



# Proximal Femur Fracture: Common Doubts on Frequently Used Terminologies

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Those of us who have somehow been involved in the study of fractures of the proximal femur, and especially fractures secondary to bone metabolism pathology, are full of doubts about elementary basic questions regarding the frequently used terminology in this type of bone injury and that forces us to ask ourselves many questions.

First, what about the hip? A frequent definition is “a joint formed by the head, the femur, and the acetabulum” [1], so we see with concern that until now, we have spoken of hip fractures [2] and not of proximal femur fractures, which, to our knowledge, include the trochanteric area and the femoral neck, as recommended by the AO/OTA [3].

Next, one sees routinely, in all orthopedic journals, articles referring to subtrochanteric fractures, and so far in the bibliographic review carried out, we have found only one anatomical description which indicates that the subtrochanteric area is the one that is up to 5 cm below the lower border of the lesser trochanter, a very interesting assertion, as we believe that this estimate differs significantly depending on the size of the individual [4, 5]. In a recent publication that addresses surgical treatment, the images presented correspond to intertrochanteric fractures with subtrochanteric extension [6] and to the Seinsheimer classification, widely used especially by Asians [7]. What we totally agree with the ASIF/OTA is that all fractures below the lesser trochanter are high diaphyseal [2].

Because the definition of the stability of trochanteric fractures is still controversial, it is the possible cause

of the complication of the choice of osteosynthesis [8], especially in the elderly; for that reason, continues to be a tremendous public health problem in terms of patient mortality, morbidity, and burden to the healthcare system. We agree that the definitions of unstable fractures vary but include those with a fractured lesser trochanter, reverse fracture line, or intertrochanteric comminution associated with a big posteromedial component, a broken greater trochanter, and lateral cortex breach [9].

Continuing with the doubts, we find that to date there are no agreements on the classification of fractures of the proximal femur, reliable and universally accepted, and this may stimulate the debate on the appropriate treatment options [10–14].

Any classification system used must aspire to have a high degree of reliability between observers and intra-observers that facilitates the communication of the patient's conditions, provides clear guidance for treatment, and allows interaction among physicians. The use of the same vocabulary enables them to guide planning, predict treatment results, and it is applicable to both clinical practice and research. In this way, the examination of the evaluation of the fracture by the same physician and different physicians must yield the same result each time (intraobserver and interobserver reliability). Despite the widespread use of these systems and the thousands of publications related to hip fracture, few studies have evaluated the reliability of the classification systems, and even fewer studies have investigated the reliability of experienced clinicians using the classification systems [15–17].

Due to what was previously reported, researchers interested in the subject of proximal femur fractures have not agreed on a single fracture classification system and in this sense, there are a variety of them, which is not the case to describe them and if to inform that all have been created with radiographs in two dimensions.

The AO/OTA classification describes the morphological characteristics of fractures in more detail, include more rare and complex types, provides more personalized subtype selection, and adapts to the clinical needs of both fractures and surgeries. But today many surgeons prefer the simplified AO/OTA classification because they consider that is more reliable than the AO/OTA classification with subgroups. In fact, the inter- and intra-observer reliability decreases when the classification becomes more complex. It does not mean that these classifications can be considered successful because their interobserver reliabilities are not high enough, and even surgeon experience did not improve them [18, 19].

With the use of radiological studies in two planes, there are differences in criteria regarding the AO/OTA classification because, for some, the best interobserver and interobserver compliance was found in the main groups, even among experienced surgeons [18] while, for others, it remains fraught with difficulties and seems difficult to apply with consistent precision [19].

Today, orthopedic surgeons must be aware of 3D-CT, based on the analysis of three-dimensional fragments, for a better classification of fractures of the proximal femur since it better evaluates fragmentation and instability and has better interobserver and interobserver reliability than conventional two-dimensional systems, even for AO/OTA classification [20]. The current version, revised in 2018, has provided acceptable reliability in the diagnosis of femoral trochanteric fractures; with the addition of 3D-CT, it will increase. If we do not have 3D tomography equipment in our hospital, the current AO/OTA classification of intertrochanteric fractures should be used in some way, using the three main types, because this allows a common language among treating physicians [18–20].

Nowadays, it must be said that it is necessary to have computed tomography with 3D reconstructions at the hospital emergency level because it helps to better preoperative classification of intertrochanteric fractures, especially in a selected group of fractures where stability and sidewall integrity, among other things, are difficult to assess [21].

To conclude, we must say that this represents some doubts that we have related to fractures of the proximal femur, and we hope to know the opinion and the due clarifications of some interested in the subject.

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