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VARIATION OF SUPERFICIAL PALMAR ARCH: A CASE REPORT

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ABSTRACT
The hand in the humans is abundantly supplied by the blood by two anastomotic arches, there are superficial and deep palmar arch. The knowledge of variations in the arterial supply of hand has reached the practical importance. Superficial palmar arch is an arterial arcade and a dominant vascular structure in the palm. These two arcades are formed by the anastomosis between two main arteries of forearm ie. radial and ulnar artery and their branches. Superficial palmar arch is defined as the anastomosis between superficial branch of ulnar artery and superficial palmar branch of radial artery with the ulnar artery as the main feeding vessel. Superficial palmar branch shows variation in formation at the radial side. In this study we have recorded the variation which would help in clinical and surgical implications.

KEYWORDS: *Superficial palmar arch, Ulnar artery, Radial artery, Anastomosis*

INTRODUCTION
Arterial arch of palm is formed by the terminal parts of ulnar and radial arteries on reaching the palm, anastomose with each other to form superficial and deep palmar arch.

Superficial Palmar Arch(SPA) is a dominant vascular structure of the palm and is located deep to the palmar aponeurosis. It ensures the suitable blood supply to the entire region of hand, thus it maintains the integrity of the tissue.

The ulnar artery accompanied by ulnar nerve on its medial side, enters the palm superficial to the flexor retinaculum and on the radial side of the pisiform bone. Beneath the Palmaris brevis the artery divides into superficial and deep branches. The superficial branch is the direct continuation of the ulnar artery and forms the main contribution of the palmar arch[1].

AIMS AND OBJECTIVES
To review the anatomy of Superficial Palmar Arch.
To study the variation in formation of Superficial Palmar Arch.

MATERIALS AND METHODS
A female adult human cadaver hand was dissected in the Department of Rachana Shareera, Sri Dharmasthala Manjunatheshwara college of Ayurveda and Hospital, Hassan in the regular practical classes of Academic curriculum.

At the wrist joint, a horizontal incision was made. Another incision was made vertically from the centre of horizontal incision all the way up to the third metacarpo phalangeal joint. Along the root of the fingers, a horizontal incision was done and the skin flaps were reflected laterally. Then palmar aponeurosis was visible. After removal of the palmar aponeurosis, the superficial palmar arch and its branches and digital branches of the median and ulnar nerves of palm were visible. By dissecting the surrounding adipose tissue, the arch and its branches were made evident. Arteries were colored with red acrylic paint mixed with quick fix and amyl acetate. Nerves and its branches were colored yellow.

CASE REPORT
A 92 year old female cadaver was procured by Body Donation Cell of Department of Rachana Shareera, Sri Dharmasthala Manjunatheshwara college of Ayurveda and Hospital, Hassan on 12-10-2021, which was taken for regular practical classes of Academic curriculum. While dissection of hand it was found that there was Variation in the Palmar Arches. The Variation was noted and separated from the surrounding structures, painted, photographs were taken and documented.

SUPERFICIAL PALMAR ARCH[2]
Superficial Palmar Arch is an arterial arcade which lies beneath the palmar aponeurosis and in front of long flexor tendons, lumbrical muscles and palmar digital branches of median nerve. The arch is formed by the superficial terminal branch of the ulnar

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artery and completed on the lateral side by one of the following arteries.

1. Superficial palmar branch of radial artery;
2. Arteria princeps pollicis;
3. Arteria radialis indicis; or
4. Arteria nervi mediana which accompanies the median nerve.

The convexity of the arch is directed distally on a level with the distal border of outstretched thumb.

Branches

Four Palmar Digital Arteries arise from the convexity of the arch. The most medial digital branch passes along the ulnar side of the little finger. The remaining three branches from the **common palmar digital arteries** which proceed distally to the web between the fingers, where each joins with the palmar metacarpal artery of the deep palmar arch and then divides into **two proper palmar digital arteries** to supply the adjacent fingers.

Therefore, the superficial palmar arch does not supply the radial side of index finger and both sides of index finger and both sides of the thumb.

DISCUSSION

In the description of the branches of superficial palmar arch, there are four palmar digital arteries. During the dissection, the first branch was found is the medial digital branch which passes along the ulnar side of little finger. The second common palmar digital artery passes distally to the web between the little and ring fingers and then divides into two proper digital arteries to supply the adjacent fingers. The third common palmar digital artery passes distally to the web between ring finger and middle finger and then it divides into two proper digital arteries to supply adjacent fingers. The fourth common palmar digital artery, that which has to pass distally to the web between the middle finger and index finger and should divide into two proper digital arteries to supply adjacent fingers but it showed variation when it proceeds distally, it passes to the radial side of index finger and there is no division of two proper palmar digital arteries to supply the adjacent fingers.

