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Written by Vaishnavi PatilLast Updated On: 19 Oct 2023Published On: 12 Oct 2015 Table of Contents (click to expand) There is almost no chance of surviving a gunshot to the head, but even if you do survive, no one can come out of such an injury unharmed, which is why gun violence is one popular media depiction that no one wants to see translated into reality. Popular culture, action movies, and the media love to highlight anyone that takes a gunshot to the head and still manages to survive. Victims of gunshots are depicted in many ways, often having lost some memories, but are otherwise alive and walking around! As science aficionados, we have often scoffed at this idea. Surely, no one can survive a bullet to the head, right? Well, that's almost right. Statistically speaking, you would be correct 95% of the time. However, there is still a lucky 5% who endure, despite literally staring death in the face. The chance of surviving a headshot has its roots in the physics of the bullet and the biology of our bodies. Thus, a person's odds of surviving a headshot trauma depend on the type and size of the bullet, its velocity, its trajectory, and the entry and exit point of the bullet. So, to begin, let's try to understand the science of headshots and the aftermath of getting hit by a bullet. Illustration of a bullet shot from a handgun (Photo Credit: Lukas Gojda / Shutterstock) Recommended Video for you:Can You Survive a Gunshot to The Head? The most important factor from a biological standpoint to determine survivability from a gunshot is the location where the bullet hits and passes through. The brain is a marvelous mystery, with each little cluster governing specific vital and not-so-vital functions of the body. Responsible for controlling involuntary actions, for example, the brain stem is a critical part of our body. A shot directed towards it is often fatal. The degree of injury would depend on which region the bullet penetrates through. If it zips through the amygdala or the hypothalamus, the injury would lead to memory loss and other memory-related problems. This is the symptom that is most commonly exploited in the daily soaps that your grandma loves so much! If the injury is to the frontal lobe (also seen frequently, as this is situated behind the forehead), then the survivability increases. vector illustration of the brain's limbic system There is also a much greater chance of surviving a front-to-back gunshot than a gunshot received from the side. This is because, in the case of a front-to-back gunshot, it's possible that the bullet will only damage one hemisphere of the brain, while the other is left unaffected. Our brain is a resilient organ and tantamount to a twin-engine plane that can work even upon losing one engine. Major functions like cognition and speech are shared between the two hemispheres of the brain, so if one hemisphere is left intact by the bullet, the individual still has a decent chance of bouncing back from the ordeal, though never again with complete psychological and physical health. Blood Loss After A Gunshot Proves Fatal Since the brain stem is nestled safely at the back of the head, brain death is not usually the outright concern for the victim, but rather blood loss. The amount of blood that is potentially lost is directly influenced by the size and speed of the bullet fired. If a bullet hits any other part of the body, the impact is released to the adjoining body parts, often stabilizing the damage and saving the individual. However, the case of the skull is unique, on account of its enclosed structure. If a high-speed bullet is fired into the skull, the skull bears the full brunt of the force, leading to skull fractures. Skull shards that pierce the brain at that point are even more difficult to remove than the bullet itself. If the skull is subjected to a high-speed, but small bullet, the worry is that the tiny bullet would ricochet around after entering the brain cavity, damaging several areas of the brain at once. The best-case scenario for survival is therefore a small, low-velocity bullet fired from a distance... with a low-caliber gun. So far, we have discussed the gunshot mostly from a biological standpoint. Let's now consider the fatality of the gunshot from a physics standpoint. From a physics standpoint, fatality would also be influenced by the projectile of the fired bullet. We all know kinetic energy is given by the formula: Here, KE= kinetic energy m=mass v=velocity This may explain why an injury inflicted by a fast-moving heavy bullet is likely to be more lethal. As we can see, the velocity of the bullet is much more crucial than the mass of the bullet, as evident from the formula. Although both mass and velocity contribute to the overall energy of the bullet's projectile, the energy is linearly proportional to the mass, but exponentially proportional to the velocity. Let's understand this with an example: For a constant velocity of a bullet, if the mass is doubled then the resultant projectile energy is also doubled. But on the other hand, for the constant mass of the bullet if the velocity is doubled, then the energy increase quadruples i.e. increases four times. Size and projectile