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First detailed description of axial traction techniques by Serefeddin Sabuncuoglu in the 15th century

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Introduction

Serefeddin Sabuncuoglu was a famous Turkish surgeon who lived in Amasya, Central Anatolia in 1385–1470. He is the author of the first illustrated surgical textbook in the Turkish-Islamic literature, namely, ‘Cerrahiyyetu’l Haniyye’ [23]. There are three known handwritten copies of the book; two in İstanbul [18, 19] and one in Paris [20]. His marvellous book, ‘Cerrahiyyetu’l Haniyye’ was re-discovered in 1939 by Suheyl Unver [22]. In 1992 Ilter Uzel, a Turkish medical historian, examined three copies of the book and published them in Turkish, English and Arabic [23].

The book consists of three chapters (cauterization treatments, surgical procedures and fractures and dislocations), 193 topics and 206 pages dealing with many fields of surgery [4–8, 11, 24]. The book includes the author’s own coloured miniature drawings of the operative procedures.

Sections of this book regarding spinal disorders are reviewed. He describes the management of spinal dislocations in the third chapter, 30th section (17, 22, 23). We focus on the interesting axial traction techniques which were described and used by Sabuncuoglu in the 15th century.

Axial traction techniques of serefeddin sabuncuoglu

“Spinal dislocations may be complete or partial. The prognosis of complete dislocation is poor and may be fatal. Paraplegia and sphincter incontinence below the level of injury are possible signs of death. Malfunction of internal organs and motor loss of upper extremities rarely occurred. Vertebrae dislocation may be of four types. If the vertebrae dislocated backwards a hump occurred. The children and the patients with anterior thoracic and lateral dislocations eventually die. Only posterolateral dislocations can be treated.” The techniques of axial traction were described as below (Fig. 1):

“The patient is placed near the wall on a soft bed in a prone position. Two wooden blocks are placed on the floor from the levels of head up and foot end. Each wooden block has an extension in the middle. Threaded wheels are attached to each extension of the blocks. The patient is wrapped beneath the axilla and hips with two soft ropes. Ends of the ropes are tied and attached to each of the wheels. The physician should strongly compress the dislocated vertebrae down, while two helpers simultaneously turn the wheels.”

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Fig. 1 Illustration showing the axial traction system for replacement of dislocated vertebrae. Reprinted with permission of the Turkish Historical Society from Uzel I [23]

If the reduction did not occur, an alternative traction technique was also described: “The patient is placed near the wall in a prone position. A wooden block is placed in a suitable hole in the wall. The level of the dislocation is placed under the middle of the wooden block. Afterwards, the physician should strongly press against to the hump using his feet. After the reduction is achieved,

healing and drying creams are applied over the skin of the dislocated area. A soft cotton dress and a hard wooden plate in three-finger width diameter, are placed, respectively. After the treatment, the patient must be fed with fine food. If the hump still exists, ointment therapy is continued for a while, and then a copper plate is placed on the area for a myorelaxant effect. Swelling should

not be accepted as a failure of procedure, and if the traction technique is repeated, it may lead to the patient’s death, in inexperienced hands” (Fig. 2).

Discussion

“Cerrahiyyetu’l Haniyye” is the first illustrated and written book in the old Turkish alphabet in the Middle East area where painting, drawing and sculpture were frowned upon by Islamic rules [1]. Despite the Muslim thinkers’ tradition, Serefeddin Sabuncuoglu used his own miniatures, describing the techniques even on female patients [11]. As a modest person, he was open about complications and he always criticized himself as well. As a scientist, he always cited the seniors Hippocrates (460–370 BC), Galen (131–199 BC), Al-Zahrawi (936–1013) from whom he obtained knowledge [23].

Axial traction to correct spinal deformities was known first in ancient Hindu epics (3500–1800 BC) [13]. Hippocrates was the first to arrange devices (Fig. 2) on a scientific basis [2, 9, 15]. Guided by his principles, Galen recommended the Hippocratic board according to which correction of the curvature is achieved through a combination of traction and pressure [16]. Paulus of

Fig. 2 The Hippocratic ladder for the reduction of spinal curvatures. From the Apollonius of Kitium on the Hippocratic treatise ‘on joints’. Bibliotheca Medica Laurenziana Florence (9th–10th century AD) [15]

Aegina (625–690 AD) used Hippocrates' traction bed and worked on red-hot iron [12]. It is worthwhile to mention that the use of copper plate after traction by Serefeddin Sabuncuoglu is thought to be a precursor of thermal therapy, since copper is a well-known conductor of heat. Roland recommended a prototypical traction mechanism with bands fastened over the trunk, cervical region and hips, in his famous book "Chirurgica" in 1210 [21]. Axial traction system designed by wheel and axle mechanism for spinal dislocations is the first in the 15th cen-

tury, while Avicenna's and Ambroise Paré's same descriptions were published in the 16th century in Western literature [3, 10, 14]. Although Hippocrates had mentioned about the wheel and axle system, Sabuncuoglu was the first practice wheels in traction. Sabuncuoglu also suggested 'prone position' instead of 'suspending position' which was generally followed [12]. The importance of ointment, thermal and myorelaxant therapy and dietary habit on healing process represent the same principles of current treatment modalities in spine related sciences.

As a pioneer of surgery and as a highly qualified scientist, Serefeddin Sabuncuoglu ought to be given the credit that he richly deserves after all these years of neglect.

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