First aid

Print

Head trauma: First aid

Basics Expert Answers

Products and services

By Mayo Clinic Staff

To give first aid to a person who has head trauma, **call 911 or your local emergency number.** Any of the following symptoms may indicate a serious head injury:

Adults

- Severe head or facial bleeding.
- Bleeding or fluid leakage from the nose or ears.
- Vomiting.
- Severe headache.
- Change in consciousness for more than a few seconds.
- Black-and-blue discoloration below the eyes or behind the ears.
- Not breathing.
- Confusion.
- Agitation.
- Loss of balance.
- Weakness or an inability to use an arm or leg.
- Unequal pupil size.
- Slurred speech.
- Seizures.

Children

- Any of the symptoms for adults.
- Persistent crying.
- Refusal to eat.
- Bulging in the soft spot on the front of the head of infants.
- Repeated vomiting.

Administer the following first-aid steps while waiting for emergency medical help to arrive:

- **Keep the person still.** The injured person should lie down with the head and shoulders slightly elevated. Don't move the

person unless necessary. Avoid moving the person's neck. If the person is wearing a helmet, don't remove it.
- **Stop any bleeding.** Apply firm pressure to the wound with sterile gauze or a clean cloth. But don't apply direct pressure to the wound if you suspect a skull fracture.
- **Watch for changes in breathing and alertness.** If the person shows no signs of circulation — no breathing, coughing or movement — begin CPR.

Head trauma that results in concussion symptoms need to be evaluated by a medical professional. Concussion symptoms include nausea, unsteadiness, headaches or difficulty concentrating.

Feb. 18, 2023

Show references

See also

Bump on the head: When is it a serious head injury?

First aid Head trauma: First aid Basics ART-20056626

Concussion

Overview

A concussion is a mild traumatic brain injury that affects brain function. Effects are often short term and can include headaches and trouble with concentration, memory, balance, mood and sleep.

Concussions usually are caused by an impact to the head or body that is associated with a change in brain function. Not everyone who experiences a blow to the body or head has a concussion.

Some concussions cause the person to lose consciousness, but most do not.

Falls are the most common cause of concussions. Concussions also are common among athletes who play a contact sport, such as American football or soccer. Most people recover fully after a concussion.

Symptoms

The symptoms of a concussion can be subtle and may not occur right away. Symptoms can last for days, weeks or even longer.

Common symptoms after a mild traumatic brain injury are headache, confusion and loss of memory, known as amnesia. The amnesia usually involves forgetting the event that caused the concussion.

Physical symptoms of a concussion may include:

- Headache.
- Ringing in the ears.
- Nausea.
- Vomiting.
- Fatigue or drowsiness.
- Blurry vision.

Other symptoms of a concussion include:

- Confusion or feeling as if in a fog.
- Amnesia surrounding the event.
- Dizziness or "seeing stars."

A witness may observe these symptoms in the person with a concussion:

- Temporary loss of consciousness, though this doesn't always occur.
- Slurred speech.
- Delayed response to questions.
- Dazed appearance.
- Forgetfulness, such as asking the same question over and over.

Some symptoms of a concussion occur right away. But sometimes symptoms may not occur for days after the injury, such as:

- Trouble with concentration and memory.
- Irritability and other personality changes.
- Sensitivity to light and noise.
- Trouble with sleep.
- Feeling emotional or depressed.
- Changes in taste and smell.

Symptoms in children

Concussions can be hard to recognize in infants and toddlers because they can't describe how they feel. Concussion clues may include:

- Dazed appearance.
- Listlessness and tiring easily.
- Irritability and crankiness.
- Loss of balance and unsteady walking.
- Excessive crying.
- Change in eating or sleeping patterns.
- Lack of interest in favorite toys.
- Vomiting.

When to see a doctor

See a healthcare professional within 1 to 2 days if:

- You or your child experiences a head injury, even if emergency care isn't required.

Children and adolescents need to see a healthcare professional trained in evaluating and managing pediatric concussions.

Seek emergency care for an adult or child who experiences a head injury and any of these symptoms:

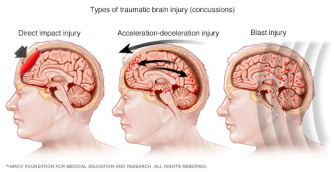
- Repeated vomiting or nausea.
- A loss of consciousness lasting longer than 30 seconds.
- A headache that gets worse over time.
- Fluid or blood draining from the nose or ears.
- Vision or eye changes. For example, the black parts of the eye, known as the pupils, may be bigger than usual or unequal sizes.
- Ringing in the ears that doesn't go away.
- Weakness in the arms or legs.
- Changes in behavior.
- Confusion or disorientation. For example, the person may not recognize people or places.
- Slurred speech or other changes in speech.
- Obvious changes to mental function.
- Changes in physical coordination, such as stumbling or clumsiness.
- Seizures or convulsions.
- Dizziness that doesn't go away or that goes away and comes back.
- Symptoms that worsen over time.
- Large head bumps or bruises, such as bruises around the eyes or behind the ears. It's especially important to seek emergency care if these symptoms

appear in infants under 12 months of age.

When symptoms occur in athletes

Never return to play or vigorous activity immediately following a concussion. Experts recommend that adult, child and adolescent athletes with concussions not return to play on the same day as the injury. Even if a concussion is suspected, experts recommend not returning to activities that can put the athlete at risk of another concussion. Gradual return to learning and physical activity is individual and depends on the symptoms. It should always be supervised by a healthcare professional.

Causes



Types of concussion injuries

Enlarge image

During a concussion, the brain slides back and forth against the inner walls of the skull. This forceful movement can be caused by a violent blow to the head and neck or upper body. It also may be caused by the sudden acceleration or deceleration of the head. This may happen during a car crash, a fall from a bike or from a collision with another player in sports.

These movements injure the brain and affect brain function, usually for a brief period of time. Sometimes a mild traumatic brain injury can lead to bleeding in or around the brain, causing prolonged drowsiness, confusion and, sometimes, death. Anyone who experiences a brain injury needs to be monitored in the hours afterward and seek emergency care if symptoms worsen.

Risk factors

Events and factors that may increase the risk of a concussion include:

- Activities that can lead to falls, especially in young children and older adults.
- High-risk sports such as American football, hockey, soccer, rugby, boxing or other contact sports.
- Not using proper safety equipment and supervision when playing high-risk sports.
- Auto accidents.
- Pedestrian or bicycle accidents.
- Military combat.
- Physical abuse.

