Lauge-Hansen Classification: Fact or Fiction?

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STATEMENT OF PURPOSE

This paper critically examines the Lauge-Hansen classification system and its original study. It assesses the system's accuracy and legitimacy as a teaching and surgical planning tool for ankle fractures, focusing on its predictive capabilities for injury patterns, soft tissue damage, reproducibility, and overall complications. The goal is to critically analyze the Lauge-Hansen classification and its utility in diagnosis and treatment planning through a narrative review of the current literature, as well as to identify a more reliable and precise method of classifying ankle fractures.

MATERIALS AND METHODS

A comprehensive literature search was conducted to gather articles that analyze the utility of the Lauge-Hansen classification system and the original Lauge Hansen studies. All articles in the English language were reviewed and a narrative summary performed.

RESULTS

The literature review reveals that the Lauge-Hansen classification does not accurately predict injury patterns or prognosis. This includes inability to predict corresponding soft tissue damage. Moreover, there is poor inter-observer reliability, and the classification system itself is overly complex, leading to lack of utilization and accurate surgical prediction.
Despite numerous attempts and advanced technology, reproducing the findings of the original Lauge-Hansen study has never been replicated.

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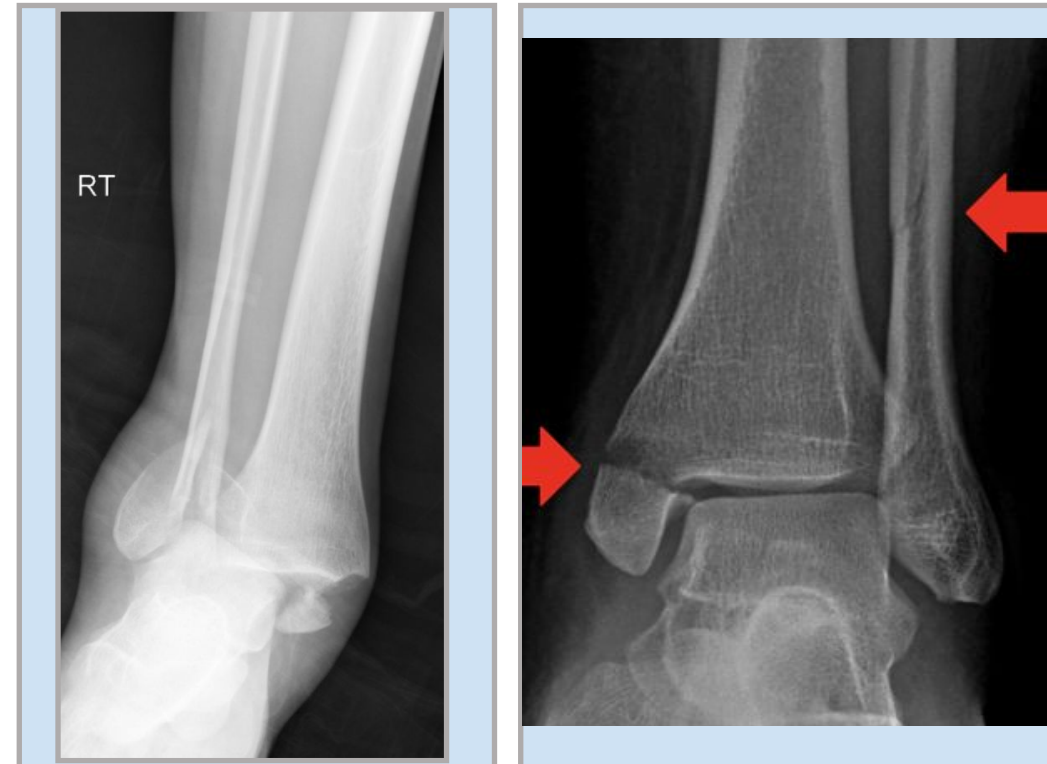
CASE EXAMPLES

Above (left): 36 year old male who tripped and fell, twisting his ankle.
Above (right): 27 year old female vet student who was kicked by an eland in the medial ankle.
There are several variants of ankle fractures that the Lauge-Hansen classification does not account for. Above (left) is a radiograph of a Bosworth type ankle fracture. This is when the proximal portion of the fibula fracture is locked behind the posterior tibial tubercle, usually rendering the fracture irreducible by closed means. The Lauge-Hansen classification cannot explain why this fracture pattern is irreducible.
On the above (right) radiograph is an ankle fracture caused by a direct force, that cannot be classified by Lauge-Hansen.

