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Letter to Editor

A coinsidence, a chance or a misfortune? Hangman's fracture

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ABSTRACT

William R. Francis and Bassam El-Effendi shared a common ground: they were the first individuals to classify Hangman's Fractures. Interestingly, although they were unaware of each other, they classified and published their findings in the same year, published in the same edition of the same journal (but on different pages). This new classification system was a chance for notoriety for El-Effendi, yet it was a misfortune for Francis. Both physicians graduated in 1973 (from different universities). Also fellows at different universities in 1981, they were also both unaware they studied the same topic. Coincidentally, their paths crossed in the same edition of a journal where their studies were published in the same year, which was unprecedented in the literature. One classification scheme is well-known while the other is almost completely unheard of for no apparent reason other than chance for one and misfortune for the other.

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1. Introduction

Execution by hanging is one of the oldest and most commonly used methods of capital punishment. 10% and 30% of suicides in the Roman and Greek civilisations, respectively, were by hanging [1,2]. In hanging, if the rope is short, the victim dies from suffocation; if the hanging rope is longer, the victim's neck is broken. Some reports even note instances where the victim was decapitated on rare occasion due to the victim's weight and excessive rope length.

The term 'traumatic spondylolystesis of the axis', also known as a Hangman's fracture, was introduced by Schneider [3]. Traumatic spondylolystesis of the axis is different from spondylolystesis caused by hanging, although this term is used interchangeably with the term Hangman Fracture since the radiologic images are similar to those in a person as the result of a hanging death [4,5]. William R. Francis and Bassam El-Effendi shared a common ground: they were the first individuals to classify Hangman's Fractures. Interestingly, although they were unaware of each other, they classified and published their findings in the same year, published in the same edition of the same journal (but on different pages).

2. Francis's classification

Francis classified the Hangman's Fracture according to the displacement of C2 over C3 in the cervical lateral direct radiography, angulation and ligamentous instability [6]. Displacement was defined as the movement of the anterior or posterior border of C2 on the posterior edge of the body of C3. Angulation was measured based on the angle between the posterior edge of C2 and the posterior edge of C3. Cases with a displacement longer than 3.5 mm and angulation greater than 11 degrees were considered to be instable. Out of 123 patients, 19 (15.4%) were classified as grade I, 9 (7.3%) as grade II, 46 (37.3%) as grade III, 42 (34.1%) as grade IV and 7 (5.6%) as grade V. Francis's classification is presented in Table 1.

3. Classification of Bassam El-Effendi

Effendi categorised Hangman's Fractures in 3 groups by injury mechanisms of the axis ring [7].

Type I are isolated hairline fractures of the ring of the axis with minimal displacement of the body of C2. The fracture may involve any part of the ring of the axis and may extend

Table 1 – Classification of Francis.

Type	
Type I	Fractures with 0- to 3.5-mm displacement and/or C2-3 angulation up to 11
Type II	Fractures with displacement <3.5 mm and angulation >11
Type III	Fractures with displacement >3.5 mm but less than half of C3 vertebral width, 0.5 and angulation >11
Type IV	Fractures with displacement >3.5 mm but less than half of C3 vertebral width with <11 angulation
Type V	Fractures with complete C2-3 disc disruption.

anteriorly into the body of C2. The fracture line is then oblique, involving usually one (or rarely both) posteroinferior corner(s) of the body. The disc space below the axis is normal and stable. Type II is displacement of the anterior fragment with an abnormal disc below the axis. The body of the axis may be displaced in extension, flexion or obvious forward listhesis. Type III is displacement of the anterior fragment with the body of the axis in the flexed position in addition to the dislocated and locked facet joints at C2-3. A Type III lesion must be suspected when the body of the axis is in a position of flexion; it has not been seen when it is in a position of extension or of forward listhesis. El-Effendi's classification is presented in Table 2.

4. Comparison between both classifications

Out of 131 patients, 85 (64.8%) were categorised under group I, 37 (28.2%) under group II and 9 (6.8%) under group 3. Greene et al. applied Francis's and El-Effendi's classifications to 74 patients with Hangman's Fractures and reported a strong correlation between Francis's Type I and El-Effendi's Type I. They also reported a correlation between Francis's Type IV and El-Effendi's Type III [8]. Burke and Harris applied the El-Effendi classification scheme to their series of 65 patients with Hangman fractures; 11% of the fracture injuries in their series were not accurately described by the El-Effendi scheme [9].

Table 2 – Classification of Effendi.

Type	
Type I	Nondisplaced fractures and all fractures with, 3-mm displacement of C2 on C3 associated with hyperextension and axial loading.
Type II	Fractures of the ring of the axis with displacement of the anterior fragment with disruption of the disc space below the axis associated with hyperextension and rebound flexion
Type III	Fractures of the ring of the axis with displacement of the body of the axis in a flexed forward position (angulation), in conjunction with C2-3 facet dislocation associated with primary flexion and rebound extension.

5. What made a difference?

Levine and Edwards categorised the Hangman fractures under 4 sub-groups by adding flexion–extension types of injuries (IIA) to El-Effendi's classification scheme (4 years after both classification schemes were published) [10]. Following this classification, El-Effendi's and Francis's classification schemes have been referenced less, while the new classifications have been more commonly used. Because Levin and Edwards modified Effendi's classification scheme, it allowed his method greater exposure, leaving behind Francis's classification system.

6. Their short life stories and what do they do now?

6.1. *William R. Francis*

Dr. Francis received his doctorate degree in medicine at Baylor College of Medicine from 19701973. He worked as a general surgery resident at Baylor College of Medicine for a year after and then for a following year as an orthopaedic surgeon. Francis has been working as an assistant professor at the Baylor College of Medicine since 1979. He developed the Hangman's Classification during his fellowship at St. Luke's Hospital Center in New York. Dr. Francis has seven published papers, all of which are available through PubMed.

6.2. *Bassam El-Effendi*

Dr. El-Effendi graduated from American University of Beirut Medical Center in 1973. He worked as a fellow at Centre hospitalier de l'Universite de Montreal. He worked as an orthopaedic surgeon in Iran. He currently works as an orthopaedic surgeon resident at the University of Aleppo in Syria. Dr. El-Effendi developed his classification scheme during his fellowship at Centre hospitalier de l'Universite de Montreal and has two published papers which are available through PubMed.

7. Conclusion

Francis and El-Effendi are two physicians who graduated from different universities in 1973. They were unaware of the fact that both studied the same topic in different universities where they were fellows in 1981. Coincidentally, their paths crossed in the same edition of a journal where their studies were published in the same year, which was unprecedented in the literature. One classification scheme is well known while the other is almost completely unheard of, which we believe is a chance for one and misfortune for the other and cannot be explained by any other reasons.

Conflict of interest

None declared.

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Ethics

The work described in this article has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans; Uniform Requirements for manuscripts submitted to Biomedical journals.

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