Having had a previous concussion also increases the risk of having another.

Complications

Potential complications of concussion include:

- **Post-traumatic headaches.** Some people experience concussion-related headaches for several days to weeks after a brain injury.
- **Post-traumatic vertigo.** Some people experience a sense of spinning or dizziness for days or weeks after a brain injury.
- **Persistent post-concussive symptoms, also known as post-concussion syndrome.** A small number of people may have multiple symptoms that last longer than expected. Longer lasting symptoms may include headaches, dizziness and trouble with thinking. If these symptoms persist beyond three months, they're called persistent post-concussive symptoms.
- **Effects of multiple brain injuries.** Researchers are studying the effects of repeated head injuries that don't cause symptoms, known as subconcussive injury. At this time, there's no conclusive evidence that these repeated brain injuries affect brain function.
- **Second impact syndrome.** Rarely, experiencing a second concussion before symptoms of a first concussion go away may result in rapid brain swelling. This can lead to death. It's important that athletes never return to sports while they're still experiencing symptoms of concussion.

Prevention

These tips may help you prevent or minimize the risk of a concussion:

- **Wear protective gear during sports and other recreational activities.** Make sure the equipment fits properly, is well maintained and is worn correctly. Follow the rules of the game and practice good sportsmanship.

Be sure to wear a helmet when bicycling, motorcycling, snowboarding or doing any activity that may result in a head injury.

- **Buckle your seat belt.** Wearing a seat belt may prevent serious injury, including head injury, during a traffic accident.
- **Make your home safe.** Keep your home well lit. Keep your floors free of anything that might cause you to trip and fall. Falls around the home are a leading cause of head injury.
- **Protect your children.** To help lessen the risk of head injuries in children, block off stairways and install window guards.
- **Exercise regularly.** Exercise strengthens your leg muscles and improves your balance.
- **Educate others about concussions.** Educate coaches, athletes, parents and others about concussions to help spread awareness. Coaches and parents also can help encourage good sportsmanship.

By Mayo Clinic Staff

Concussion care at Mayo Clinic

Diagnosis & treatment

Jan. 12, 2024

Print

Show references

Related

Concussion in children

Concussion Recovery

Concussion Telemedicine

Show more related content

Associated Procedures

Concussion testing and screening tools

CT scan

CON-20251910

Patient Care & Health Information

Diseases & Conditions

Concussion

Feedback

Find a doctor

Explore careers

Sign up for free e-newsletters

About Mayo Clinic

About this Site

Contact Us

Locations

Health Information Policy

Medicare Accountable Care Organization (ACO)

Media Requests

News Network

Price Transparency

Medical Professionals

AskMayoExpert

Clinical Trials

Mayo Clinic Alumni Association

Refer a Patient

Businesses

Executive Health Program

International Business Collaborations

Students

Degree Programs

Admissions Requirements

Student & Faculty Portal

Researchers

Research Faculty

Laboratories

International Patients

Appointments

Financial Services

International Locations & Offices

Charitable Care & Financial Assistance

Community Health Needs Assessment

Financial Assistance Documents – Arizona

Financial Assistance Documents – Florida

Financial Assistance Documents – Minnesota

Facilities & Real Estate

Supplier Information

Follow Mayo Clinic

Get the Mayo Clinic app

Language: English

Feedback

Concussion

Diagnosis

To diagnose a concussion, your healthcare professional evaluates your symptoms and reviews your medical history. You may need tests that help diagnose a concussion. Tests may include a neurological exam, cognitive testing and imaging tests.

Neurological exam

Your healthcare professional asks detailed questions about your injury and then performs a neurological exam. This evaluation includes checking your:

- Vision.
- Hearing.
- Strength and sensation.
- Balance.
- Coordination.

- Reflexes.

Cognitive testing

Your healthcare professional may conduct several tests to evaluate your thinking skills, also known as cognitive skills. Testing may evaluate several factors, including your:

- Memory.
- Concentration.
- Ability to recall information.

Imaging tests

Brain imaging may be recommended for some people who have had a concussion. Imaging may be done in people with symptoms such as bad headaches, seizures, repeated vomiting or symptoms that are becoming worse. Imaging tests may determine whether the injury has caused bleeding or swelling in the skull.

A computerized tomography (CT) scan of the head is the standard test in adults to assess the brain right after injury. A CT scan uses a series of X-rays to obtain cross-sectional images of the skull and brain.

For children with a suspected concussion, CT scans are used only if specific criteria are met, such as the type of injury or signs of a skull fracture. This is to limit radiation exposure in young children.

Magnetic resonance imaging (MRI) may be used to identify changes in your brain or to diagnose complications that may occur after a concussion. An MRI uses powerful magnets and radio waves to produce detailed images of your brain.

Observation

After a diagnosis of a concussion, you or your child may need to be hospitalized overnight for observation.

Or your healthcare professional may agree that you or your child can be observed at home. Have someone stay with you and check on you for at least 24 hours to ensure that your symptoms aren't getting worse.

Care at Mayo Clinic

Our caring team of Mayo Clinic experts can help you with your concussion-related health concerns

Start Here

More Information

Concussion care at Mayo Clinic

Concussion testing and screening tools

CT scan

Treatment

There are steps you can take to help your brain heal and speed recovery.

Physical and mental rest

In the first couple of days after a concussion, relative rest allows your brain to recover. Healthcare professionals recommend that you physically and mentally rest during this time. However, complete rest, such as lying in a dark room without any stimuli, does not help recovery and is not recommended.

In the first 48 hours, limit activities that require a lot of concentration if those activities makes your symptoms worse. This includes playing video games, watching TV, doing schoolwork, reading, texting or using a computer.

Don't do physical activities that increase your symptoms. This may include general physical exertion, sports or any vigorous movements. Don't do these activities until they no longer provoke your symptoms.

After a period of relative rest, gradually increase daily activities if you can tolerate them without triggering symptoms. You can start both physical and mental activities at levels that do not cause a major worsening of symptoms.

Light exercise and physical activity as tolerated starting a couple of days after injury have been shown to speed recovery. Activities might include riding a stationary bike or light jogging. But don't engage in any activities that have a high risk of another head impact until you are fully recovered.

