

## BIOGRAPHY

### Ambroise Paré (1510-1590) and His Contribution to the Treatment of Scoliosis

#### Abstract

The purpose of this study is to summarize the treatment options for scoliosis and spine deformities from Antiquity through Medieval Times up to the Renaissance. Furthermore, it is to present the contribution of “the Father of Modern Surgery”, Ambroise Paré (1510-1590), to this field.

Paré was a distinguished surgeon of the Renaissance with many contributions to surgery, including war trauma, obstetrics, forensic medicine, and Orthopaedics. He was the first to recognize the importance of bracing for the treatment of scoliosis, inventing his famous metallic brace with holes to reduce weight.

In conclusion, it is noted that up to the time of the Renaissance traction and exercise were the main treatments of spinal deformities, especially scoliosis. The pioneering work of Ambroise Paré, “The father of Modern Surgery”, suggested the use of a metallic brace during adolescence in order to correct spine curvature of scoliosis. Besides that, Paré never rejected more traditional treatment options, like traction and exercise. He just suggested continuous bracing in order to add to the already existing conservative therapeutic options.

**Keywords:** Ambroise Paré; Scoliosis; Brace; Spine deformity; Traction

Received: 20 Jun 2015; Accepted: 17 Jul 2015; Online published: 8 Nov 2015  
**Research on History of Medicine/ 2015 Nov; 4(4): 191-198**

Konstantinos Markatos<sup>1</sup>  
Gregory Tsoucalas<sup>1</sup>  
Markos Sgantzos<sup>1</sup>  
Konstantina Arkoudi<sup>2</sup>

<sup>1</sup>History of Medicine Department, Medical School, University of Thessaly, Larissa, Greece.

<sup>2</sup>Arxaggeloi Medical Center, Athens, Greece

#### Correspondence:

Konstantinos Markatos  
History of Medicine Department, Medical School,  
University of Thessaly, Larissa, Greece  
gerkremer@yahoo.gr



## Introduction

Ambroise Paré (1510-1590) was one of the most prominent surgeons of his time. For many, he is considered as “the Father of Modern Surgery”. The son of a barber-surgeon and a trained barber-surgeon himself, he managed to overcome the obstacles of not having significant academic education that he was not provided with. He was one of the most significant innovators of the Renaissance in the fields of military operation, bandages, wound healing, bloodletting, close blood vessels techniques and cesarean section. An important milestone of his work was the treatment of spinal deformities and especially scoliosis with the use of the brace he invented<sup>1</sup>.

The purpose of this study is to summarize the treatment methods for spinal deformity up to the time of Ambroise Paré, his contribution to and impact on this field, both clinically and academically.

## Paré’s biography

Ambroise Paré was born in 1510 in Bourg-Hersent in north-western France. At the age of 19, he was admitted at the Hotel-Dieu Hospital of Paris where the most famous barber-surgeon school of the time was active. There, he studied and worked for 4 years. For the next decade, he followed the French Army where he acquired a significant experience in Traumatology. He was a great reformer of surgery at a time when most surgeons supported the advantages of blood loss for trauma patients. His contribution was acknowledged in 1554 when he became a fellow of the College of Surgeons of Saint-Come<sup>2</sup>.

Paré lived in an era when war trauma from powder was considered poisonous and the high mortality of the injured intimidated surgeons. As an army surgeon, facing complicated cases, he had to perform under difficult circumstances. In the battlefield, he invented new treatment methods for trauma, burns and fractures with tools and other means which he described in his book: “La Méthode de traiter les plaies faites par les arquebuts et autres bastons à feu, et celles qui sont faites par la poudre à canon” [The Method of Treating Wounds Made by Harquebuses and Other Guns]<sup>2</sup>.

He was accepted as the king’s barber-surgeon in 1552 under Henry II of France and although he failed to cure him from a head injury occurred during a tournament in 1559, he remained in the service of the kings of France with the assistance and supervision of Andreas Vesalius (1514-1564)

1- Varvaroussis, 2001: 21-123.

2- LeVay, 1990: 212-265.



until his death in 1590. He served under Henry II, Francis II, Charles IX, and Henry III<sup>3</sup>.

### **Paré's work**

The most significant contribution of Paré to surgery was the importance he attributed to surgical lavishing with warm water, the systemic ligation of arteries and veins by means of stitches instead of cauterization during amputation, the abandonment of burning wounds and injuries, the successful treatment of amputations, the use of orthopaedic devices, artificial limbs, metallic braces and other innovative surgical tools<sup>1</sup>.

His most famous report concerned the treatment of gun wounds not with cauterization as it was common at that time but with an ointment he himself made. He compared one group of patients who were treated in the traditional manner with boiling elderberry oil and cauterization, with the group treated using a recipe made of egg yolk, oil of roses and turpentine. Both groups were left overnight. Paré discovered that the soldiers treated with the boiling oil were in agony, whereas the ones treated with the ointment recovered because of the antiseptic properties of turpentine. This finding approved the efficacy of his method and hence he avoided cauterization thereafter. However, treatments such as this were not widely used until many years later. He published his first book "La Méthode de traiter les plaies faites par les arquebuts et autres bastons à feu, et celles qui sont faites par la poudre à canon" in 1545<sup>3</sup>.

