Annotation

THE HISTORY OF FRACTURES OF THE PROXIMAL FEMUR
The contribution of the Dublin Surgical School in the first half of the 19th century
J. Bartoniček
From Charles University, Prague, Czech Republic

The designation ‘Adam Bogen’ (arch) which is used in the German literature as a description of the thick medial cortex of the femoral neck is incorrect. This arch was described by Robert Adams (1795-1871), who was an Irish anatomist and surgeon. Adams, Colles and Smith were outstanding surgeons who described fractures of the proximal femur in detail during the first half of the 19th century and who together formed the Dublin Surgical School. The most important aspects of these fractures were described between 1818 and 1839.


A thick medial cortex of the femoral neck which is often termed, incorrectly, the calcar femoris in the English literature is called the ‘Adambogen’ or ‘Adamschen Bogen’ (Adam’s arch) in the German literature. There is, however, no literary source which explains the origin of this eponym. In the Handlexikon der medizin the description of the arch is ascribed to William Adams (1820-1900), an English surgeon of the 19th century, although it is not mentioned in his biography. After investigation for more than 15 years the origin of this eponym has become clear. The thick medial cortex of the proximal femur and its significance for the stability of fractures in this region was described by Robert Adams, an Irish anatomist and surgeon, in The cyclopaedia of anatomy and physiology of man, Vol II. The principal editor of this monumental six-volume work was an English anatomist and surgeon, R. B. Todd (1809-1860). It is a very detailed treatise which also deals with aspects of clinical medicine.

The first to use the term Adam’s arch was probably the American surgeon N. Senn. In the first of his publications of 1883 he used the form Adams’s arch, but in another work of the same year and published in the same journal we read “A portion of Adam’s arch, which had been implanted into lower fragment, could be distinctly seen in the spongiosa, on making a vertical section”. He also used the same term, i.e. Adam’s arch, in another publication. His source was probably either Smith’s monograph which was published in 1850, or Todd’s Cyclopedia.

Thirteen years later (1896) Theodor Kocher, in his monograph dealing with fractures of the proximal femur, mentioned ‘Adam’schen Bogen’ in the description of the femoral neck and cited Senn as his source of information. In his outline of the treatment of fractures of the femoral neck Faltin in 1924 described “… a powerful cortical layer, called Adam’s arch”. In the text he referred to Senn, but not to Adams or Smith. It is likely that he adopted the term Adam’s arch from Senn, but he did not include his literary sources. The term ‘Adam’s arch (Adam Bogen)’ therefore probably entered the German anatomical and surgical literature either from Kocher or Faltin.

Investigation of the origin of the term Adam’s arch has revealed further information relating to the history of fractures of the proximal femur. There is, however, little mention of Abraham Colles, Robert Adams or William Robert Smith. These authors came to prominence in other fields and had much in common. They studied at Trinity College in Dublin and were members of the Royal College of Surgeons of Ireland, of which the first two were presidents.

The oldest was Abraham Colles (1773-1843) whose main contribution was the description of the extra-articular dorsally angulated fracture of the distal radius which today is called after him. He also described the effects of tying the subclavian artery. Less well known is his description in 1818 of 11 cases of fracture of the neck of the femur. It is likely that he was the first to describe an impacted fracture of the neck of the femur, reporting three cases. He also described and illustrated with a drawing a case which today would be classified as an unstable trochanteric fracture and another of nonunion of an intracapsular fracture.

Associated with the second author, Robert Adams (1791-1875), is the Adams-Stokes syndrome (syncope triggered by arrhythmia). His most significant contribution, however, was a monograph on the subject of chronic rheumatoid arthritis. His contribution to the treatment of fractures of the proximal femur is, however, not mentioned. His detailed descriptions of conditions and injuries of other...
major joints such as the shoulder, elbow, wrist, hip, knee and ankle may be found in *The cyclopaedia of anatomy and physiology of man.* The chapter which is entitled ‘Hip-joint, abnormal conditions’ is extensive and deals with many clinical conditions such as congenital subluxation, arthritis, traumatic dislocation and fractures. Fractures of the proximal femur are described in great detail with figures and there are extensive references to English and French authors from the beginning of the 19th century. Robert Adams takes issue here with Sir Astley Cooper concerning the healing of intracapsular fractures. In the description of extracapsular fractures (the drawing clearly shows a trochanteric fracture) he draws attention to the contribution of the powerful cortical arch to the stability of the proximal femur. He also shows the arch in a cross-section through normal bone. In this he refers to his previous description in the *Dublin Journal of Medical and Chemical Science.*

