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MORPHOLOGICAL STUDY

A preliminary survey of the median artery in human cadavers of South Indian origin

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Abstract: *Background:* The median artery is a transitory vessel that represents the arterial axis of the forearm during early embryonic life. It normally regresses in the second embryonic month. Its persistence in the human adult has been recorded in 2 different patterns: as a large, long vessel (palmar type) which reaches the hand; or as a small and short vessel (antebrachial type) which ends before reaching the wrist joint. The palmar type is of major clinical significance.
Objective: This study was undertaken to investigate the incidence and course of the palmar type of the median artery in South Indian cadavers.
Material and methods: 25 upper limbs of South Indian cadavers were taken to study the median artery.
Results: The occurrence of median artery was 8 %; of which 4 % was on the right side and the other 4 % was on the left side. On both sides, the artery originated from the ulnar artery. On the right side, the artery was involved in the formation of superficial palmar arch, whereas the artery on the left side did not join the arch; it terminated as 1st and 2nd common palmar digital arteries.
Conclusion: Persistent median artery is closely related to the anterior interosseous nerve, it is possible that the artery may compress the anterior interosseous nerve and cause the anterior interosseous nerve syndrome *(Fig. 2, Ref. 17).* Full Text in free PDF *www.bmj.sk.*
Key words: persistent median artery, superficial palmar arch, transitory vessel.

Arterial variations in the upper limb have been the subject of much controversy since Von Haller mentioned their existence for the first time in the eighteenth century (1). The median artery represents a persistent part of the embryonic arterial axis of the upper extremity (2). The artery normally presents a short course (antebrachial type) and less commonly appears as a long slender vessel reaching the palm (palmar type) (3). The incidence and pattern of this artery seem to depend on race; hence, the ranges given for its occurrence are extensive (4, 5). The antebrachial type is a short artery arising from the anterior interosseous artery with a higher incidence, ranging from 70–100 % (3). The incidence of the palmar type has been reported as ranging from 11–23 % (4, 5). The presence of a palmar type of median artery may result in numerous complications such as pronator teres syndrome, compression of the median nerve in the carpal tunnel and compression of the anterior interosseous nerve. There are very few studies, which investigated the incidence, origin and fate of the palmar type of median artery.

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Materials and methods

In this study, 25 upper limbs from embalmed cadavers were dissected to document the presence of the median artery. In the forearm, the median artery was carefully dissected from its origin to its termination. The artery and its branches were traced, cleaned and photographed. The presence of the palmar median artery was recorded separately for each side.

Results

Dissection of the upper limbs revealed the incidence of palmar type of median artery in 2 limbs (8 %). Of these, one (4 %) was on the right side and the other (4 %) was on the left side. In both instances, the median arteries arose from the ulnar arteries and pierced the median nerve from posterior to anterior (Figs 1, 1a, 2, 2a). On the right side (case 1) the median artery was posterior to the median nerve in the upper part, lateral in the middle and anterior to the nerve at the wrist and carpal tunnel (Fig. 1a). In the upper third of left forearm (case 2), the median artery passed in front of anterior interosseous nerve and lateral to the median nerve throughout the forearm and anterior at the wrist (Fig. 2). The median artery in case one ended in the hand by joining with the superficial palmar arch (Fig. 1b). But in second