Acknowledging the risks of an open fracture, he usually proceeded to amputations, believing that conservative treatment for an open fracture presented with ulcer, contusion and inflammation was lethal. For amputations, he used metallic claps and long stitches emerging from the wound until they were absorbed with healing<sup>4</sup>.

Paré attributed spine deformities in traumatic conditions, bad posture and genetic predisposition. He used holed braces made of iron or steel for the treatment of spine deformities that he changed the brace when growth imposed it (Figure 1). For the treatment of the foot, he designed specially made boots and for stance pain and limping he recommended crutches<sup>5</sup>.

Paré's reputation expanded even more with the edition of his book entitled "Anatomie Universelle du corps humain", where he described fracture treatment with braces and gave

3- Drucker, 2008: 199.

4- Hamby, 1967.

5- Lonstein, 1995: 219-256.





guidelines for treating fractures, especially when fractures were accompanied by open wounds<sup>6,7</sup>.

Paré was also an important figure in promoting Surgery for Fetus Delivery in the middle of the 16th century. He revived the practice of the cesarean section, and showed how even in cases of head presentation, surgeons, following this method, could often deliver the infant safely, instead of having to dismember the infant and extract it piece by piece<sup>4</sup>.

6- Paré, 1598: 632-749.

7- Kumar, 1996:653-5.

8- Vasiliadis, 2009:6.

9- Peltier, 1993.

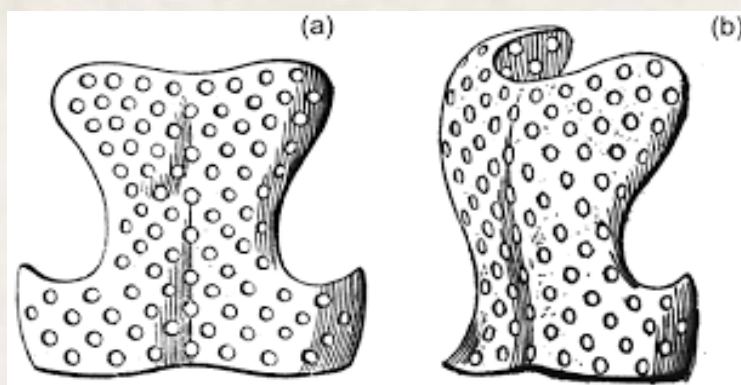


Figure 1. The metallic brace introduced by Pare for the correction of scoliosis with holes in order to reduce weight.<sup>8</sup>

### Spine deformities and their management by Paré

Until the Renaissance, during Antiquity and the Middle Ages, traction had been the most popular method for treating spinal deformity. Traction is the process of applying force through body weight, weights, and/or pulleys in order to stretch a given part or to separate two parts<sup>8</sup>.

The oldest existing reference available about axial traction was described in “Srimad Bhagwat Mahapuranam”, an ancient Indian religious literature written between 3500 BC and 1800 BC. It was a mythological epic about Lord Krishna who corrected the hunchback of one of his devotees, Kubja, by applying axial traction<sup>8,9</sup>.

From the time of Hippocrates and later Galen, traction had been a time-honored method of treatment for spine deformities and especially scoliosis. Thus, many traction devices had been developed. Hippocrates used the “Hippocratic ladder”, his board and the scamnum, all the methods and devices invented by him and named after him. Later, Galen used the board and scamnum and improved them by combining axial



traction with direct pressure applied by a manipulator<sup>10,11</sup>.

Oribasius (325-400 AD), a Byzantine physician, improved the Hippocratic board by adding a bar and used it for treating spinal trauma and deformities. Caelius Aurelianus (5th century), a Roman physician, in his work “ardarum sive chronicarum passionum”, which was about acute and chronic illnesses, gave a detailed description of the type of traction and physical therapy he used to treat sciatica. Later, Paulus of Aegina (625-90 AD), a Byzantine Greek Physician, who was the first to propose a surgical intervention in a living patient, used traction devices and red hot iron during spinal interventions. At the beginning of the tenth century, a Byzantine physician, Niketas (Nicetas), made a collection of surgical manuscripts which is known as the earliest surviving illustrated surgical codex. It contained illustrations of Hippocratic treatments, including traction methods in addition to illustrations representing Byzantine practice. Ibn-i Sina (Avicenna, 980-1037 AD), the renowned physician of the Middle East, also used spinal traction to correct spinal deformities under the influence of Hippocrates and Galen. He also explained his own traction methods in his book, named *Al Kanun fit Tibb* (The Canons of Medicine). In 1210, Roland of Parma, a surgeon from Salerno, in his famous book “*Chirurgica*”, rejected the use of Hippocrates’ methods and recommended a new traction mechanism with bands fastened over the trunk, neck and hips for the treatment of spinal cord injuries. Serefeddin Sabuncuoglu (1385-1470), a famous Turkish surgeon from Central Anatolia, was the author of the first illustrated surgical textbook in the Turkish-Islamic literature, i.e., “*Cerrahiyyetu’l Haniyye*”. He was thought to be the first to use copper plate after traction which was thought to be a precursor of thermal therapy and to practice wheels in traction. Unlike the traditional positioning (suspending position), he also suggested “prone position” during the traction<sup>12</sup>.