of different bullets (Credits: Oleksandr Khoma/Shutterstock) As you can see, fatality and time to death would heavily depend on the velocity of the bullet. The velocity of the bullet, in turn, depends on the firearm being used. For example, a bullet shot from the lethal AK-47 rifle has a very high speed. They are infamous for inflicting severe peripheral damage to the critical regions in the brain as they path through, as compared to a relatively slower-moving bullets from a handgun. Lethal Russian assault rifle: AK-47 (Credits: Nomad_Soul/Shutterstock) The US military conventionally uses 5.56mm bullets, which have a comparatively lower mass than a typical bullet, but move really quick. As a result, they produce much more kinetic energy, which is then transmitted to the tissues of the target, causing them to rupture. As mentioned earlier, blood loss is the real villain in such scenarios, but there is a window of a few minutes wherein the victim can remain conscious and survive. If the victim immediately receives medical attention during this time, there is a better chance of avoiding an untimely end. X-ray of a bullet inside the head of a gunshot victim (Credits: DrCHAMPGO/Shutterstock) Neurosurgeons opine that victims stand a chance to survive a headshot if they can continue breathing and their blood pressure does not drop too much. Both functions are essential to ensure an adequate supply of oxygen to the brain in this exigency. Upon the arrival of medical aid, the doctors can try their best to remove the dead tissue and clear the area to relieve the imminent swelling. Otherwise, the swelling will have no outlet and begin to come out at the base, which often has fatal consequences. Sometimes, doctors place drains to remove excess fluids and avert this type of dangerous brain-swelling. Case Study Of Christen McGinnes: Remarkable Story Of A Headshot Survivor In 2016, The Trace, a non-profit gun-specific news portal published a story of Christen McGinnes, who survived a self-inflicted gunshot wound in her suicide attempt in 2009. She narrated her remarkable story of miraculously surviving a deliberate gunshot to her head to end her life. During the subprime crisis in 2009, Christen, a woman in her 40s, was fired from a job, lost her close kin and even her pet dog passed away. It was the peak of the financial crisis of 2009 and she was running out of savings in such challenging times. On one particularly fateful night in 2009, she loaded her 0.357 revolver with hollow-point bullets and placed the gun underneath her chin, a shot that she felt would result in instant death. She pulled the trigger and while she blew off much of her face, lost many teeth, charred her tongue and lost an eye, she miraculously survived. She was immediately rushed to Fairfax Inova Hospital by her neighbors, where she was treated. She had to undergo several surgeries and was in semi-coma state for a number of weeks in the hospital. Her face was distorted and she couldn't eat or speak without aid for a long time. It was only after a few years that she could talk again and narrate her remarkable story of surviving the suicide attempt. So, as you can see, there is a chance—albeit a very slim one—to survive a gunshot to the head. However, the aftermath of surviving a gunshot is scary. As in the case of Christen, she ended up losing more than half of her teeth, one-third of her tongue and half her vision. No patient can come out of such a terrible injury unscathed, which is why rampant gun violence and responsible access to firearms is a critical issue that must be addressed in our modern world. References (click to expand)Muehlschlegel, S., Ayturk, D., Ahlawat, A., Izzy, S., Scalea, T. M., Stein, D. M., ... Sheth, K. N. (2016, October 26). Predicting survival after acute civilian penetrating brain injuries. Neurology. Ovid Technologies (Wolters Kluwer Health).Cranial GunShot Wounds - UCLA Neurosurgery, Los Angeles, CA - neurosurgery.ucla.edu:80Neurosurgical Treatment for Gunshot Wound Head Trauma. The American Association of Neurological Surgeons. (2004). Firearms and Violence. []. National Academies Press. Vaishnavi has a bachelor's degree in Sociology/Anthropology from St. Xavier's College, Mumbai (India) and is currently pursuing a Master's Degree in Global Studies (whatever that is) from Humboldt University, Berlin (Germany). She loves to read and to sing, especially to avoid awkward situations. She claims she has learned a lot through traveling but she still ends up pulling a door marked 'Push', so the jury is still out on that one. Related Videos The aim of this study was to determine the differences in the anatomical site of a gunshot entrance wound and the direction of the bullet path between right- and left-handed subjects who committed a suicide by a single gunshot injury to the head. The retrospective autopsy study was performed for a 10-year period, and it included selected cases of single suicidal gunshot head injury, committed by handguns. We considered only contact or near-contact wounds. The sample included 479 deceased, with average age 47.1 ± 19.1 years (range, 12-89 years): 432 males and 47 females, with 317 right-handed, 25 left-handed, and 137 subjects with unknown dominant hand. In our observed