# Commotio **cordis**

## What would you do?

It's Friday night, and you're at your nephew's high school lacrosse championship game. With two minutes left in the third quarter, the game is tied 2-2. A midfielder from the visiting team shoots the ball above the arc into a crowd of nearby defenders. The ball strikes one of the defenders in the chest. The defender scoops the ball up, passes it and begins to run down the field, but collapses suddenly.

The referees' whistles stop the game, and your nephew and several of his teammates jog to their collapsed teammate who is lying on the ground motionless. The coach, trainers and referees push past the players and kneel next to the young man on the ground. The crowd gets quiet, straining to see what's going on. A few minutes seem like 20 as the player still has not moved. Did the player simply get the breath knocked out of him? Did he hurt his ankle or knee, or is this something more serious? No one seems to know what to do. What is happening?

## What is commotio cordis?

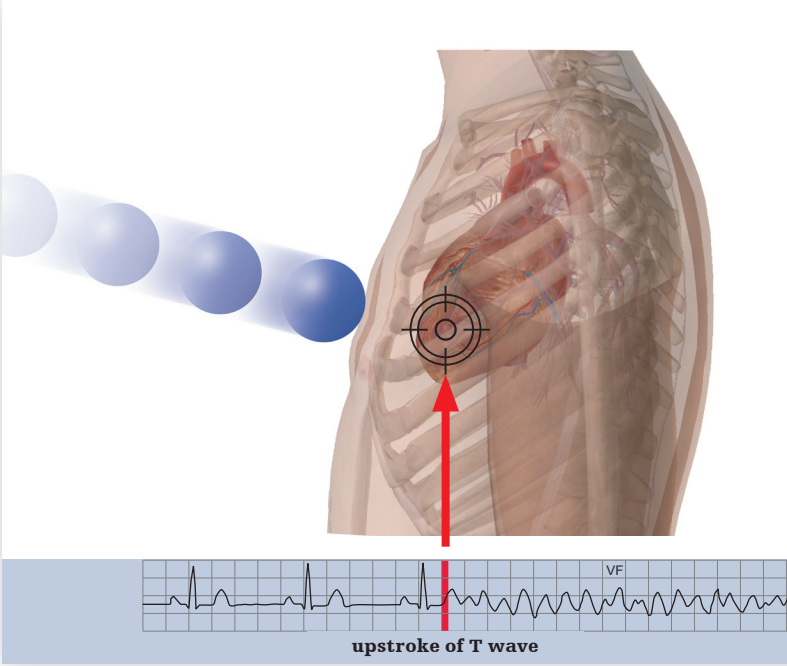
Commotio cordis is a relatively rare event, though it has been reported more frequently in recent years due to better understanding of this phenomenon. It occurs when a person experiences a sudden, blunt nonpenetrating blow to the left side of the chest over the front, lower portion of the victim's heart.[1] Victims of commotio cordis often have no underlying heart disease and do not experience trauma or injury to the heart from the force.

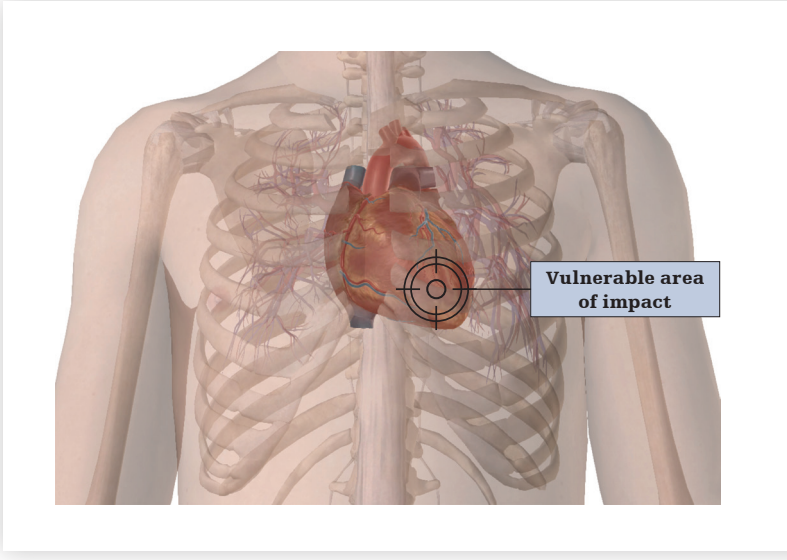
This blunt force blow, at speeds averaging around 40 mph, at just the right spot over the victim's heart, and at a specific time during the normal cardiac cycle can cause sudden cardiac arrest (SCA).[2] This event triggers ventricular fibrillation (VF), which is a lethal cardiac rhythm. Victims collapse within a few seconds of the blow, become unconscious, stop breathing and have no pulse.