In this journal, in 1835, the youngest of these surgeons, Robert William Smith (1807-1873), published a paper on the diagnosis of fractures of the neck of the femur. He also disagreed with Sir Astley Cooper on the subject of the amount of shortening of the limb after intra- and extracapsular fractures. He cites a long passage which he borrowed from Adams dealing with the role of the thick medial cortex of the neck of the femur and added illustrative drawings. This work, however, is little known in the history of fractures of the proximal femur since his name is primarily associated with the anteriorly angulated fracture of the distal radius. He was also the first to use the term Colles’ fracture. His most important monograph was published in 1850, and includes an extensive chapter on fractures of the neck of the femur in which he mentions his two senior colleagues, Colles and Adams.

We should also mention Adams’s co-author William Stokes (1804-1878) who was a distinguished Irish physician (Adams-Stokes syndrome, Cheyne-Stokes breathing). He described the use of the stethoscope, and also reported the circumstances of Colles’ death. His second son, Sir William Stokes (1839-1900), whose uncle was R. W. Smith, visited Vienna in 1863 and Berlin in 1864 where he met a number of well-known Austrian and German physicians including Bernhard Rudolph Konrad von Langenbeck (1810-1887) who was one of the first surgeons to undertake internal fixation of an ununited fracture of the neck of the femur. At the end of his life (1896) he published a small monograph on the subject of such fractures in which he refers to the three outstanding surgeons and presents his own detailed classification of fractures of the proximal femur in which the different types are illustrated by photographs. This monograph is not referred to in the historical reviews of proximal femoral fractures.

These three surgeons, Colles, Adams and Smith, formed the ‘Dublin Surgical School’. Their cases are described in great detail and are based both on clinical and subsequent cadaver findings and often illustrated by line drawings. On some matters they disagreed with the views of Sir Astley Cooper (1768-1841), who was considered to be the foremost surgical authority of the first half of the 19th century.

When discussing the history of the study of fractures of the proximal femur the period between 1818 and 1838 may be called the British period. It began in 1818 with Colles’ article which was cited the following year by Cooper and Travers in *Surgical essays.* In this book they presented the first extensive description of fractures of the neck of the femur. They divided these fractures into intra- and extracapsular according to their prognosis and described in detail the clinical and cadaver findings in a way which still remains relevant today. They also discussed the healing of intracapsular fractures and suggested that they heal only by fibrous tissue. This view was prevalent thereafter for many years. They also referred to fractures below the trochanter (subtrochanteric fractures) and described the characteristic displacement of the proximal fragment. “The upper end of the bone is drawn forwards and upwards, so as to form nearly a right angle with the body of the thigh-bone, the cause of this is evidently the contraction of the iliacus internus and psoas muscle...”. Cooper became internationally known after the publication in 1822 of his monograph entitled *A treatise on dislocations and on fractures of the joints.* It has not proved possible to find a copy of the first edition. The second edition of 1823 contains virtually the same description of these fractures as in his *Surgical essays.* Apart from fine drawings of cadaver findings and bony specimens, the Appendix includes a letter from Colles to the author in which he refers to intracapsular fractures of the neck of the femur. Less well known is his monograph entitled *The principles and practice of surgery* which was published in 1837 and in which he added further descriptions of these fractures. Of interest is the description of an isolated avulsion of the greater trochanter in a 16-year-old girl and also the method of treatment of fractures of the femoral neck advocated by H. Earle which is described as “Mr Earle’s fracture bed”. Two years earlier, in 1835, R. W. Smith had published his paper on fractures of the neck of the femur.

In 1838 a 20-year old medical student Frederick Oldfield Ward (1818-1877) described the structure of the proximal femur in a paper which is often still cited. He worked for many years in the London sewerage system and returned to the study of bones only at the end of his life. This period culminated in the publication of Todd’s *Cyclopaedia* in 1836 to 1839. In the chapter entitled ‘Hip joint-abnormal condition’ Adams presents a detailed description of a number of developmental and acquired conditions and injuries of the hip including fractures of the proximal femur. This book is infrequently referred to in textbooks on the history of fractures. The only exception is a review by Lauge in 1948 in which Adams’s chapter on the ankle is mentioned.

Thus, during a period of 20 years, there appeared works...
describing fractures of the proximal femur which remain relevant today. In particular, the *Cyclopedia* contains very significant information. The contribution of the Dublin Surgical School to the understanding of these fractures deserves greater recognition than has been given hitherto.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References


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