sample, most cases involved the right temple as the site of entrance gunshot wound (about 67%), followed by the mouth (16%), forehead (7%), left temple (6%), submental (2%), and parietal region (1%). The left temple, right temple, and forehead were the sites of the gunshot entrance wounds, which were the best predictors of the handedness of the deceased (Spearman ρ = 0.149, P = 0.006). Our study showed that the direction of the bullet intracranial path in cases of suicide was even a more potent predictor of the handedness of the deceased (Spearman ρ = 0.263, P = 0.000; Wald = 149.503, P = 0.000). If a bullet enters the head and bounces around, the permanent cavity (bullet track) may be large, but the damage from the temporary cavity that forms is even worse. There is no room for the brain to move and the shock waves often cause irreversible damage. How is a bullet entry hole different from a bullet exit hole? Entrance Wounds The entrance wound is normally smaller and quite symmetrical in comparison to the exit wound, which can sometimes be ragged with skin, tissue, and muscle and bone damage. Entrance wounds are often ringed with the residue of gunpowder and cordite – the two substances contained within a bullet. READ ALSO: What does it mean if my ascendant is Scorpio?Can a bullet go through a skull? A gunshot wound to the head with a rifle or handgun will not produce an easily predictable outcome. The skull is a sealed container that protects the brain. For some lucky people, the bullet may not enter the skull. Even if it does, the bullet may pass through non-critical parts of the brain and survival is possible. Do you apply pressure to a gunshot wound to the head? Gunshot first aid involves stopping the bleeding and keeping the wound clean. Applying direct pressure can help control the bleeding. Cover the wound with a clean cloth or gauze. What is bullet entrance hole? When a bullet strikes an object, such as clothing, a bullet entrance hole is created and in a lot of cases the bullet will pass through the object and produce an exit hole on the backside. Bullet Entrance Holes. Bullet entrance holes typically have very even margins. Why are exit holes bigger than entry holes? Of the two holes, exit holes often tend to be much larger than entrance wounds for three reasons: 1) The bullet is misshaped or 'mushroomed' from the initial bone strike, 2) The bullet may no longer be moving along a straight trajectory, 3) The projectile may be tumbling end-over-end. READ ALSO: What is the mean of first x natural numbers?Can 22 pierce the skull? Yes. The 22 LR is a supersonic round. It can penetrate several inches of wood, depending upon the wood type. It could easily penetrate a human skull unless it hits at a glancing angle. Are exit wounds bigger than entrance wounds? Exits are often more irregular, and usually larger than entrances. What are the characteristics between gunshot entrance and gunshot exit wounds? These are entry wounds and exit wounds – entry wounds are generally smaller and more regular than exit wounds. Entry wounds show invagination of tissue into the wound, while exit wounds show outward beveling of tissue. What happens when a bullet hits your head? The bullet with your name on it slides past hair, skin and muscle before it smashes into one of eight cranial bones engineered to keep your brain safe. Unfortunately, it's too late for that now. Bullets beat bones. The projectile's entrance into your skull makes easy shrapnel of your calcium, phosphorus, sodium, and collagen case. READ ALSO: What does Denmark and Sweden have in common?Does a bullet that passes through the body cause less damage? A bullet that passes through the body (creating an exit wound) generally will cause less damage than one which stays in the body, because a bullet that stays in the body transfers all of its kinetic energy (and ensures maximum damage to tissue). This is the aim of most modern ballistic design. Is it possible to determine entrance and exit from a gunshot wound? In such an instance a determination as to entrance versus exit may not be possible. In a case seen by the author, the victim had a through-and-through gunshot wound of the left calf with wounds on the lateral and posterior-medial surfaces of the calf. Can a bullet enter the skull through the thick occipital bone? A bullet entering the skull through the thick occipital bone is less likely to exit than a bullet entering through the thin temporal bone. General Information Since the late 1950s, firearm deaths have increased dramatically in the United States. In 1988, guns were responsible for 34,000 deaths in this country, making them the eighth leading cause of death. Suicide accounted for 53 percent of the fatalities and homicides 40 percent. Accidental shootings and those with undetermined causes made up the remainder. For every firearm-related death, an additional seven people sustain nonfatal gunshot wounds. Gunshot wounds to the head, the most lethal of all firearm injuries, rank among the leading causes of head injury in many United States cities. They carry a fatality rate greater than 90 percent, and at least two-thirds of the victims die before reaching a hospital. Because of the high mortality rate, cranial gunshot