Your healthcare professional may recommend that you have shortened school days or workdays. You may need to take breaks during the day, or have modified or reduced school workloads or work assignments as you recover.

Your healthcare professional also may recommend different therapies. You may need rehabilitation for symptoms related to vision, balance, or thinking and memory.

Returning to routine activity

As your symptoms improve, you may gradually add more activities that involve thinking. You may do more schoolwork or work assignments, or increase your time spent at school or work.

Some physical activity can help speed brain recovery. Specific return to physical activity sport protocols may be suggested by your healthcare professional. These typically involve specific levels of physical activity to make sure you return to activity safely. Don't resume contact sports until you are symptom-free and cleared by your healthcare professional.

Pain relief

Headaches may occur in the days or weeks after a concussion. To manage pain, ask your healthcare professional if it's safe to take a pain reliever such as acetaminophen (Tylenol, others). Don't take other pain relievers such as ibuprofen (Advil, Motrin IB, others) and aspirin. These medicines may increase the risk of bleeding.

Request an appointment

Clinical trials

Explore Mayo Clinic studies testing new treatments, interventions and tests as a means to prevent, detect, treat or manage this condition.

Preparing for your appointment

It's important for anyone who has a head injury to be evaluated by a healthcare professional, even if emergency care isn't required.

If your child has received a head injury that concerns you, call your child's healthcare professional right away. Depending on the symptoms, your healthcare professional may recommend that your child get medical care right away.

Here's some information to help you get ready for and make the most of your medical appointment.

What you can do

- **Be aware of any pre-appointment restrictions or instructions.** The most important thing for you to do while waiting for your appointment is not to do activities that cause or worsen symptoms. Don't play sports or do vigorous physical activities. Minimize stressful or prolonged mental tasks. At the time you make the appointment, ask what steps you or your child need to take to encourage recovery or prevent another injury. Experts recommend that athletes not return to play until they have been medically evaluated.
- **List any symptoms you or your child has been experiencing** and how long they've been occurring.
- **List key medical information,** such as other medical conditions for which you or your child is being treated. Include any history of head injuries. Also write down the names of any medicines, vitamins, supplements or other natural remedies you or your child is taking.
- **Take a family member or friend along.** Sometimes it can be hard to remember all the information provided to you during an appointment. Someone who comes with you may recall something that you missed or forgot.
- **Write down questions to ask** your healthcare professional.

For a concussion, some basic questions to ask include:

- Do I have a concussion?
- What kinds of tests are needed?
- What treatment approach do you recommend?
- How soon will symptoms begin to improve?
- What is the risk of future concussions?
- What is the risk of long-term complications?
- When will it be safe to return to competitive sports?
- When will it be safe to resume vigorous exercise?
- Is it safe to return to school or work?
- Is it safe to drive a car or operate power equipment?
- I have other medical conditions. How can they be managed together?
- Should I see a specialist? What will that cost, and will my insurance cover a visit to a specialist? You may need to call your insurance provider for some of these answers.
- Are there any brochures or other printed material that I can take home with me? What websites do you recommend?

In addition to the questions that you've prepared, don't hesitate to ask questions that come up during your appointment.

What to expect from your doctor

Being ready to answer your healthcare professional's questions may reserve time to go over any points you want to talk about in-depth.

You or your child should be prepared to answer the following questions about the injury and related symptoms:

- Do you play contact sports?
- How did you get this injury?
- What symptoms did you experience immediately after the injury?
- Do you remember what happened right before and after the injury?
- Did you lose consciousness after the injury?
- Did you have seizures?
- Have you experienced nausea or vomiting since the injury?
- Have you had a headache? How soon after the injury did it start?
- Have you noticed any trouble with physical coordination since the injury?
- Have you had any issues with memory or concentration since the injury?
- Have you noticed any sensitivity or changes with your vision and hearing?
- Have you had any mood changes, including irritability, anxiety or depression?
- Have you felt sluggish or easily fatigued since the injury?
- Are you having trouble sleeping or waking from sleep?
- Have you noticed changes in your sense of smell or taste?
- Do you have any dizziness?
- What other symptoms are you concerned about?
- Have you had any previous head injuries?

What you can do in the meantime

Before your appointment, don't do activities that increase your symptoms and risk another head injury. This includes not playing sports or activities that require vigorous movements.

Gradually resume your usual daily activities, including screen time, as you're able to tolerate them without worsening symptoms.

If you have a headache, acetaminophen (Tylenol, others) may ease the pain. Don't take other pain relievers such as aspirin or ibuprofen (Advil, Motrin IB, others) if you suspect you've had a concussion. These may increase the risk of bleeding.

By Mayo Clinic Staff

Concussion care at Mayo Clinic

Symptoms & causes

Jan. 12, 2024

Related

Concussion in children

Concussion Recovery

Concussion Telemedicine

Show more related content

Associated Procedures

Concussion testing and screening tools

CT scan

CON-20251910

Patient Care & Health Information

Diseases & Conditions

Concussion

Explore careers

Sign up for free e-newsletters

About Mayo Clinic

About this Site

Contact Us

Locations

Health Information Policy

Medicare Accountable Care Organization (ACO)

Media Requests

News Network

Price Transparency

Medical Professionals

AskMayoExpert

Clinical Trials

Mayo Clinic Alumni Association

Refer a Patient

Businesses

Executive Health Program

International Business Collaborations

Facilities & Real Estate

Supplier Information

Admissions Requirements

Student & Faculty Portal

Researchers

Research Faculty

Laboratories

International Patients

Appointments

Financial Services

International Locations & Offices

Charitable Care & Financial Assistance

Community Health Needs Assessment

Financial Assistance Documents – Arizona

Financial Assistance Documents – Florida

Financial Assistance Documents – Minnesota

Follow Mayo Clinic

Get the Mayo Clinic app

Feedback

Traumatic brain injury

On this page

Overview ↓ Symptoms ↓ When to see a doctor ↓ Causes ↓ Risk factors ↓ Complications ↓ Prevention ↓

Overview

Traumatic brain injury usually results from a violent blow or jolt to the head or body. An object that goes through brain tissue, such as a bullet or shattered piece of skull, also can cause traumatic brain injury.

Mild traumatic brain injury may affect your brain cells temporarily. More-serious traumatic brain injury can result in bruising, torn tissues, bleeding and other physical damage to the brain. These injuries can result in long-term complications or death.