## What sports are more likely to cause commotio cordis?

Commotio cordis is a term that has been used since the late 1800s to describe chest injuries to workers in Europe.[3] For much of history, it was scarcely reported due to lack of knowledge, but it became more evident during the 20th century as competitive sports became more popular. Baseball is the most reported sport in which commotio cordis occurs, but lacrosse, hockey and softball have all experienced increased reports of commotio cordis.[3]

Commotio cordis can also occur in sports without a solid ball or puck, such as karate or even football due to chest impact with fists, feet, elbows or helmets. Any strong impact to the chest wall by a hard, solid object can cause this potentially deadly result.



## What are the age ranges most impacted?

Since most reports of commotio cordis are due to sports injuries, adolescent males are the largest demographic of victims.[1,2,3] According to the United States Commotio Cordis Registry[4]:

- 26 percent of victims are younger than 10 years old
- 95 percent of victims are male
- Cases report victims range from six weeks old to 50 years old
- Approximately 10-20 cases are reported each year

## What is the definitive treatment?

The treatment for commotio cordis is no different than the treatment for victims of SCA—prompt recognition, activation of the emergency response system, CPR and early defibrillation for shockable cardiac rhythms.[5] Witnessed SCA events tend to increase a victim's chances for survival, and though survival rates for commotio cordis have steadily increased, there is still room for improvement.[1]

Researchers found commotio cordis events that occur during sporting events are often associated with lower survival rates because of improper identification of SCA and longer response times.[1] Prompt identification of SCA, high-quality CPR and early defibrillation with an automated external defibrillator (AED) are crucial elements that have repeatedly shown to vastly increase a victim's chances of survival.

## How to increase public access to AEDs:

1. **Get medical advice and work with EMS:** Your local EMS office can help establish protocols on patient care transfer, data sharing and AED placement within your building and/or field placement.
2. **Choose your AED:** AEDs located in public spaces must be simple and easy to operate. Choose one that provides clear directions either visually or audibly. There are a variety of AED options on the market including Stryker's compact and easy-to-use LIFEPAK® CR2 defibrillator. LIFEPAK CR2 includes integrated child mode, which delivers reduced energy and CPR guidance appropriate for children without changing electrode pads.
3. **Train staff, volunteers and coaches how to use an AED:** Train all staff how to use an AED and perform CPR. Trained responders must know how to:
   - Recognize the signs of SCA
   - Respond to an emergency
   - Activate the local EMS
   - Perform CPR and use the AED properly
4. **Raise awareness:** Educating staff, volunteers and coaches about the AEDs in your organization is key to increased success during a cardiac emergency. Create ongoing campaigns to raise awareness of use and location.


**References**

1. Link M, Estes M, Maron B et al. Eligibility and disqualification recommendations for competitive athletes with cardiovascular abnormalities: Task force 13: Commotio cordis: A scientific statement from the American Heart Association and American College of Cardiology. *Circulation*. 2015 Dec 1. 132 (22):e339-42.
2. Yabek S, Windle M, Allen H, et al. Commotio cordis. https://emedicine.medscape.com/article/902504-overview. Updated January 4, 2016.
3. Link M. Commotio cordis: Ventricular fibrillation triggered by chest impact-induced abnormalities in repolarization. *Circulation*. 2012;5:425-432.
4. Maron B, Haas T, Ahluwalia A, et al. Increasing survival rate from commotio cordis. *Heart Rhythm*. 2013 February. 10(2):219-23.
5. Panchal A, Bartos J, Cabañas J, et al. Part 3: Adult basic and advanced life support. 2020 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*. 2020;142(suppl 2):S366-S468.


**For further information, please contact Stryker at 800 442 1142 (U.S.), 800 668 8323 (Canada) or visit our website at strykeremergencycare.com**

# Emergency Care Public Access

Stryker's AEDs require a prescription in the U.S. Please consult your physician. AED users should be trained in CPR and in the use of the AED.

Although not everyone can be saved, studies show that early defibrillation can dramatically improve survival rates. AEDs are indicated for use on adults and children. AEDs may be used on children weighing less than 25 kg (55 lbs) but some models require separate defibrillation electrodes.

The information presented is intended to demonstrate Stryker's product offerings. Refer to operating instructions for complete directions for use indications, contraindications, warnings, cautions, and potential adverse events, before using any of Stryker's products. Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets. Please contact your representative if you have questions about the availability of Stryker's products in your area. Specifications subject to change without notice.

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**Manufactured by:**

Physio-Control, Inc.
11811 Willows Road NE
Redmond, WA, 98052 U.S.A.
Toll free 800 442 1142
strykeremergencycare.com

**Distributed in Canada by:**

Stryker Canada
2 Medicorum Place
Waterdown, Ontario
L8B 1W2
Canada
Toll free 800 668 8323