Paré was the first to suggest the use of a metallic brace for the correction of scoliosis. In his work, he is recognized as the first physician to treat scoliosis with a brace. He also recognized that once a patient with scoliosis had reached maturity, bracing was not useful, due to the fact that growth was complete. So he recognized scoliosis and other spine deformities as a developmental anomaly. Paré’s orthosis consisted of a metal corset (fashioned in a village smithy setting) with many holes in it to help diminish its significant weight (Figure 1)<sup>8</sup>. His writings also made it clear that Ambroise Paré

10- Marketos, 1999;24(13):1381-7.

11- Ibid;24(22):2358-62.

12- Pellechia, 1994:262-267.



embraced the postural theory of scoliosis<sup>3,13</sup>.

Although Paré was the first to apply the treatment of scoliosis with a brace, he did not reject other traditional methods of treating spinal deformity. He maintained and applied traction as a preferred method of treatment (Figure 2)<sup>8</sup>. He also emphasized the importance of exercise towards a physically correct development and correction of spinal deformities<sup>14</sup>.

Nevertheless, he was the first to recognize the importance of continuous bracing during development in order to intercept curvature in scoliosis and he invented an efficient brace towards that end<sup>15</sup>.

13- Wenger, 1993.

14- Bick, 1968.

15- Cyriax, 1977.



*Figure 2. Image of a table traction device used during the Antiquity and the Middle Ages for the correction of spinal deformities.<sup>8</sup>*

### **Conclusion**

In conclusion, it is noted that up to the time of the Renais-





sance traction and exercise were the main treatments of spinal deformity and especially scoliosis. The pioneering work of Ambroise Paré, “The father of Modern Surgery”, suggested the use of a metallic brace during adolescence in order to correct spine curvature of scoliosis. Besides that, Paré never rejected more traditional treatment options like traction and exercise. He just suggested continuous bracing in order to add up to the already existing conservative therapeutic options.

### References

- Bick EM. *Orthopaedics of Book*. New York: Hafner Publishing. 1968.
- Cyriax J. *Text Book of Orthopaedic Medicine*. Vol. 1 and 8. London: Bailliere Tindall London. 1977.
- Drucker CB. Ambroise Paré and the Birth of the Gentle Art of Surgery. *Yale J Biol Med*. 2008;**81**:199-202.
- Hamby WB. *Ambroise Paré Surgeon of the Renaissance*. St. Louis: W.H. Green. 1967.
- Kumar K. Spinal Deformity and Axial Traction. *Spine*. 1996; **21**(5): 653-5.
- LeVay D, Park Ridge NJ. *The History of Orthopaedics: An Account of the Study and Practice of Orthopaedics from the Earliest Times to the Modern Era*. USA : Parthenon Pub. Group; 1990.
- Lonstein JE. Idiopathic scoliosis. In: Lonstein JE, Bradford DS, Winter RB, Ogilvie J, editors. *Moe's Textbook of Scoliosis and Other Spinal Deformities*. 3rd ed. Philadelphia, Pa: WB Saunders Co; 1995:219-56.
- Marketos SG, Skiadas P. Hippocrates The father of spine surgery. *Spine*. 1999; **24**(13): 1381-87.
- Marketos SG, Skiadas PK. Galen a Pioneer of Spine Research. *Spine*. 1999; **24**(22): 2358-62.
- Paré A. *Oeuvres*. Paris: 1598: 632-749.
- Pellecchia GL, et al. Lumbar traction: A review of the literature. *J Orthop Sports Phys Ther*. 1994;**20**(5):262-7.
- Peltier LF. *Orthopaedics A History and Iconography*. San Francisco: Calif Norman Publishing. 1993.
- Varvaroussis A. *History of Orthopaedics*. Athens: Parisianos Scientific Publications. 2001; 21-123.
- Vasiliadis ES, Grivas TB, Kaspiris A. Historical over view of spinal deformities in ancient Greece. *Scoliosis*. 2009; **4**:6.



doi:10.1186/1748-7161-4-6

Wenger DR. Idiopathic scoliosis. In: Wenger DR, Rang M, eds. *The Art and Practice of Children's Orthopaedics*. New York: Raven Press; 1993.