Symptoms

Traumatic brain injury can have wide-ranging physical and psychological effects. Some signs or symptoms may appear immediately after the traumatic event, while others may appear days or weeks later.

Mild traumatic brain injury

The signs and symptoms of mild traumatic brain injury may include:

Physical symptoms

- Headache
- Nausea or vomiting
- Fatigue or drowsiness
- Problems with speech
- Dizziness or loss of balance

Sensory symptoms

- Sensory problems, such as blurred vision, ringing in the ears, a bad taste in the mouth or changes in the ability to smell
- Sensitivity to light or sound

Cognitive, behavioral or mental symptoms

- Loss of consciousness for a few seconds to a few minutes
- No loss of consciousness, but a state of being dazed, confused or disoriented
- Memory or concentration problems
- Mood changes or mood swings
- Feeling depressed or anxious
- Difficulty sleeping
- Sleeping more than usual

Moderate to severe traumatic brain injuries

Moderate to severe traumatic brain injuries can include any of the signs and symptoms of mild injury, as well as these symptoms that may appear within the first hours to days after a head injury:

Physical symptoms

- Loss of consciousness from several minutes to hours
- Persistent headache or headache that worsens
- Repeated vomiting or nausea
- Convulsions or seizures
- Dilation of one or both pupils of the eyes
- Clear fluids draining from the nose or ears
- Inability to awaken from sleep

- Weakness or numbness in fingers and toes
- Loss of coordination

Cognitive or mental symptoms

- Profound confusion
- Agitation, combativeness or other unusual behavior
- Slurred speech
- Coma and other disorders of consciousness

Children's symptoms

Infants and young children with brain injuries might not be able to communicate headaches, sensory problems, confusion and similar symptoms. In a child with traumatic brain injury, you may observe:

- Change in eating or nursing habits
- Unusual or easy irritability
- Persistent crying and inability to be consoled
- Change in ability to pay attention
- Change in sleep habits
- Seizures
- Sad or depressed mood
- Drowsiness
- Loss of interest in favorite toys or activities

When to see a doctor

Always see your doctor if you or your child has received a blow to the head or body that concerns you or causes behavioral changes. Seek emergency medical

care if there are any signs or symptoms of traumatic brain injury following a recent blow or other traumatic injury to the head.

The terms "mild," "moderate" and "severe" are used to describe the effect of the injury on brain function. A mild injury to the brain is still a serious injury that requires prompt attention and an accurate diagnosis.

Causes

Traumatic brain injury is usually caused by a blow or other traumatic injury to the head or body. The degree of damage can depend on several factors, including the nature of the injury and the force of impact.

Common events causing traumatic brain injury include the following:

- **Falls.** Falls from bed or a ladder, down stairs, in the bath, and other falls are the most common cause of traumatic brain injury overall, particularly in old

adults and young children.

- **Vehicle-related collisions.** Collisions involving cars, motorcycles or bicycles — and pedestrians involved in such accidents — are a common cause of traumatic brain injury.
- **Violence.** Gunshot wounds, domestic violence, child abuse and other assaults are common causes. Shaken baby syndrome is a traumatic brain injury in infants caused by violent shaking.
- **Sports injuries.** Traumatic brain injuries may be caused by injuries from a number of sports, including soccer, boxing, football, baseball, lacrosse, skateboarding, hockey, and other high-impact or extreme sports. These are particularly common in youth.
- **Explosive blasts and other combat injuries.** Explosive blasts are a common cause of traumatic brain injury in active-duty military personnel. Although how the damage occurs isn't yet well understood, many researchers believe that the pressure wave passing through the brain significantly disrupts brain function.

  Traumatic brain injury also results from penetrating wounds, severe blows to the head with shrapnel or debris, and falls or bodily collisions with objects following a blast.

Risk factors

The people most at risk of traumatic brain injury include:

- Children, especially newborns to 4-year-olds
- Young adults, especially those between ages 15 and 24
- Adults age 60 and older
- Males in any age group

Complications

Several complications can occur immediately or soon after a traumatic brain injury. Severe injuries increase the risk of a greater number of and more-severe complications.

Altered consciousness

Moderate to severe traumatic brain injury can result in prolonged or permanent changes in a person's state of consciousness, awareness or responsiveness. Different states of consciousness include:

- **Coma.** A person in a coma is unconscious, unaware of anything and unable to respond to any stimulus. This results from widespread damage to all parts of the brain. After a few days to a few weeks, a person may emerge from a coma or enter a vegetative state.
- **Vegetative state.** Widespread damage to the brain can result in a vegetative state. Although the person is unaware of surroundings, he or she may open his or her eyes, make sounds, respond to reflexes, or move.

  It's possible that a vegetative state can become permanent, but often individuals progress to a minimally conscious state.
- **Minimally conscious state.** A minimally conscious state is a condition of severely altered consciousness but with some signs of self-awareness or awareness of one's environment. It is sometimes a transitional state from a coma or vegetative condition to greater recovery.
- **Brain death.** When there is no measurable activity in the brain and the brainstem, this is called brain death. In a person who has been declared brain dead, removal of breathing devices will result in cessation of breathing and eventual heart failure. Brain death is considered irreversible.

Physical complications

- **Seizures.** Some people with traumatic brain injury will develop seizures. The seizures may occur only in the early stages, or years after the injury. Recurrent seizures are called post-traumatic epilepsy.

- **Fluid buildup in the brain (hydrocephalus).** Cerebrospinal fluid may build up in the spaces in the brain (cerebral ventricles) of some people who have had traumatic brain injuries, causing increased pressure and swelling in the brain.
- **Infections.** Skull fractures or penetrating wounds can tear the layers of protective tissues (meninges) that surround the brain. This can enable bacteria to enter the brain and cause infections. An infection of the meninges (meningitis) could spread to the rest of the nervous system if not treated.
- **Blood vessel damage.** Several small or large blood vessels in the brain may be damaged in a traumatic brain injury. This damage could lead to a stroke, blood clots or other problems.
- **Headaches.** Frequent headaches are very common after a traumatic brain injury. They may begin within a week after the injury and could persist for as long as several months.
- **Vertigo.** Many people experience vertigo, a condition characterized by dizziness, after a traumatic brain injury.

Sometimes, any or several of these symptoms might linger for a few weeks to a few months after a traumatic brain injury. When a combination of these symptoms lasts for an extended period of time, this is generally referred to as persistent post-concussive symptoms.

