

**MANAGEMENT OF SPINAL DISORDERS AND
TRAUMA IN AVICENNA'S CANNON OF MEDICINE**

*TRATAMENTO DE DOENÇAS E TRAUMA DA
COLUNA NO CÂNONE DE MEDICINA DE AVICENA*

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Knowing the history of medicine is understanding what led us here. Scientific progress is each time more and more impressive and has been greater in the last century than it ever was in the whole history of humankind. Its growth is exponential.

Nevertheless, a recent article published in the periodical Neurosurgery shows us that the foundations of treatment for spinal disorders have not changed much - rather, it has evolved.

The first discovered document concerning the spine was the Edwin Smith Surgical Papyrus from Egypt, which is a series of six cases description written probably 31 centuries ago.

Celsus, who wrote *De Re Medicina* suggested immobilization and stabilization rather than intervention for spinal fractures; surgeries were first suggested by Paul of Aegina, in the 7th century, and Al-Zahrawi described and drew the necessary tools in the 10th century.

Hippocrates, known as the father of medicine, also took a part on spine diseases history and wrote his own observations and conclusions, which guided medical thought for several centuries and inspired many doctors. One of them was Galen. The other one was Avicenna (Figure 1).

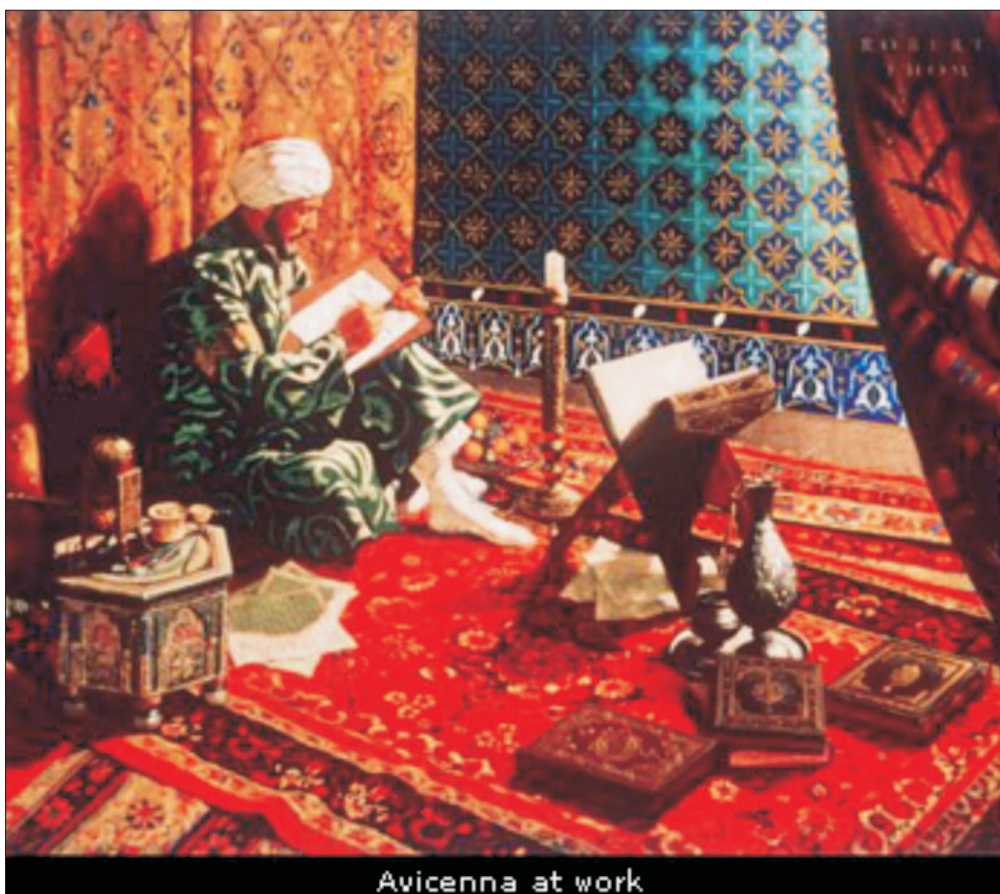


Figure 1. Source: http://www.greekmedicine.net/history/Unani_Medicine.html

Ibn-Sena (980 - 1037) (Avicenna, for the Eastern World), the most famous doctor in the western world wrote the famous Canon of Medicine, a magnificent four-volume book that contained all the knowledge of medicine by his time. His work may have dictated medicine in the west, but was only brought to the east by the 15th century. Avicenna was so famous that he was sought by eager medical students who wanted to practice the “real medicine”, instead of the “barber-surgery” practiced in Europe by that time, as is so well represented by Noah Gordon in his famous “The Physicist”.

