

## What is physical trauma?

Physical trauma is a serious injury to the body. Two main types of physical trauma are:

- Blunt force trauma—when an object or force strikes the body, often causing concussions, deep cuts, or broken bones.
- Penetrating trauma—when an object pierces the skin or body, usually creating an open wound.

Surgery can also cause physical trauma, sometimes called a controlled injury. Psychological trauma is an emotional or psychological injury. It usually results from an extremely stressful or life-threatening situation. For more information on psychological trauma, visit the National Institute of Mental Health's [Coping with Traumatic Events](#).



Motor vehicle accidents are a common cause of physical trauma. Credit: iStock.

## How has basic research improved trauma patient care?

Research on how the body responds to trauma has led to advances in the following areas:

- Fluid replacement, such as saline solution for dehydration, and blood or blood substitutes for blood loss
- Wound cleaning
- Infection control
- Nutrition support, such as vitamins that support wound healing

This means people who might have died from infection or blood loss before these advances have a better chance at survival today.

## What are researchers learning about how the body responds to major trauma?

Researchers are making important discoveries about how the body responds to trauma. For example:

- Research reveals that inflammation plays critical and complex roles after injury. It is needed for healing. But it can also lead to many life-threatening complications.
- Studies of gene activity show that severe injury alters a large number of genes. By taking a close look at these changes, scientists can better understand how the body responds to trauma in the short and long term. It might also point to new treatment strategies.
- Scientists have found links between the brain and the system that controls inflammation throughout the body. This work is leading to new treatments, including a way to stimulate the left vagus nerve—part of a pair of nerves that run from the brainstem through the neck and down to each side of the chest and abdomen—to control inflammation.



Credit: iStock.

- Internal organs often suffer damage after a serious injury. When faced with a life-threatening injury, the body redirects blood to try to save the brain and heart. This may rob the intestines and lungs of oxygen and other vital substances. Doctors can give the patient blood and other fluids to prevent damage to other organs.
- Increasingly, researchers and doctors exchange ideas on new ways to treat severely injured patients.

## What is on the horizon for trauma research supported by the National Institute of General Medical Sciences (NIGMS)?

NIGMS-funded research is directed toward an improved understanding of immediate as well as prolonged total body response to injury. This includes the following areas:

- Researchers hope to find specific genes or proteins that they could measure to better predict outcomes and guide doctors to the best treatments for each patient.
- Advances in wound care, including lab-grown cells, promise to speed healing. They may also allow a greater return to function and less scarring.
- Continued testing of experimental approaches will bring new treatments. This means patients will have fewer complications, and more of them will survive.



Credit: iStock.

## Where can I find more information about physical trauma?

Articles, videos, images, and more about [physical trauma and sepsis](#) can be found on the NIGMS Science Education page. The [American Trauma Society](#) also has information about injury prevention and trauma care.

*NIGMS does not provide specific medical advice, but rather provides users with information to help them better understand health and disease. Please consult with a qualified health care professional for answers to personal medical questions.*

*NIGMS is a part of the National Institutes of Health that supports basic research to increase our understanding of biological processes and lay the foundation for advances in disease diagnosis, treatment, and prevention. For more information on the Institute's research and training programs, see <https://www.nigms.nih.gov>.*

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## Learn More

### NIGMS Resources

*Biomedical Beat* Blog Posts on [Physical Trauma and Sepsis](#)

Related [Physical Trauma and Sepsis Articles](#)

[Sepsis](#) Fact Sheet

### Other Resources

[Wounds and Injuries](#)  
(MedlinePlus, NIH)

[National Center for Injury Prevention and Control](#) (CDC)