Traumatic brain injuries at the base of the skull can cause nerve damage to the nerves that emerge directly from the brain (cranial nerves). Cranial nerve damage may result in:

- Paralysis of facial muscles or losing sensation in the face
- Loss of or altered sense of smell or taste
- Loss of vision or double vision
- Swallowing problems
- Dizziness
- Ringing in the ear

- Hearing loss

Intellectual problems

Many people who have had a significant brain injury will experience changes in their thinking (cognitive) skills. It may be more difficult to focus and take longer to process your thoughts. Traumatic brain injury can result in problems with many skills, including:

Cognitive problems

- Memory
- Learning
- Reasoning
- Judgment
- Attention or concentration

Executive functioning problems

- Problem-solving
- Multitasking
- Organization
- Planning
- Decision-making
- Beginning or completing tasks

Communication problems

Language and communications problems are common following traumatic brain injuries. These problems can cause frustration, conflict and misunderstanding for people with a traumatic brain injury, as well as family members, friends and care providers.

Communication problems may include:

- Difficulty understanding speech or writing
- Difficulty speaking or writing
- Inability to organize thoughts and ideas
- Trouble following and participating in conversations

Communication problems that affect social skills may include:

- Trouble with turn taking or topic selection in conversations
- Problems with changes in tone, pitch or emphasis to express emotions, attitudes or subtle differences in meaning
- Difficulty understanding nonverbal signals
- Trouble reading cues from listeners
- Trouble starting or stopping conversations
- Inability to use the muscles needed to form words (dysarthria)

Behavioral changes

People who've experienced brain injury may experience changes in behaviors. These may include:

- Difficulty with self-control
- Lack of awareness of abilities
- Risky behavior
- Difficulty in social situations
- Verbal or physical outbursts

Emotional changes

Emotional changes may include:

- Depression
- Anxiety

- Mood swings
- Irritability
- Lack of empathy for others
- Anger
- Insomnia

Sensory problems

Problems involving senses may include:

- Persistent ringing in the ears
- Difficulty recognizing objects
- Impaired hand-eye coordination
- Blind spots or double vision
- A bitter taste, a bad smell or difficulty smelling
- Skin tingling, pain or itching
- Trouble with balance or dizziness

Degenerative brain diseases

The relationship between degenerative brain diseases and brain injuries is still unclear. But some research suggests that repeated or severe traumatic brain injuries might increase the risk of degenerative brain diseases. But this risk can't be predicted for an individual — and researchers are still investigating if, why and how traumatic brain injuries might be related to degenerative brain diseases.

A degenerative brain disorder can cause gradual loss of brain functions, including:

- Alzheimer's disease, which primarily causes the progressive loss of memory and other thinking skills
- Parkinson's disease, a progressive condition that causes movement problems, such as tremors, rigidity and slow movements

- Dementia pugilistica — most often associated with repetitive blows to the head in career boxing — which causes symptoms of dementia and movement problems

Prevention

Follow these tips to reduce the risk of brain injury:

- **Seat belts and airbags.** Always wear a seat belt in a motor vehicle. A small child should always sit in the back seat of a car secured in a child safety seat or booster seat that is appropriate for his or her size and weight.
- **Alcohol and drug use.** Don't drive under the influence of alcohol or drugs, including prescription medications that can impair the ability to drive.
- **Helmets.** Wear a helmet while riding a bicycle, skateboard, motorcycle, snowmobile or all-terrain vehicle. Also wear appropriate head protection when playing baseball or contact sports, skiing, skating, snowboarding or riding a horse.
- **Pay attention to your surroundings.** Don't drive, walk or cross the street while using your phone, tablet or any smart device. These distractions can lead to accidents or falls.

Preventing falls

The following tips can help older adults avoid falls around the house:

- Install handrails in bathrooms
- Put a nonslip mat in the bathtub or shower
- Remove area rugs
- Install handrails on both sides of staircases
- Improve lighting in the home, especially around stairs
- Keep stairs and floors clear of clutter

- Get regular vision checkups
- Get regular exercise

Preventing head injuries in children

The following tips can help children avoid head injuries:

- Install safety gates at the top of a stairway
- Keep stairs clear of clutter
- Install window guards to prevent falls
- Put a nonslip mat in the bathtub or shower
- Use playgrounds that have shock-absorbing materials on the ground
- Make sure area rugs are secure
- Don't let children play on fire escapes or balconies

By Mayo Clinic Staff

Feb 04, 2021

Mayo Clinic Press

Check out these best-sellers and special offers on books and newsletters from Mayo Clinic Press.

Mayo Clinic on Incontinence

The Essential Diabetes Book

Mayo Clinic on Hearing and Balance

FREE Mayo Clinic Diet Assessment

Mayo Clinic Health Letter - FREE book

Patient Stories from Mayo Clinic

Unforeseen danger of a child's fall: Livia's remarkable recovery

Associated Procedures

Brain rehabilitation

Craniotomy

CT scan

MRI

Products & Services

A Book: Guide to the Comatose Patient

CON-20378540

Traumatic brain injury

Diagnosis

Traumatic brain injuries may be emergencies. In the case of more-severe traumatic brain injuries (TBIs), consequences can worsen rapidly without treatment. Doctors or first responders need to assess the situation quickly.

Glasgow Coma Scale

This 15-point test helps a doctor or other emergency medical personnel assess the initial severity of a brain injury by checking a person's ability to follow directions and move their eyes and limbs. The coherence of speech also provides important clues.

Abilities are scored from three to 15 in the Glasgow Coma Scale. Higher scores mean less severe injuries.

Information about the injury and symptoms

If you saw someone sustain an injury or arrived immediately after an injury, you may be able to provide medical personnel with information that's useful in

assessing the injured person's condition.

Answers to the following questions may be beneficial in judging the severity of injury:

- How did the injury occur?
- Did the person lose consciousness?
- How long was the person unconscious?
- Did you observe any other changes in alertness, speaking, coordination or other signs of injury?
- Where was the head or other parts of the body struck?
- Can you provide any information about the force of the injury? For example, what hit the person's head, how far did he or she fall, or was the person thrown from a vehicle?
- Was the person's body whipped around or severely jarred?