wounds account for only about 10 percent of traumatic brain injury patients who survive. Diagnosis If a patient's blood pressure and oxygen level can be maintained upon arrival at the hospital, an urgent computed tomography (CT) scan of the brain is obtained. Treatment Virtually all cranial gunshot victims are aggressively resuscitated upon initial arrival at the hospital. The decision to proceed with surgery to manage the wound is based on three factors: The level of consciousness as determined by the Glasgow Coma Scale (GCS) The degree of brainstem neurological function The findings on the CT scan Death is virtually certain among comatose patients with minimal evidence of brainstem function and no evidence of an intracranial hematoma. In such patients, aggressive treatment is rarely pursued because of the futility of the situation. If, however, the CT scan identifies a hematoma, a craniotomy to open a section of skull and surgically remove the clot is generally warranted, and some of these patients will make a satisfactory recovery. Outcome Recovery after brain injury varies widely. The predictors of poor brain function outcome or death after a gunshot wound to the head include the initial GCS score, older age, presence of low blood pressure or inadequate blood oxygen shortly after injury, and dilated non-reactive pupils. The bullet trajectory through the brain carries major significance. Bullets that cut through the brainstem, multiple lobes of the brain, or the chambers where spinal fluid is located are particularly lethal. Many initial survivors develop uncontrollable pressure on the brain and subsequently die. The Neuro-ICU cares for patients with all types of neurosurgical and neurological injuries, including stroke, brain hemorrhage, trauma and tumors. We work in close cooperation with your surgeon or medical doctor with whom you have had initial contact. Together with the surgeon or medical doctor, the Neuro-ICU attending physician and team members direct your family member's care while in the ICU. The Neuro-ICU team consists of the bedside nurses, nurse practitioners, physicians in specialty training (Fellows) and attending physicians. UCLA Neuro ICU Family Guide Though Rep. Gabrielle Giffords (D—Ariz.) remains in critical condition this morning at Tucson's University Medical Center, doctors are optimistic about her odds.The bullet that struck Rep. Giffords on Saturday traveled the length of the left side of her brain — it entered from the back and exited through the front of her head. She was responsive to voice commands after the shooting and was in the operating room within 38 minutes, according to the medical center.Though it may take weeks or months for doctors to be able determine the extent of any permanent damage, the bullet's trajectory is cause for the doctors' optimism, experts say. You may like A person's chances of surviving such a trauma to the brain depend on the areas of the brain that are struck, the velocity of the bullet and whether the bullet exits the brain, said Dr. Keith Black, chairman of neurosurgery at Cedars-Sinai Medical Center in Los Angeles.If a bullet passes through both the right and left hemispheres of the brain, instead of being confined to one side, as it was in the case of Rep. Giffords, then the damage is likely to be much worse, Black said."The brain is somewhat redundant — it can sometimes tolerate losing one half," Black said. Like a twin-engine plane that has lost one engine, he said, a person whose brain was pierced by a bullet on only one side has a better chance than someone who has suffered injury to both sides.It's also a positive sign if the bullet misses the brain's "high-value real estate," such as the brain stem and the thalamus, Black said. These deep brain structures are crucial to consciousness and basic functions such as controlling breathing and the heartbeat. And a person has a better chance of recovering if the bullet misses the major blood vessels that bring oxygen to areas where it's needed.Get the world's most fascinating discoveries delivered straight to your inbox.The left side of the brain, where Giffords was struck, controls language and speech, so the fact that Giffords was responding to those speaking to her after her injury shows that she may be able to understand and process language – a very good sign for her recovery, Black said.A bullet that misses the brain's ventricles — the cavities within the center of the brain that are filled with cerebrospinal fluid — also leaves a person in better shape than one that strikes these regions. If struck, the cavities may fill with blood, which may lead to complications such as hydrocephalus (a swelling of the brain), which can further endanger the victim.The speed of the bullet as it travels through the brain makes a difference as well."A high-velocity bullet does more damage than a low-velocity bullet," Black said. High-speed bullets, such as those fired by an AK-47 or other military weapon, do more peripheral damage to the regions of the brain around their path as they pass through than slower-moving bullets, such as those fired by handguns.And, "if it stays in the brain, it does more damage," Black said, than a bullet that exits the brain, as it did in Rep. Giffords' case.A