



# Tracing the Path: A Brief History of Adolescent Idiopathic Scoliosis

*Adolescent Idiopathic Scoliosis (AIS) is a condition where the spine develops a sideways curve during the growth spurt of adolescence. Unlike other forms of scoliosis, the cause of AIS is not clear, and it tends to appear in otherwise healthy teenagers.*

*AIS is a condition that has intrigued and challenged medical minds for centuries.*



Autor: James Webb



## Ancient Observations



While not explicitly documented, historical records hint at ancient civilizations recognizing the presence of spinal curvature. Hippocrates (460-370 BC) recommended diet and extension for the treatment of scoliosis, and spinal manipulation was widely. He was the first to invent devices based on principles of axial traction and three points correction of spinal curvatures. Hippocratic books do not contain illustrations but Apollonius of Kitium (1st century BC) wrote of Hippocrates techniques in his work “On Articulations” and illustrations were found in Florentine surgical manuscript (*Laurentianus 74. 7*, 9th century AD).

Depictions of figures with asymmetrical postures in art and writings suggest that even in antiquity, the enigma of AIS was noted<sup>1</sup>.

<sup>1</sup> <https://www.hudsonvalleyscoliosis.com/what-is-scoliosis/history/>



## 19th Century: Naming the Curvature

Guillaume Dupuytren, a French surgeon and anatomist, is often referred to as the “father of scoliosis.” In the early 19th century, Dupuytren made significant contributions to various fields of medicine, including orthopedics. He recognized that certain spinal curvatures weren’t simply due to poor posture or temporary misalignment. Instead, he identified a distinct category of curvatures that seemed to persist and progress over time.



In 1835, Dupuytren introduced the term “scoliosis” to the medical world. Derived from the Greek word “skolios,” meaning “curved or crooked,” the term aptly captured the essence of the condition it represented. With this coinage, Dupuytren paved the way for a more precise and systematic understanding of spinal curvatures, differentiating them from other spinal anomalies.

Dupuytren’s introduction of the term “scoliosis” marked a pivotal moment in medical history. By giving a distinct identity to a previously observed but not fully understood phenomenon, he laid the groundwork for subsequent research, diagnosis, and treatment. His legacy continues to influence the way medical professionals’ approach spinal conditions and strive for clarity in their terminology.

## 20th Century: X-Rays Illuminate

In the late 19th century, a ground breaking discovery forever changed the landscape of medicine. Wilhelm Conrad Roentgen’s accidental encounter with X-rays in 1895 opened a new window into the human body, offering unparalleled insights and transforming diagnostics.

While experimenting with cathode rays, Roentgen noticed an unexpected glow on a screen located across the room. This mysterious radiation, which could pass through certain materials while leaving others opaque, fascinated him. He named it “X-ray” due to its unknown nature. Roentgen’s serendipitous discovery laid the foundation for a revolutionary medical tool.



Roentgen immediately recognized the potential of X-rays in medical imaging. Within weeks of his discovery, he produced an X-ray image of his wife’s hand, revealing the bones and a ring she was wearing. The implications were immense. For the first time, doctors could peer inside the body without surgery, enabling early detection and precise diagnosis of various conditions.



News of Roentgen's discovery spread rapidly, and X-rays quickly found their way into medical practices across the world. The ability to visualize fractures, foreign objects, and even internal organs was unprecedented. The medical community hailed X-rays as a game-changer, enabling faster and more accurate diagnoses.

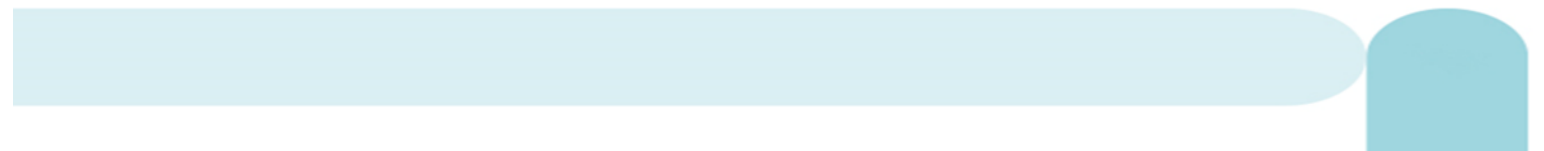
Doctors could now see how the spinal bones curved in scoliosis patients, and through their combined observations of X-rays and the clinical history of the patients, they could differentiate different types of scoliosis.