Imaging tests

- **Computerized tomography (CT) scan.** This test is usually the first performed in an emergency room for a suspected traumatic brain injury. A computed tomography (CT) scan uses a series of X-rays to create a detailed view of the brain. A CT scan can quickly visualize fractures and uncover evidence of bleeding in the brain (hemorrhage), blood clots (hematomas), bruised brain tissue (contusions), and brain tissue swelling.
- **Magnetic resonance imaging (MRI).** An Magnetic resonance imaging (MRI) uses powerful radio waves and magnets to create a detailed view of the brain. This test may be used after the person's condition stabilizes, or if symptoms don't improve soon after the injury.

Intracranial pressure monitor

Tissue swelling from a traumatic brain injury can increase pressure inside the skull and cause additional damage to the brain. Doctors may insert a probe through the skull to monitor this pressure.

More Information

CT scan

MRI

Treatment

Treatment is based on the severity of the injury.

Mild injury

Mild traumatic brain injuries usually require no treatment other than rest and over-the-counter pain relievers to treat a headache. However, a person with a mild traumatic brain injury usually needs to be monitored closely at home for any persistent, worsening or new symptoms. He or she may also have follow-up doctor appointments.

The doctor will indicate when a return to work, school or recreational activities is appropriate. Relative rest — which means limiting physical or thinking (cognitive) activities that make things worse — is usually recommended for the first few days or until your doctor advises that it's OK to resume regular activities. It isn't recommended that you rest completely from mental and physical activity. Most people return to normal routines gradually.

Immediate emergency care

Emergency care for moderate to severe traumatic brain injuries focuses on making sure the person has enough oxygen and an adequate blood supply, maintaining blood pressure, and preventing any further injury to the head or neck.

People with severe injuries may also have other injuries that need to be addressed. Additional treatments in the emergency room or intensive care unit of a hospital will focus on minimizing secondary damage due to inflammation, bleeding or reduced oxygen supply to the brain.

Medications

Medications to limit secondary damage to the brain immediately after an injury may include:

- **Anti-seizure drugs.** People who've had a moderate to severe traumatic brain injury are at risk of having seizures during the first week after their injury.

  An anti-seizure drug may be given during the first week to avoid any additional brain damage that might be caused by a seizure. Continued anti-seizure treatments are used only if seizures occur.

- **Coma-inducing drugs.** Doctors sometimes use drugs to put people into temporary comas because a comatose brain needs less oxygen to function. This is especially helpful if blood vessels, compressed by increased pressure in the brain, are unable to supply brain cells with normal amounts of nutrients and oxygen.

- **Diuretics.** These drugs reduce the amount of fluid in tissues and increase urine output. Diuretics, given intravenously to people with traumatic brain injury, help reduce pressure inside the brain.

Surgery

Emergency surgery may be needed to minimize additional damage to brain tissues. Surgery may be used to address the following problems:

- **Removing clotted blood (hematomas).** Bleeding outside or within the brain can result in a collection of clotted blood (hematoma) that puts pressure on the brain and damages brain tissue.
- **Repairing skull fractures.** Surgery may be needed to repair severe skull fractures or to remove pieces of skull in the brain.
- **Bleeding in the brain.** Head injuries that cause bleeding in the brain may need surgery to stop the bleeding.
- **Opening a window in the skull.** Surgery may be used to relieve pressure inside the skull by draining accumulated cerebrospinal fluid or creating a window in the skull that provides more room for swollen tissues.

Rehabilitation

Most people who have had a significant brain injury will require rehabilitation. They may need to relearn basic skills, such as walking or talking. The goal is to improve their abilities to perform daily activities.

Therapy usually begins in the hospital and continues at an inpatient rehabilitation unit, a residential treatment facility or through outpatient services. The type and duration of rehabilitation is different for everyone, depending on the severity of the brain injury and what part of the brain was injured.

Rehabilitation specialists may include:

- **Physiatrist,** a doctor trained in physical medicine and rehabilitation, who oversees the entire rehabilitation process, manages medical rehabilitation problems and prescribes medication as needed
- **Occupational therapist,** who helps the person learn, relearn or improve skills to perform everyday activities
- **Physical therapist,** who helps with mobility and relearning movement patterns, balance and walking

- **Speech and language therapist,** who helps the person improve communication skills and use assistive communication devices if necessary
- **Neuropsychologist,** who assesses cognitive impairment and performance, helps the person manage behaviors or learn coping strategies, and provides psychotherapy as needed for emotional and psychological well-being
- **Social worker or case manager,** who facilitates access to service agencies, assists with care decisions and planning, and facilitates communication among various professionals, care providers and family members
- **Rehabilitation nurse,** who provides ongoing rehabilitation care and services and who helps with discharge planning from the hospital or rehabilitation facility
- **Traumatic brain injury nurse specialist,** who helps coordinate care and educates the family about the injury and recovery process
- **Recreational therapist,** who assists with time management and leisure activities
- **Vocational counselor,** who assesses the ability to return to work and appropriate vocational opportunities and who provides resources for addressing common challenges in the workplace

More Information

Brain rehabilitation

Craniotomy

Clinical trials

Explore Mayo Clinic studies testing new treatments, interventions and tests as a means to prevent, detect, treat or manage this condition.

Coping and support

A number of strategies can help a person with traumatic brain injury cope with complications that affect everyday activities, communication and interpersonal relationships. Depending on the severity of injury, a family caregiver or friend may need to help implement the following approaches:

- **Join a support group.** Talk to your doctor or rehabilitation therapist about a support group that can help you talk about issues related to your injury, learn new coping strategies and get emotional support.
- **Write things down.** Keep a record of important events, people's names, tasks or other things that are difficult to remember.
- **Follow a routine.** Keep a consistent schedule, keep things in designated places to avoid confusion and take the same routes when going to frequently visited destinations.
- **Take breaks.** Make arrangements at work or school to take breaks as needed.
- **Alter work expectations or tasks.** Appropriate changes at work or school may include having instructions read to you, allowing more time to complete tasks or breaking down tasks into smaller steps.
- **Avoid distractions.** Minimize distractions such as loud background noise from a television or radio.
- **Stay focused.** Work on one task at a time.