shooting victim stands a better chance if they don't stop breathing and if their blood pressure remains high enough — both functions are needed to maintain an adequate oxygen supply to the brain. Arriving at a Level 1 trauma center — the highest level and most prepared to provide care for such injuries — shortly after such a trauma can help maintain or sometimes restore these functions, Black said.The medical team treating Giffords removed part of her skull, and Black said this allows the brain to swell without becoming compressed."Inside the skull, the brain is like jello in a jar," Black told MyHealthNewsDaily. "If it doesn't have any place to expand, there can be even more damage. Confinement can prevent blood flow."Later, when the swelling subsides, the part of the skull that was removed is replaced, he said. Swelling often peaks on the third day after such an injury, but in Rep. Giffords' case, doctors may wait as long as several months to replace the bone, he said."With a gunshot wound, they may be worried that the bullet brought in bacteria. They may want to make sure there's no evidence of infection before they replace the skull," Black said.Follow MyHealthNewsDaily on Twitter @MyHealth_MHND. The type of gunshot wound a person receives plays a key role in their chance of survival. Research suggests that in some circumstances, people can survive a penetrating wound, one in which the bullet goes straight through the head and creates both entrance and exit wounds. If the bullet doesn't make an escape, then it's called a perforating wound. In these cases, a bullet lodged in the brain can migrate and cause even more damage. Blood loss is often the main factor in deaths resulting from shots to the head since the brain's midline is home to many important blood vessels. There's also the risk that growing pressure from a blood clot can cause death since the brain's tissue becomes increasingly compressed. According to a 2012 study by the Centers for Disease Control and Prevention, more than 56% of male suicides involved a gun. While some might consider a close-range shot to be fatal in all instances, it is not a guaranteed death sentence, since aim can be an issue even when self-inflicted. Each hemisphere of the brain is made up of four lobes. Fatalities are less likely when the bullet track is limited to one hemisphere and one lobe. For instance, if the bullet path goes through the right frontal lobe while staying clear of the brain stem, the most vital areas of the brain (the parts that control breathing and thinking) could be spared. This is essentially an upward trajectory through the forehead and out the back of the head. A bullet travels faster than the rate at which brain tissue rips. This means when a bullet moves through the brain, it is actually pushing tissues out of the way, stretching them wildly. The speed at which a bullet tears through the brain means the bullet will exit the skull before tissues even have a chance to rip. However, brain tissue over-stretches when it snaps back. This results in a long cavity created by the bullet, so while the brain tissue snaps back to its original position, it overshoots its normal location due to said cavity. Some reports indicate that bullets that are narrow maintain their shape and move at a high velocity are considered just as dangerous as large, exploding shells, but they may not cause as much damage. While speed can definitely kill, a high-velocity bullet (faster than 2,000 feet per second) is less likely to wobble around and cause secondary damage. It can be likened to throwing a football with a tight spiral. That said, all bullets should be considered dangerous. Skip to main content Reddit and its partners use cookies and similar technologies to provide you with a better experience. By accepting all cookies, you agree to our use of cookies to deliver and maintain our services and site, improve the quality of Reddit, personalize Reddit content and advertising, and measure the effectiveness of advertising. By rejecting non-essential cookies, Reddit may still use certain cookies to ensure the proper functionality of our platform. For more information, please see our Cookie Notice and our Privacy Policy. News item | 06-02-2017 | 16:22Do bullets deviate if they are shot through a human body, but do not hit any bones? This is a question that may be essential to find out what exactly happened during a shooting incident. Firearm experts of the Netherlands Forensic Institute (NFI) are currently doing scientific research to get an answer to that question. "If you investigate a crime scene following a shooting, you know one thing for sure: the victim is not in exactly the same position as when he or she was hit. The victim fell, may have run away, been taken to hospital or died in the meantime. Legally, however, it may be highly relevant to establish the exact location of the victim later on," one of the researchers and firearm expert Wim Kerkhoff says. Image: ©Netherlands Forensic Institute / Netherlands Forensic Institute Forensic experts reconstruct the trajectory of a shot, among other things, on the basis of the bullet holes. Imagine, for example, that a bullet was shot through a door and finally ended in a wall. If you