

# POULAINES

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## Introduction

The wheel of fashion inexorably turns. The Romans reserved certain colours of sandals for high ranking officials whilst sumptuary laws enacted, for example by Henry VIII, determined who and who not could wear specific styles or width of footwear. Latterly, styles have been determined by certain designers and popularised by persons in the public eye such as film stars, popular musicians etc. Although it has been historically recognised that footwear is the main culprit in cases of hallux abducto-valgus, because of the variation in styles, (Horwood and Chocklingam 2023) it has until recently, been impossible to carry out a longitudinal study of the effects of different footwear styles with a true comparator. It should be noted that other authors attribute the condition primarily to abnormal foot mechanics (Lawton 1992). Fortunately, the study by the Dept. of Archaeology, Cambridge University quoted above offers the opportunity for an assessment of the potential aetiology of the condition of hallux abducto-valgus related to pointed toed shoes. Long toed shoes became popular in the thirteenth century after oriental styles following the Crusades (Brooke 1948) however, the style became elongated, supposedly to match the liripipe hoods. It is notable that the new styles were limited to the rich including churchmen. Chaucer in his 'Canterbury Tales' mocks such pretensions in his description of the Monk:



***"He was a fat and personable priest;  
His prominent eyeballs never seemed to settle,  
They glittered like flames beneath a kettle;  
Supple his boots; his horse in fine condition.  
He was a prelate fit for exhibition."*** (Coghill 2003)

The pointed or 'piked' shoe eventually became so long that a law was passed in 1420CE banning any person whose annual income did not exceed £40.00 from wearing such footwear. The length increased such that they were often chained at the knee and bells attached. The nursery rhyme:

***"Ride a cock horse to Banbury Cross  
To see a fine lady ride on a white horse,  
With rings on her fingers and bells on her toes,  
She shall have music wherever she goes"***

Refers to the fashion (Brooke 1948)

The style was applied to sabatons or foot armour and at the 1386 Battle of Sempach, it became necessary for the knights of Leopold III, Duke of Austria, to quickly dismount and fight on foot. Because they had not prepared for this, many were obliged to cut off the tips of their sabatons on the field to continue, nevertheless, the unarmoured Swiss won the day (Wikipedia 2024). It is not unlikely that a similar situation occurred at the Battle of Agincourt in 1415 when the French chivalry were compelled to fight on foot and were routed by lightly armoured English archers. (Thompson 1966)

## Discussion

The foot has essentially two functions; to convert the rotational forces of the hip and knee and act as a mobile shock absorber (pronation) and then to change to a rigid lever to push the body from the ground at 'toe off' (supination). The complex actions of the foot included adapting to irregular supporting surfaces and compensating for proximal variations such as internal and external hip positions, genu valgus and varum and internal tibial torsion. If for any reason, pronation continues when supination should occur, or supination continues when pronation should occur repetitively then there is a pathological outcome. Both these functions act in the three body planes: sagittal (or longitudinal), Transverse (or horizontal) and frontal (or coronal). It follows that if the foot, or a portion of a foot – the hallux in this case – is forced into an unnatural position, normal gait will be impeded.

It would seem that the outcome of forcing the hallux into an unnaturally abducted position is to cause 'bowstringing' of the T.Extensor Hallucis Longus and Flexor Hallucis Longus. The action of these muscles changes from extension and flexion to abduction, thus decreasing the windlass effect and prolonging subtalar joint pronation. The 1st metatarsal is then pushed medially and T. Flexor Hallucis Brevis carries the sub 1st metatarsal sesamoids medially (in respect of the 1st metatarsal) resulting in the lateral sesamoid jamming the 1st metatarsal yet further medially, whilst the medial sesamoid is jammed against the crista of the plantar surface of the metatarsal head where it frequently becomes bi-partite, eventually developing osteo-arthritic changes. Both the transverse and oblique heads of M.Adductor Hallucis together with M.Flexor Hallucis Brevis, in the meantime, rotate the proximal phalanx of the hallux into a valgus position.



Structure following function, the excess subtalar joint pronation results in Davis's Law dictating that as the structure and alignment of fascia, tendons, ligaments, and other soft tissues will adapt over time to the physical demands placed upon them, the medial collateral ligaments and capsule around the 1st metatarsophalangeal joint will stretch and the lateral collateral ligament and capsule contract resulting in established hallux abducto-valgus. (Gerbert et al 1973) It is not uncommon for a chronic bursitis to occur on the medial aspect of the metatarsal head, due to irritation from the footwear. Wolff's Law states that bone will conform to the stresses placed upon it. It is therefore unsurprising that the examples in Lewsey's report show lateral deviation of the articular surface of the 1st metatarsal and thickening of the bone, whilst without exception bone cysts were noted on the enlarged medial aspect of the metatarsal head.

## Summary

The above notes are offered as a brief, possible explanation for the aetiology of hallux-abducto-valgus in the specimens studied. It is well known that unshod peoples can also develop the condition but Lewsey's report is important in that it compares a population suffering from the deformity with one that does not although the numbers are insufficient to draw irrefutable conclusions (Holland 2024). The question may be asked why did only some of the subjects exhibit the abnormality? Without further study it is not possible to offer a positive answer. However, it may be that those who did demonstrate the condition were affected by such underlying factors as proximal variations, obliquity of the 1st metatarso-cuneiform joint and genetic factors such as naturally wide and splay feet predisposing to the pathology, metadductus or a short 1st metatarsal, whilst those who did not presented with pes cavus, narrow feet, stable square metatarsal heads resisting pressure, or adducted gait patterns.

It is entirely speculative to offer a reason for the footwear style lasting for almost two centuries but the evidence that poulaines were reserved for the high ranking and rich suggests that the abducted gait secondary to the style may have led to slow, stately gait with a natural sway. This would be accentuated by the robes worn by nobles and accord with the wide use of poulaines by churchmen of the 13th and 14th CE.



*Square, congruous stable metatarsal head*



*Metadductus*



*Short 1st metatarsal head*

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