By Mayo Clinic Staff

Feb 04, 2021

Print

Show References

← Symptoms & causes

Doctors & departments

Diseases & Conditions

> Traumatic brain injury diagnosis & treatment

Mayo Clinic Health Letter - FREE book

Patient Stories from Mayo Clinic

Unforeseen danger of a child's fall: Livia's remarkable recovery

Associated Procedures

Brain rehabilitation

Craniotomy

CT scan

MRI

Products & Services

A Book: Guide to the Comatose Patient

CON-20378540

Find a doctor

Explore careers

Sign up for free e-newsletters

About Mayo Clinic

About this Site

Contact Us

Locations

Health Information Policy

Medicare Accountable Care Organization (ACO)

Media Requests

News Network

Price Transparency

Medical Professionals

AskMayoExpert

Students

Degree Programs

Admissions Requirements

Student & Faculty Portal

Researchers

Research Faculty

Laboratories

International Patients

Appointments

Financial Services

International Locations & Offices

Charitable Care & Financial Assistance

Community Health Needs Assessment

Financial Assistance Documents – Arizona

Financial Assistance Documents – Florida

Financial Assistance Documents – Minnesota

Feedback

Clinical Trials

Mayo Clinic Alumni Association

Refer a Patient

Businesses

Executive Health Program

International Business Collaborations

Facilities & Real Estate

Supplier Information

Follow Mayo Clinic

Get the Mayo Clinic app

GET IT ON Google Play

Download on the App Store

Terms & Conditions Privacy Policy Notice of Privacy Practices Accessibility Statement
Advertising & Sponsorship Policy Site Map

Language: English

Feedback

Chronic traumatic encephalopathy

Overview

Chronic traumatic encephalopathy (CTE) is a brain disorder likely caused by repeated head injuries. It causes the death of nerve cells in the brain, known as degeneration. CTE gets worse over time. The only way to definitively diagnosis CTE is after death during an autopsy of the brain.

CTE is a rare disorder that is not yet well understood. CTE doesn't appear to be related to a single head injury. It's related to repeated head injuries, often occurring in contact sports or military combat. The development of CTE has been associated with second impact syndrome, in which a second head injury happens before previous head injury symptoms have fully resolved.

Experts are still trying to understand how repeated head injuries and other factors might contribute to the changes in the brain that result in CTE. Researchers are looking into how the number of head injuries someone experiences and how bad the injuries are may affect risk of CTE.

CTE has been found in the brains of people who played U.S. football and other contact sports, including boxing. It also may occur in military members who were exposed to explosive blasts. Symptoms of CTE are thought to include trouble with thinking and emotions, physical problems, and other behaviors. It's thought that these develop years to decades after head trauma occurs.

CTE can't be definitively diagnosed during life except in people with high-risk exposures. Researchers are currently developing diagnostic biomarkers for CTE, but none has been validated yet. When the symptoms associated with CTE occur, health care providers may diagnose traumatic encephalopathy syndrome.

Experts don't yet know how often CTE occurs in the population, but it appears to be rare. They also don't fully understand the causes. There is no cure for CTE.

Symptoms

There are no specific symptoms that have been clearly linked to CTE. Some of the possible symptoms can occur in many other conditions. In the people who were confirmed to have CTE at autopsy, symptoms have included cognitive, behavioral, mood and motor changes.

Cognitive impairment

- Trouble thinking.
- Memory loss.
- Problems with planning, organization and carrying out tasks.

Behavioral changes

- Impulsive behavior.
- Aggression.

Mood disorders

- Depression or apathy.
- Emotional instability.
- Substance misuse.
- Suicidal thoughts or behavior.

Motor symptoms

- Problems with walking and balance.
- Parkinsonism, which causes shaking, slow movement and trouble with speech.
- Motor neuron disease, which destroys cells that control walking, speaking, swallowing and breathing.

CTE symptoms don't develop right after a head injury. Experts believe that they develop over years or decades after repeated head trauma.

Experts also believe that CTE symptoms appear in two forms. In early life between the late 20s and early 30s, the first form of CTE may cause mental health and behavioral issues. Symptoms of this form include depression, anxiety, impulsive behavior and aggression. The second form of CTE is thought to cause symptoms later in life, around age 60. These symptoms include memory and thinking problems that are likely to progress to dementia.

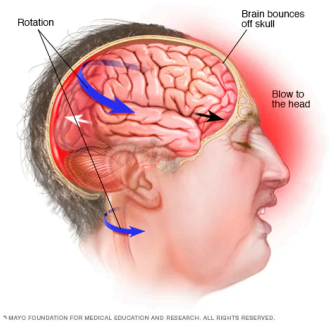
The full list of signs to look for in people with CTE at autopsy is still unknown. There's also little known about how CTE progresses.

When to see a doctor

CTE is thought to develop over many years after repeated brain injuries that may be mild or severe. See your health care provider in these situations:

- **Suicidal thoughts.** Research shows that people with CTE may be at increased risk of suicide. If you have thoughts of hurting yourself, call 911 or your local emergency number. Or contact a suicide hotline. In the U.S., call or text 988 to reach the 988 Suicide & Crisis Lifeline or use the Lifeline Chat.
- **Head injury.** See your health care provider if you've had a head injury, even if you didn't need emergency care. If your child has received a head injury that concerns you, call your child's health care provider right away. Depending on the symptoms, your or your child's provider may recommend seeking immediate medical care.
- **Memory problems.** See your health care provider if you have concerns about your memory. Also see your provider if you experience other thinking or behavior problems.
- **Personality or mood changes.** See your health care provider if you experience depression, anxiety, aggression or impulsive behavior.

Causes



Concussion

Enlarge image

Repeated head trauma is likely the cause of CTE. Football players in the United States, ice hockey players and military members serving in war zones have been the focus of most CTE studies. However, other sports and factors such as physical abuse also can lead to repeated head injuries.

A head injury can cause a concussion, which may cause headaches, problems with memory and other symptoms. Not everyone who experiences repeated concussions, including athletes and military members, go on to develop CTE. Some studies have shown no increased incidence of CTE in people exposed to repeated head injuries.

In brains with CTE, researchers have found that there is a buildup of a protein called tau around the blood vessels. Tau buildup in CTE is different from accumulations of tau found in Alzheimer's disease and other forms of dementia. CTE is thought to cause areas of the brain to waste away, known as atrophy. This happens because injuries to nerve cells that conduct electrical impulses affect communication between cells.

It's possible that people with CTE may show signs of another neurodegenerative disease, including Alzheimer's disease, amyotrophic lateral sclerosis (ALS), Parkinson's disease or frontotemporal lobar degeneration, also known as frontotemporal dementia.