draw a line between these two points, you know the trajectory of the bullet. If a person was standing in the trajectory of the bullet, it is possible to position this person by placing the entrance and/or exit in the body in the trajectory of the bullet. Kerkhoff: "In our calculations, we always apply margins, of course, because we do not know what exactly the influence of the human body is on the trajectory of the bullet. That has never been researched scientifically. And that is exactly what we envision with this study. The results will enable us to determine the position of the victim much more accurately in the future." The firearm expert gives a fictitious example to explain this. "A fatal shooting incident in a staircase involves several persons. The trajectories of the bullets in the body of the victim run diagonally from top to toe. Does this prove that the victim was shot at from top to toe, as a witness states? Or could the slanting trajectories have been caused as a result of the fact that the trajectories of the bullets deviated in the body?" Leather and gelatine The NFI performed the first tests in cooperation with the University of Bern. "They have made substantial progress in the area of wound ballistics", Kerkhoff explains. "We fired shots at blocks of gelatine covered with a specific type of leather. These are the best simulants for the human body and the skin." With the first tests, Kerkhoff and his colleagues wanted to find out to what extent the tests were influenced by using the gelatine blocks as simulants of the human body. "We examined whether the deviation of the bullets was directed if the bullets were fired just below the top of the block or just below the bottom. We also examined whether the deviation is directed if two bullets are fired right beside each other."126 shots give the answer The answer to the question posed by Kerkhoff and the other researchers was clear. There is no influence. "We did see that bullets always deviate 6 to 7 degrees. With the help of forensic statistician Annabel Bolck, we examined to what extent it was possible to establish a pattern in the deviations. This was not the case. It does not make any difference whether you fire a shot just below the bottom or top of a block of gelatine, or right beside the track of a previous shot. The only thing we saw is that the trajectory of the bullet always changed." The results of this study have been published in a scientific article. But this does not mean the end of the study. "The block of gelatine we used was 25 centimetres thick and the bullets were calibre 9 millimetre Parabellum. This is the calibre most common in the Netherlands, and this is the calibre that is also used by the police. We currently only have data about this calibre alone, with a thickness of 25 centimetre of gelatine. We also have not tried yet what happens if you fire a bullet in the gelatine at an angle." The next few months, the firearm experts of the NFI will carry out experiments with other calibres and blocks of gelatine of various sizes. "We hope to have completed these experiments before the summer, and to have processed its results in a scientific publication before the end of the year." Most people learn about gunshot wounds from watching television or going to the movies. From "Gunsmoke" to "The Sopranos," and action packed films, guns and violence are often integral parts of the story line. Being shot on the screen can result in instant death, drawn out death scenes, or heroes who brush off the injury and save the day. In real life, the same alternatives exist, depending upon what type of firearm and bullets were used, and where the bullet(s) entered and/or exited the body. It's all a matter of physics and how much damage the energy the bullet causes. When a bullet hits the body, all the energy it has is transferred to the body tissue causing damage. The heavier the bullet and the faster it moves the more damage it can potentially cause. The laws of physics state that energy is directly related to the weight of the bullet, meaning that if the weight doubles, the energy doubles. But energy increases by the square of the velocity. Doubling the speed increases the energy fourfold. The purpose of a gun is to make a bullet go faster. The type of bullet can also make a difference. If it is narrow and maintains its shape when it hits the body, it may be able to pass right through tissue without causing much secondary damage. However, if it's built to explode on contact, more tissue injury may occur. The way the bullet hits and enters the body is also important and has to do with the yaw, or side to side movement of the bullet as it enters the body. An analogy is a football thrown in a tight spiral, there is less resistance as it passes through the air than if it is moving side to side or wobbling. The more the wobble, the greater the potential to transfer energy to the body and cause damage. The combination of velocity and bullet dynamics, and the location in the body where the bullet enters will determine how much damage occurs. Gunshot wounds can be classified as low or high velocity, depending upon the type of firearm used. The cutoff is a speed of 2,000 feet per second. As a general rule, most handguns are