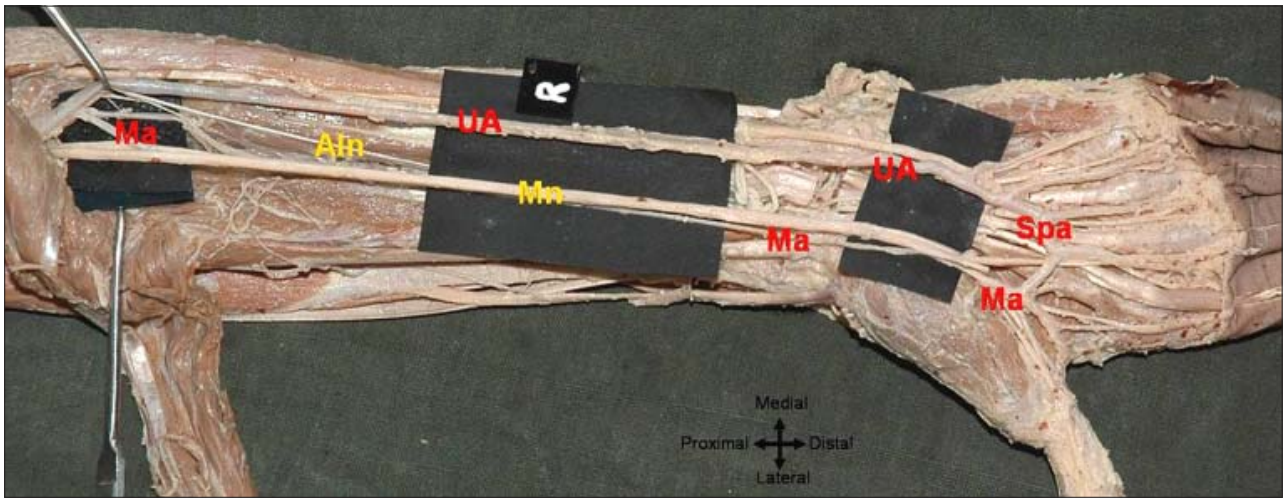
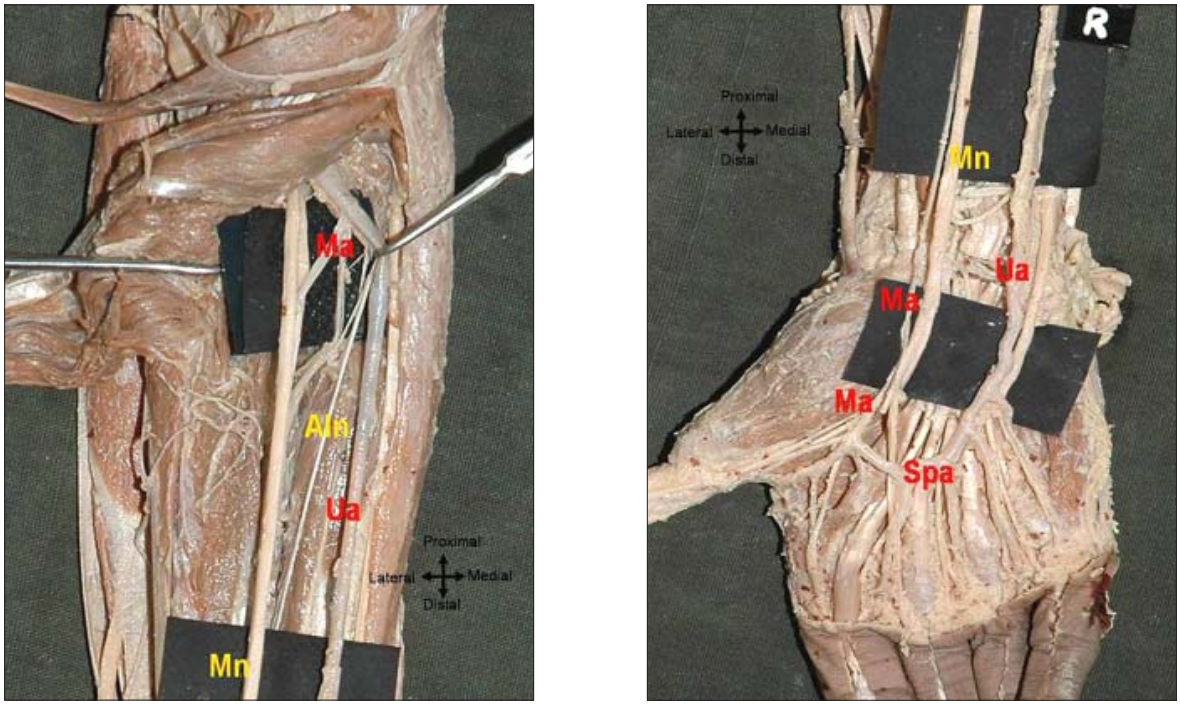


Fig. 1. Showing the origin of the median artery from the ulnar artery and it's termination by forming the superficial palmar arch. Ma – median artery; Mn – median nerve; Ua – ulnar artery; In – interosseous nerve; Spa – superficial palmar arch.