Risk factors

Repeated exposure to traumatic brain injury is thought to increase the risk of CTE. Experts are still learning about the risk factors.

Prevention

There is no treatment for CTE. But CTE may be prevented because it's associated with recurrent concussions. People who have had one concussion are more likely to have another head injury. The current recommendation to prevent CTE is to reduce mild traumatic brain injuries and to prevent additional injury after a concussion.

By Mayo Clinic Staff

Chronic traumatic encephalopathy care at Mayo Clinic

Request an appointment

Diagnosis & treatment

Nov. 18, 2023

Print

Show references

Feedback

Related

Associated Procedures

EEG (electroencephalogram)

MRI

Positron emission tomography scan

Show more associated procedures

Products & Services

A Book: Mayo Clinic Family Health Book

Show more products and services from Mayo Clinic

CON-20370902

Patient Care & Health Information

Diseases & Conditions

Chronic traumatic encephalopathy

Find a doctor

Explore careers

Sign up for free e-newsletters

About Mayo Clinic

About this Site

Contact Us

Locations

Health Information Policy

Medicare Accountable Care Organization (ACO)

Media Requests

News Network

Price Transparency

Medical Professionals

AskMayoExpert

Clinical Trials

Mayo Clinic Alumni Association

Refer a Patient

Businesses

Executive Health Program

International Business Collaborations

Facilities & Real Estate

Supplier Information

Admissions Requirements

Student & Faculty Portal

Researchers

Research Faculty

Laboratories

International Patients

Appointments

Financial Services

International Locations & Offices

Charitable Care & Financial Assistance

Community Health Needs Assessment

Financial Assistance Documents – Arizona

Financial Assistance Documents – Florida

Financial Assistance Documents – Minnesota

Follow Mayo Clinic

Get the Mayo Clinic app

Language: English

Feedback

Intracranial hematoma

Diagnosis

Diagnosing an intracranial hematoma can be a challenge because people with a head injury may seem fine at first. Healthcare professionals usually assume that bleeding inside the skull is the cause of a loss of consciousness after a head injury until proved otherwise.

Imaging techniques are the best ways to determine the position and size of a hematoma. These include:

- **CT scan.** This uses a sophisticated X-ray machine linked to a computer to produce detailed images of your brain. You lie still on a movable table that's guided into what looks like a large doughnut where the images are taken. CT is the most commonly used imaging scan to diagnose intracranial hematomas.
- **MRI scan.** This is done using magnetic field and radio waves to make computerized images. During an MRI scan, you lie on a movable table that's guided into a tube.

- **Angiogram.** If there is concern about a possible aneurysm in the brain or other blood vessel issue, an angiogram can provide more information. This test uses X-rays and a special dye to produce pictures of the blood flow in the blood vessels in the brain.

More Information

CT scan

MRI

Treatment

Intracranial hematomas that are small and produce no symptoms don't need to be removed. However, symptoms can appear or worsen days or weeks after the injury. As a result, you might have to be watched for neurological changes, have your intracranial pressure monitored and undergo repeated head CT scans.

If you take blood-thinning medicine, such as warfarin (Jantoven), you may need therapy to reverse the effects of the medicine. This will reduce the risk of further bleeding. Options for reversing blood thinners include giving vitamin K and fresh frozen plasma.

Surgery

Intracranial hematoma treatment often involves surgery. The type of surgery depends on the type of hematoma you have. Options include:

- **Surgical drainage.** If the blood is in one area and has changed from a solid clot to a liquid, your doctor might create a small hole in your skull and use suction to remove the liquid.

- **Removing part of the skull, known as a craniotomy.** Large hematomas might require that a section of your skull be opened to remove the blood.

Recovery

Recovery after an intracranial hematoma can take a long time, and you might not recover completely. The greatest recovery happens up to six months after the injury, usually with lesser improvement after that. If you continue to have neurological symptoms after treatment, you might need occupational and physical therapy.

More Information

Craniotomy

Clinical trials

Explore Mayo Clinic studies testing new treatments, interventions and tests as a means to prevent, detect, treat or manage this condition.

Coping and support

Patience is important for coping with brain injuries. The majority of recovery for adults happens during the first six months. Then you might have smaller, more-gradual improvements for up to two years after the hematoma.

To aid your recovery:

- **Get enough sleep at night,** and rest in the daytime when you feel tired.
- **Ease back into your typical activities** when you feel stronger.

- **Don't participate in contact and recreational sports** until you get your doctor's OK.
- **Check with your healthcare team** before you begin driving, playing sports, riding a bicycle or operating heavy machinery. Your reaction times likely will have slowed as a result of your brain injury.
- **Check with your healthcare team** before taking medicine.
- **Don't drink alcohol until you've recovered fully.** Alcohol may slow recovery, and drinking too much can increase your risk of a second injury.
- **Write down things** you have trouble recalling.
- **Talk with someone you trust** before making important decisions.

By Mayo Clinic Staff

Symptoms & causes

June 08, 2024

Print

Show references

Related

Bump on the head: When is it a serious head injury?

Intracranial hematoma

Associated Procedures

Craniotomy

CT scan

MRI

Products & Services

A Book: Mayo Clinic Family Health Book

Show more products and services from Mayo Clinic

CON-20301702

Patient Care & Health Information

Find a doctor

Explore careers

Sign up for free e-newsletters

About Mayo Clinic

About this Site

Contact Us

Locations

Health Information Policy

Medicare Accountable Care Organization (ACO)

Media Requests

News Network

Price Transparency

Medical Professionals

AskMayoExpert

Clinical Trials

Mayo Clinic Alumni Association

Refer a Patient

Students

Degree Programs

Admissions Requirements

Student & Faculty Portal

Researchers

Research Faculty

Laboratories

International Patients

Appointments

Financial Services

International Locations & Offices

Charitable Care & Financial Assistance

Community Health Needs Assessment

Financial Assistance Documents – Arizona

Financial Assistance Documents – Florida

Financial Assistance Documents – Minnesota

Feedback

Businesses

Executive Health Program

International Business Collaborations

Facilities & Real Estate

Supplier Information

Follow Mayo Clinic

Get the Mayo Clinic app

GET IT ON Google Play

Download on the App Store

Terms & Conditions Privacy Policy Notice of Privacy Practices Accessibility Statement
Advertising & Sponsorship Policy Site Map

Language: English

Feedback