To see for the branches which supply the web between index finger and middle finger, further dissection has been done to look for the deeper structure. The branches of the radial artery were noted and it showed a variation. In the interval between the first dorsal interosseous and adductor muscle, the radial artery gives off two branches-Arteria Princeps Pollicis and Arteria Radialis Indicis. The Arteria Princeps Pollicis further divides into two Palmar Digital branches to supply the two sides of the thumb. Arteria Radialis Indicis supplies the radial side of the index finger. But here the variation found was, the Radial Artery gives off a single branch, which again divides into two branches. In that the medial branch supplies the radial side of the index finger and lateral branch divides into two Palmar Digital branches to supply the two sides of the thumb. Further dissection was continued to look for other branches, among those Second metacarpal artery was supplying web between index finger and middle finger.

After the complete dissection it was found that the radial side of the index finger was supplied superficially by a branch of the Superficial Palmar Arch and Deep branch of the Radial Artery. There was no supply for the web between the middle and index finger by Superficial Palmar Arch but it was supplied by a branch of Deep Palmar Arch.

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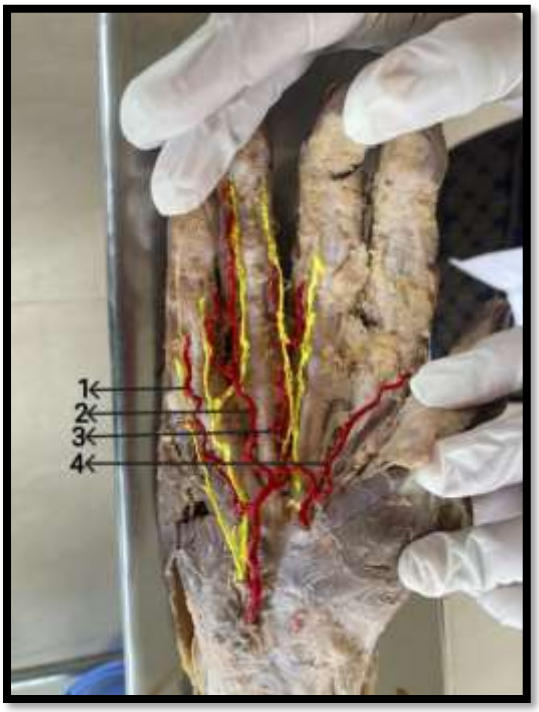

Figure 1-SPA showing variation

1. First branch of SPA
2. Second branch of SPA
3. Third branch of SPA
4. Fourth branch which shows variation and supplies radial side of index finger

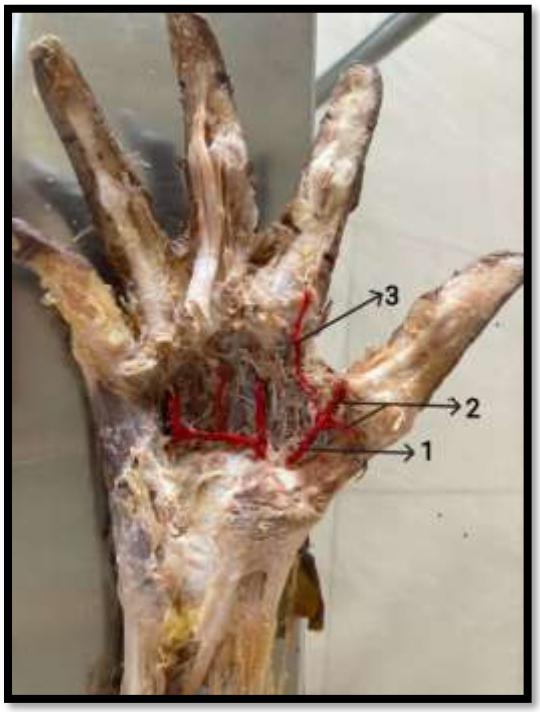

Figure 2 - Radial artery showing variation

1. Single branch of Radial Artery
2. Lateral branch of Radial artery which divides into two Palmar Digital branches to supply the two sides of the thumb
3. Medial Branch of Radial artery which supplies the radial side of the index finger

CONCLUSION

Clinicians should be aware of these variations while performing hand surgeries such as vascular graft applications, arterial repairs and few/pedicle flaps, as SPA is usually involved in these procedures and most traumatic occurrences involving the hand. The Ulnar artery may be at risk for injury in cases with Ulnar skin flaps. The ineffective use of hand and finger movements might be caused by disruption of an entire blood supply. The major vascular structure of the palm is the SPA. For surgeons working on reconstructive hand procedures and the restoration of functional anatomy of the hand, understanding the variation in its pattern is crucial. In order for the clinicians to be aware of these anomalies and thereby treat the patients, it is critical that substantial anatomical deviations be reported on regular basis.

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