PROPOSED CLASSIFICATION SYSTEM

Force + Associated Fractures

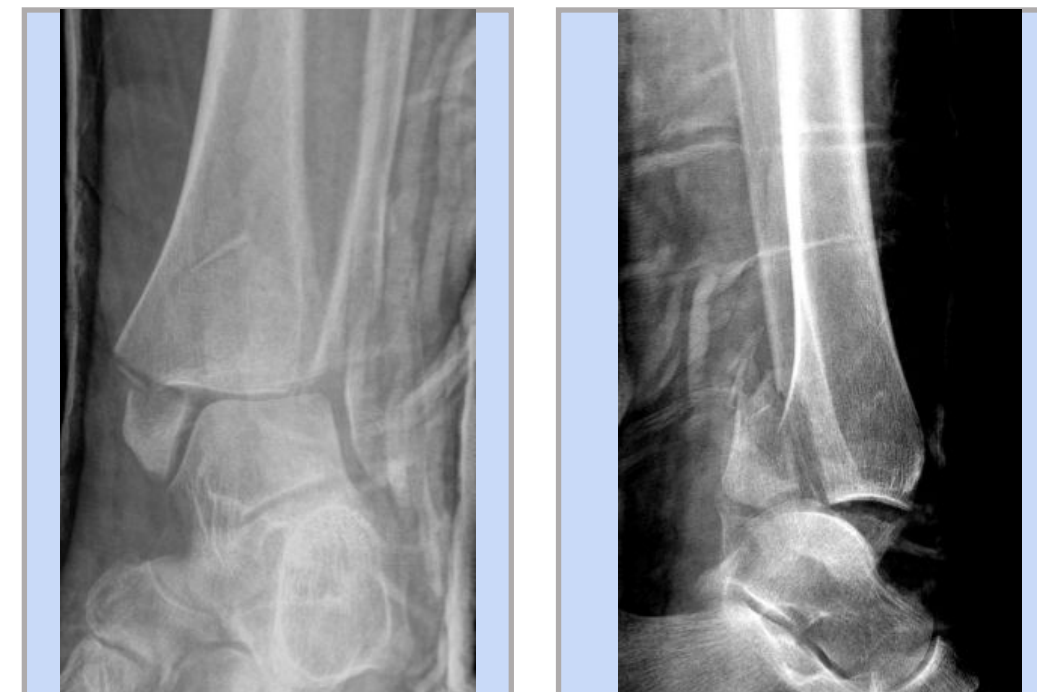Type I (mostly external force)
Type II (mostly abduction force)
Type III (supination force)
+
A = no other fractures
B = medial malleolar fractures
C = posterior malleolar fractures

CLASSIFICATION EXAMPLE

Using the proposed classification system, the above pictured fracture would be a 3BC. The supinator force sustained causing a spiral oblique fracture of the fibula gives the 3. The associated medial and posterior malleolar fractures give the B and C.

ANALYSIS & DISCUSSION

The literature has identified 5-10% of fractures are unclassified when using the Lauge-Hansen system. Going back to Lauge Hansens original work back in 1948,he utilized an open kinetic chain method which is not how most ankle fractures actually occur. His study was also a cadaveric study where he nailed the foot to a board and then rotated it by hand, not fully recreating how ankle fractures actually occur. Overall, demonstrating the poor methodology of the original study due to the lack of standardization, subjective hand rotation and positioning, confirmation bias and variable results. Nobody has been able to recreate the results of the Lauge Hansen study.[1,3,4,,16,17,19] Kwon et al attempted the same with 10 cadaveric legs and found that their findings did not correspond with the predictive pattern of Lauge Hansen.[11]

CONCLUSION

The Lauge-Hansen classification system's complexity contributes to its poor inter-observer reliability among medical professionals. The inability to replicate the original study's results highlights inherent flaws in its design, rendering it unsuitable for predicting injury patterns and soft tissue damage or for effective surgical planning. A more promising approach may involve developing a classification based on force and associated fractures.

REFERENCES

References: Scan me!