In the first volume of his Canon, Avicenna considered the anatomy of the spine; pathology was studied in both the third and fourth volumes. Following the Hippocratic line of thought, he considered that humors controlled the body and that diseases depended on their adequate flux. Therefore, kyphosis could be considered as either an external (traumatic) or internal disease. If internal, it could be presented either as rigid, when muscles and tendons become rigid due to the flux, or degenerative, when flux degenerates supportive structures. He also considered an isolated inflammation or a tuberculum as possible causes. One can infer by that that Avicenna knew of osteoarthritis, ankylosing spondylitis and even Pott's disease.

He also comments on the impact of kyphosis on the development of a child and on breathing. “Bad Efese” (Juvenile Hunch Back) is considered as a childhood malnutrition syndrome

caused by the lack of milk; even though no explanation is given in this article, one can also infer that Avicenna had already observed rickets by then. Avicenna thought that an “infection” could produce local masses and spread to surrounding or distant organs and induce a plegia; he also knew cancer, in spite of considering it a common infection.

The canon provides signs and diagnostic techniques, such as the use of ointments. Specific herbs and no surgery should be prescribed for the treatment of this disease; the herbs should be firming, warming, and eradicating.

The canon also offers protocols and surgical interventions for slippage and dislocation of vertebrae. The spinal cord could be ruptured or compressed, what leads to swelling. Avicenna relates the first cervical vertebra dislocation to breathing incapacity and death; anterior dislocation of the dorsal vertebrae are considered as incurable and the patient dies soon; however, posterior dislocation without severe compression cause lower extremity paralysis and placid type bowel-bladder dysfunction and can be reduced, what is not only hard, but can also break some ribs.

For that, special techniques were applied (Figures 2 and 3), a wooden plank was fixed in the back for immobilization and bath vapor was used as a myorelaxant. For posterior cervical dislocation, strengthening and loosening agents should also be used after the reduction.



FIGURE 2. A, illustration depicting Ibn Sina showing the reduction method for the management of posterior dislocation in the back by using his knees or hands while the patient is placed in the prone position (from, Goodrich JT: Landmarks in the History of Neurosurgery, in Rengechary SS, Wilkins RH (eds): Principles of Neurosurgery, London, Wolfe, 1994, p 1.5 [5]). B, illustration depicting Ibn Sina describing the second procedure in the treatment of same disease by using his heels (from, Bennett G: History, in: Howorth MB, Petrie JG: Injuries of the Spine. Baltimore, Williams & Wilkins, 1964, p 12 [3]). C, illustration showing a physician performing the shovel-method devised by Ibn Sina (from, Lewis P (ed): Tıp Tarihi (The Hamlyn History of Medicine) [in Turkish] Güdücü N (trans). Istanbul, Khalkedon, 1998, p 47 [16]).

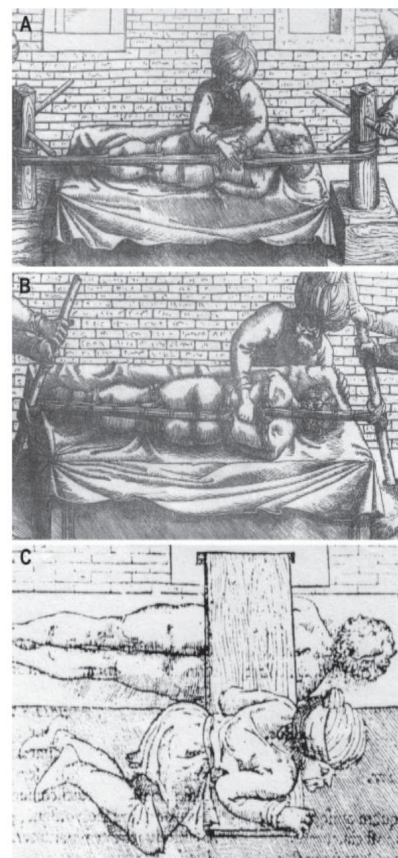


FIGURE 3. A and B, illustrations depicting Ibn Sina showing the reduction methods performed for thoracic spine dislocations, which were previously described by Hippocrates. However, Ibn Sina did not fully agree with all of these maneuvers (from, Terzioğlu A: Ibn Sina'nın Tababeti ve Avrupa'ya Tesirleri [in Turkish]. Ankara, Türk Tarih Kurumu, 1984, p VII [20]). C, illustration showing a physician correcting a back deformity by using a wooden board (from, Xarchas KC, Bourandas J: Injuries and Diseases of the Spine in the Ancient Times. Spine 28:1481-1484, 2003 [22]).

As for coccyx dislocation (contrary to Hippocrates, Avicenna considered the sacrum and the coccyx as a part of the spine), the vertebra could be reduced by introducing a finger in the patients rectum, pushing the bone and controlling the sacrum with the other hand. After that, the patient should receive laxatives and specific drugs should be put over his sacrum.

For vertebral fractures, a surgical extraction of all fragments should be performed; when this was not possible, anti-

edema therapy should be applied. His medicine was so advanced, that such a complex procedure took centuries to be performed in Europe.

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