## Charting the Genetic Journey: Milestones in Understanding Adolescent Idiopathic Scoliosis

As the century progressed, genetic factors took centre stage in the understanding of AIS. Research unveiled that family history played a role, suggesting a hereditary component. By studying families with a history of scoliosis, scientists identified specific genetic markers linked to the condition, providing valuable insights into its origins.

In 2011, Burwell proposed a new theory to explain the etiology of scoliosis. Burwell suggested that various factors, including growth asymmetry, muscle imbalances, and genetic predisposition, as well as environmental and lifestyle factors, contribute to the development of spinal curvature. This theory highlights the importance of both intrinsic and extrinsic factors in understanding the origins of scoliosis that can lead to deforming effects, and introduced epigenetics as a key process involved in the etiopathogenesis of scoliosis.

This exciting avenue holds promise for tailoring care to each patient's genetic profile. With a deeper understanding of genetic and epigenetic influences, researchers are exploring the potential for tailoring interventions to an individual's unique biological makeup. This exciting avenue holds the promise of more effective treatments and improved outcomes.





**The Genetic Link** - The first glimmers of the genetic connection emerged during these decades. Researchers recognized that AIS often ran in families, sparking the idea that genes might be involved in its development.

1970's – 1980's

**Genes in Focus** - Geneticists shifted their gaze towards specific genes associated with spinal development. Researchers began identifying candidate genes that might be involved in AIS, marking the beginning of a more targeted investigation.

1990's

2000's

**Mapping the Genome** - The Human Genome Project was a monumental undertaking that began in the 1990s, aiming to map and understand all human genes. This monumental effort laid the foundation for AIS genetics research by providing a comprehensive genetic blueprint for comparison.

2010

**Unravelling the Complexity** - The genetic landscape of AIS was revealed to be intricate. Multiple genes were found to contribute to the condition's development, each playing a unique role. This decade saw significant advancements in our understanding of the complex genetic architecture of AIS.

**GPR126 - A New Lead** - A ground-breaking discovery identified a gene called GPR126 that appeared to be linked to AIS. This was a crucial breakthrough, as it provided a potential starting point for understanding the underlying biology of the condition.

2012

Current and future

**The Epigenetic Frontier** - Researchers delved deeper into the role of epigenetics - changes in gene activity that don't involve alterations to the DNA sequence itself. Epigenetic factors were found to contribute to AIS by influencing gene expression and spinal development.



## Conclusion

The journey to unravel the mysteries of Adolescent Idiopathic Scoliosis has been marked by ancient observations, 19th-century nomenclature, 20th-century diagnostic imagery breakthroughs, genetic revelations, and 21st-century advancements in personalized care.

In the 20th and 21st centuries, researchers worked to unravel the underlying factors contributing to AIS, exploring genetics and epigenetics, growth patterns, and biomechanics. However, the exact cause is still not fully understood.

Today, although great advances have been made in some areas of AIS treatment, such as in the fields of anaesthesia and spinal surgery, the early detection and monitoring of AIS today still rely on techniques developed by Hippocrates (observation) and Wilhelm Conrad Roentgen's X-ray breakthrough in the 19<sup>th</sup> century.

Ongoing research and understanding of AIS continue will be shaped by investigations into genetics and epigenetics, which for the first time in the history of the pathology offer a hope of personalised pre-emptive, and prognostic data-based AIS management to help the multidisciplinary team of physicians and healthcare providers to care for teenagers with spinal curvature and promote their overall health and well-being.