Figs 1a, 1b. Showing the origin of the median artery from the ulnar artery (1a) and piercing the median nerve. The photograph (1b) also shows the termination of the median artery in the palm.
Ma – median artery; Mn – median nerve; Ua – ulnar artery; In – interosseous nerve; Spa – superficial palmar arch.

case it did not join the arch; it terminated as the 1st and 2nd common digital arteries (Fig. 2b). The artery in both cases gave muscular branches to pronator teres, flexor digitorum superficialis and the second lumbrical muscle, as well as to the median nerve.

Discussion

The origin of the median artery has previously been described as arising from the ulnar, anterior interosseous, common interosseous, the caudal angle between the ulnar and common interosseous, and from the radial arteries (6–8). The median artery with a palmar pattern, in relation to sex and side, has been previously recorded (9–11). However, the artery has been more frequently described as bilateral than unilateral (9, 11), or without differences between sides (10). The incidence of palmar type of median artery (8 %) as reported by us is not close to the incidence of 11–23 % reported by other authors in Indian population (4, 8). The differences in the incidence of the artery in different

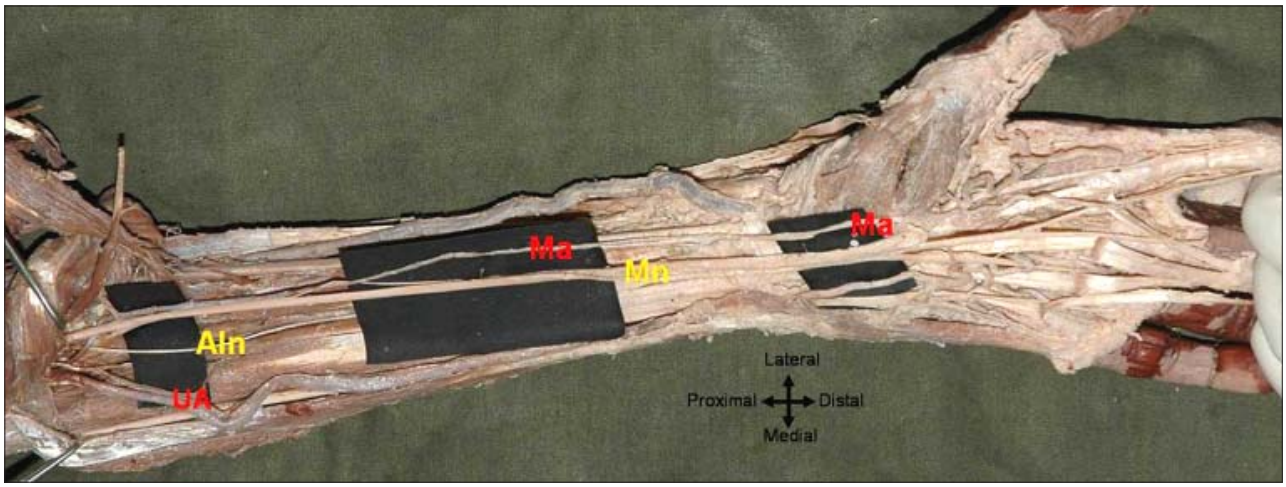
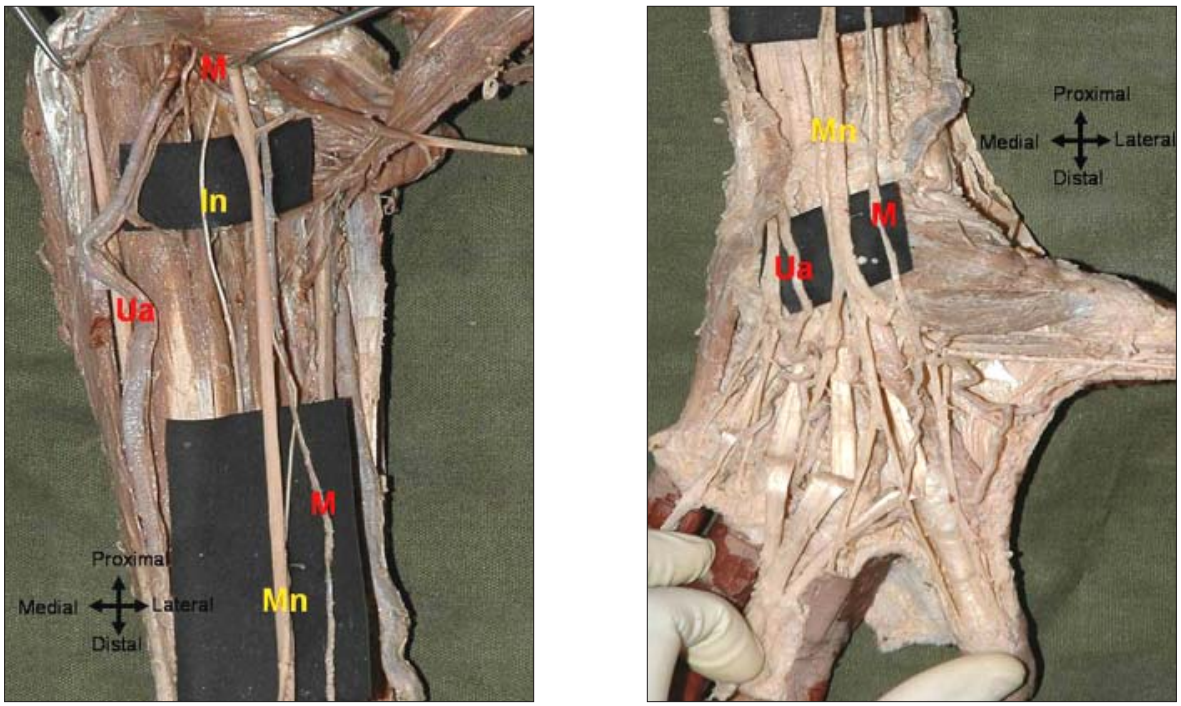


Fig. 2. Showing the origin of the median artery from the ulnar artery and it's branching pattern in the palm. Ma – median artery; Mn – median nerve; Ua – ulnar artery; AIn – anterior interosseous nerve.



Figs 2a, 2b. Showing the origin of median artery from the ulnar artery and it's close association with anterior interosseous nerve (2a). The photograph (2b) also shows the termination of the median artery by giving 1st and 2nd common palmar digital arteries.

races may be the result of the allelic variation of genes regulating this anatomical anomaly (5).

The palmar types of median arteries appear to be a predisposing factor in carpal tunnel syndrome (12) and in pronator teres syndrome (13). An enlarged, thrombosed, or calcified persistent median artery (PMA) and a PMA aneurysm in the carpal tunnel were considered causes for Carpal tunnel syndrome (CTS) in studies by Eversmann (14) and Barfred et al (15) as well as in several case reports in the surgical literature (16, 17). Another clinical condition of the forearm is the anterior interosseous nerve syndrome which has so far not been reported in association with the persistence of a median artery in many studies. Nevertheless, this possibility should be taken into account as the median artery, soon after its origin, was intimately related with the nerve. Because the artery is closely related to the anterior interosseous nerve, it is possible that the artery may compress the anterior interosseous nerve and cause the anterior interosseous nerve syndrome.

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