



## Legendary name of neuroscience: Phineas Gage (1823–1860)

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### Introduction

Phineas Gage (1823–1860) (Fig. 1), known for his miraculous survival after a big accident in the town of Cavendish, was a 25-year-old young railway worker. Gage has been the subject of many researches to date with its accident and interesting life [1].

### Phineas Gage and his terrible accident

On September 13, 1848, a huge explosion occurred on the railway line where Gage worked. In this explosion, an iron bar with a pointed tip that is 3 cm thick, 109 cm long, and 6 kg weight entered under his left zygomatic arch and smashed his left frontal lobe. He crossed the bregma point and got out of the skull and fell 30 m ahead. Gage's survival as a result of this great injury in his brain and his personality change after brain injury made him known as the “man who began neuroscience” [1, 2]. Doctor Edward Williams, who first examined Gage after the accident, thought he might die due to a big injury to his skull but was quite surprised when he saw a person who was seriously injured but could speak. Then, the treatment of Gage was made by the doctors of Harvard University under the leadership of John Martyn Harlow (1819–1907) [1]. About 12 weeks after the accident, it was thought that he has recovered enough to return to his home in Lebanon and even he returned to his former position at the railway company. Although he was allegedly physically recovered, Gage was unable to continue his job. Doctor Harlow, who did his treatment, reported that Gage's mind had changed

a lot. Gage, who was a very kind and thoughtful person before the accident, after the accident, it was seen that he was disrespectful, abusive, crusher, and a very harsh person when his requests were opposed. In addition, 2 years after the accident, he told Gage's nephews unreal heroism and escape stories [2, 3].

In the article “Passage of an iron rod through the head” published by Harlow in 1848, Gage's treatment and its various changes were reported [4]. What is known about the amount of damage to Gage's brain is Harlow's work [2, 3].

Gage died after an epileptic seizure on September 13, 1860, 12 years after the accident [4]. Gage's head cast and iron bar in

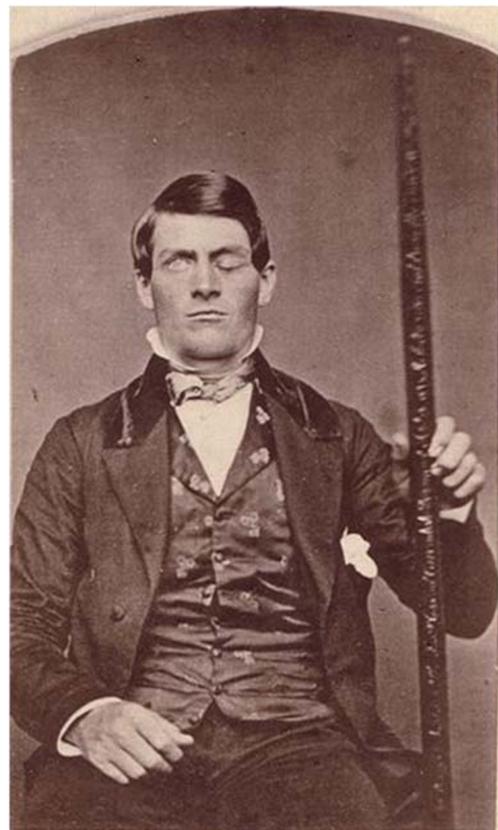


Fig. 1 Phineas Gage, which can be found [https://en.wikipedia.org/wiki/Phineas\\_Gage](https://en.wikipedia.org/wiki/Phineas_Gage)

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**Fig. 2 and Cover** Head cast of Phineas Gage made during his life, 1850, which can be found <http://collections.countway.harvard.edu/onview/items/show/18191>

the accident were given to Dr. Harlow by his brother after his death. Harlow donated them to the Harvard University Warren Anatomy Museum. Today, Gage's head cast and iron bar are still exhibited in this museum (Fig. 2 and Cover) [2].

### Phineas Gage's contributions to neuroscience

Although Dr. John Harlow's article did not attract attention for a while, it inspired Dr. David Ferrier 30 years after Gage's accident. Ferrier, who made studies by examining the article, put forward the theory accepted as the first modern frontal lobe function theory [3]. In his article published in 1878, Ferrier stated that the frontal lobe, whose function has not been known to date, is a personality-related center [5]. For

this reason, Phineas Gage case is considered as the beginning of modern clinical researches of frontal lobe and related behaviors [6].

### Conclusion

Phineas Gage's accident and subsequent changes in its personality have contributed to developments in this area by pushing scientists to do more work on the effect of brain functions on behavior.

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### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

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