low velocity, and hunting and military guns are high velocity. Damage to the body from a bullet is caused in a two ways. The first type of injury is caused by the direct blow or crush of the bullet. Whatever gets in its way is damaged, and this bullet track causes a permanent cavity. If the bullet yaws, the energy transfer increases and the cavity becomes larger. The second injury type is caused by the shock waves of the bullet. The tissue surrounding the bullet track becomes caught up in a temporary vacuum that can be as much as 40 times as large as the bullet itself. This tissue cavity gets stretched and deformed and then reforms itself numerous times, like ripples in the water, until the tissue cavity returns to normal position. With this type of injury, the higher the velocity of the bullet, the larger the cavity of tissue that is at risk for damage. Some people survive gunshot wounds that on the surface appear to be fatal, yet others die from gunshot wounds that appear relatively minor. Just like real estate, it's all about location, location, location. When a bullet enters the body, its trajectory (where it goes) helps determine the severity of injury. Some bullets can pass through the body with relative little damage, while others enter the body and then ping pong around inside damaging whatever tissue or organs are in its way. If the bullet damages a major artery or the heart, death may occur almost instantaneously; however, some people are lucky and survive a gunshot wound if nothing critical is damaged. The abbreviated term ADHD denotes the condition commonly known as: See Answer Gunshot wounds to the head are more difficult to predict. Think of the skull as a closed box that cradles the brain. There isn't a lot of room for movement fo the brain or swelling in the skull. If a bullet enters the head and bounces around, the permanent cavity (bullet track) may be large, but the damage from the temporary cavity that forms is even worse. There is no room for the brain to move and the shock waves often cause irreversible damage. For some lucky people, if the bullet velocity is high and there is no side to side movement (wobble) and it passes through non-critical parts of the brain, less damage occurs and survival is possible. Picture of the brain and potential brain injury areas Getting shot is bad. Ultimately, it's the luck of the draw as to how much damage the body can absorb and still function. Some victims are lucky and walk away; others don't. It's all about physics. Medically reviewed by John A. Daller, MD; American Board of Surgery with subspecialty certification in surgical critical care REFERENCE: Kasper, D.L., et al., eds. Harrison's Principles of Internal Medicine, 19th Ed. United States: McGraw-Hill Education, 2015. Yes, a .22 caliber bullet can penetrate a human skull, depending on the angle and distance of the shot. 1. Is a .22 caliber bullet deadly? Yes, a .22 caliber bullet can be deadly, particularly if it hits vital organs or major blood vessels. Is this article helpful to you? 2. How far can a .22 caliber bullet travel? A .22 caliber bullet can travel up to 1.5 miles when fired from a rifle. 3. What kind of damage can a .22 caliber bullet do to the body? A .22 caliber bullet can cause significant tissue damage and internal bleeding. 4. Can a .22 caliber bullet penetrate thick bone? Yes, a .22 caliber bullet can penetrate thick bone, such as the skull or the ribcage. 5. Can a .22 caliber bullet kill instantly? In some cases, a .22 caliber bullet can cause instant death if it hits a vital area. 6. How common are .22 caliber bullets in shootings? .22 caliber firearms are relatively common and are often used in shootings. 7. Can a .22 caliber bullet cause permanent injury without being fatal? Yes, a .22 caliber bullet can cause permanent injury, including paralysis or loss of limb function, without being fatal. 8. How fast does a .22 caliber bullet travel? A .22 caliber bullet can travel at speeds of around 1,000-1,200 feet per second. 9. What are the symptoms of being shot with a .22 caliber bullet? Symptoms can vary but may include severe pain, bleeding, loss of consciousness, or difficulty breathing. 10. Can a .22 caliber bullet ricochet off a hard surface and still cause injury? Yes, a .22 caliber bullet can ricochet off a hard surface and cause injury to individuals nearby. 11. Can a .22 caliber bullet be removed from the body during surgery? Yes, a .22 caliber bullet can often be removed from the body during surgery, depending on its location and the extent of the damage. 12. What are the long-term effects of being shot with a .22 caliber bullet? Long-term effects may include chronic pain, limited mobility, and psychological trauma. 13. Can a .22 caliber bullet pass through the body and hit multiple organs? Yes, a .22 caliber bullet can pass through the body and cause damage to multiple organs in its path. 14. Can a .22 caliber bullet be lethal if it hits the head? Yes, a .22 caliber bullet can be lethal if it enters the skull and causes significant damage to the brain. 15. Are there any specific treatments for injuries caused by .22 caliber bullets? Treatment may include surgery to remove the bullet, repair damaged tissue, and manage pain and other symptoms.