisms. For example, a craving for salty foods can mean you need to replenish a loss of sodium. The kidney is the primary organ that adjusts to loss and intake of the minerals and fluids. Lethargy or unconsciousness, shock, confusion, dizziness, and light headiness are signs of advanced dehydration and require medical attention.

Who is at risk?

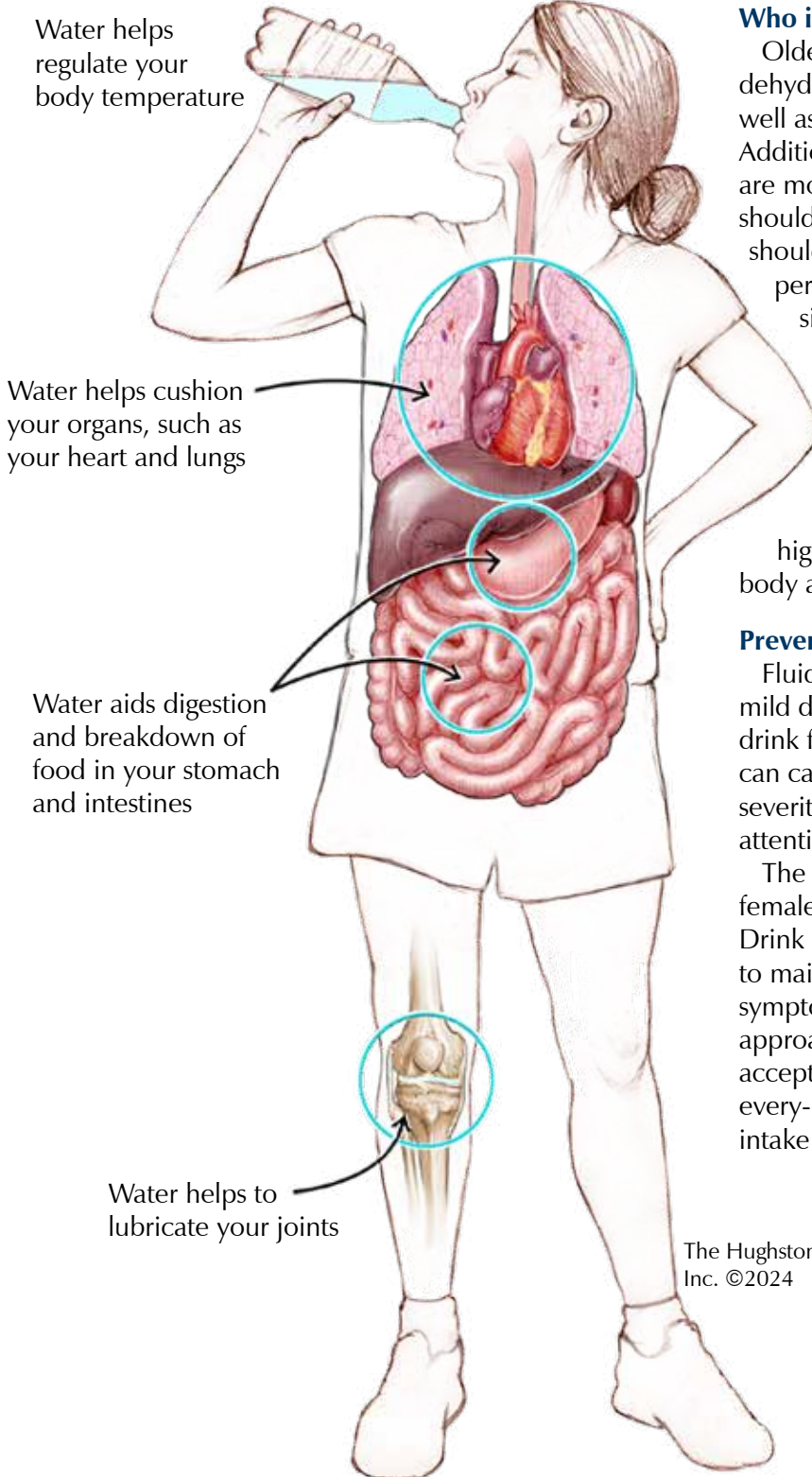
Older adults and infants are at the greatest risk for dehydration because their bodies are unable to adjust as well as an adult's body to the loss of fluids and electrolytes. Additionally, illnesses that result in vomiting and diarrhea are more common in infants and the elderly. Athletes should also be aware of their hydration level and they should replace water lost due to sweating. Extreme perspiration, along with hot temperatures, can create a situation for the dehydrated athlete. Athletes need to drink plenty of water before, during, and after any activity. One good way athletes can monitor fluid loss and intake is by weighing themselves before an activity. After a workout, the athlete can weigh in again and then replace the weight lost during activity. Some fluids, like those that contain high amounts of caffeine, do not actually benefit the body and, sometimes, can exacerbate dehydration.

Prevention

Fluids should be administered as soon as possible if mild dehydration symptoms begin to show. You should drink frequently and in small amounts. Mild dehydration can cause dizziness, fatigue, and weakness. If the severity of the symptoms increases, seek medical attention immediately.

The rule of thumb is 9 glasses of water per day for females and 13 glasses of water per day for males. Drink plenty of fluids—even when you are not thirsty—to maintain hydration. Be aware of the signs and symptoms of dehydration and take a preventative approach to ensure hydration levels are within an acceptable range. Electrolytes are consumed in our every-day diet, but you should still be aware of the intake and loss of these minerals.

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- Materials distributed at sporting events, such as the Georgia High School Soccer Association Championship, and Safe Kids programs to educate the public about safety concerns for our youth.

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