

Original Article

Anatomical variation of the *Dorsalis pedis* artery in a South African population – A Cadaveric StudyS. Ntuli^{a,*}, S. Nalla^b, A. Kiter^a^a Department of Podiatry, Faculty of Health Sciences, University of Johannesburg, P.O. Box 524, Auckland Park 2006, South Africa^b Department of Human Anatomy and Physiology, Faculty of Health Sciences, University of Johannesburg, P.O. Box 524, Auckland Park 2006, South Africa

ARTICLE INFO

Keywords:

Dorsalis pedis variations

Vascular pattern

South African population

Clinical significance of arterial variations

ABSTRACT

Background: The *dorsalis pedis* artery is responsible for blood supply to the dorsal aspect of the foot and is vital in the clinical assessment of the arterial supply thereof. Clinical assessment should consider anatomical variations of *dorsalis pedis* artery. Clearly, a thorough understanding of the potential variations of the vasculature in the area is important for a precise clinical assessment of arterial supply to the foot. The aim of this study was to investigate the different branching patterns of the *dorsalis pedis* artery that exist in a South African population.

Methods: A Cadaveric study in which a total of 33 dissected lower limbs (27 adult cadavers and 6 partial wet lower limb specimens) of a South African population sample were studied. The course and branching pattern of the *dorsalis pedis* artery were photographed and documented.

Results: Nine variations of the *dorsalis pedis* artery were recorded, with the standard branching pattern being the most common with an incidence of 36.36% and a completely absent *dorsalis pedis* artery variation was noted in 6.06% of the sample.

Conclusion: Nine variations of the arterial anatomy of the *dorsalis pedis* artery were identified in this current study. Each of these may possibly alter the location or strength of the *dorsalis pedis* pulse affecting clinical assessment outcomes. Knowledge of *dorsalis pedis* variations may be useful to clinicians when making clinical decisions.

1. Introduction

The *dorsalis pedis* artery (DPA) (*arteria dorsalis pedis*), is an artery that carries blood to the dorsum of the foot. It arises at the anterior aspect of the ankle joint and is a continuation of the anterior tibial artery. It terminates at the proximal part of the first intermetatarsal space, where it divides into two branches, the first dorsal metatarsal artery and the deep plantar artery [1,2].

In clinical practice, the *dorsalis pedis* artery is clinically invaluable in the assessment of blood circulation to the foot [3]. During clinical training the importance of this artery is emphasised, for example, the absence of the DPA pulsation in a child can lead to contracture and retard the trophic growth of foot [4] and in a diabetic patient may be indicative of an at-risk foot [3]. Therefore, correct assessment of blood supply to the foot is essential, as inaccurate findings have the potential to become limb threatening conditions, such as necrosis and gangrene [3].

In order to ensure an accurate clinical assessment takes place, clinicians should have a thorough understanding of the foot anatomy

including the vascular anatomy of the foot, and variations thereof. This will enable clinicians, to differentiate anatomical variations from clinical conditions such as *dorsalis pedis* aneurysm, deep vein thrombosis and peripheral arterial diseases [4,5]. Many anatomical reference books provide a standardised anatomical location of the arteries of the foot, however, it is important to recognise that there are variations of anatomy, which are crucial to consider during a clinical assessment [2,6,7]. Therefore, a full understanding of the vascular supply of the foot taking into consideration anatomical variations is needed. In our context with a particular emphasis on the South African demographics, such variations must include population background.

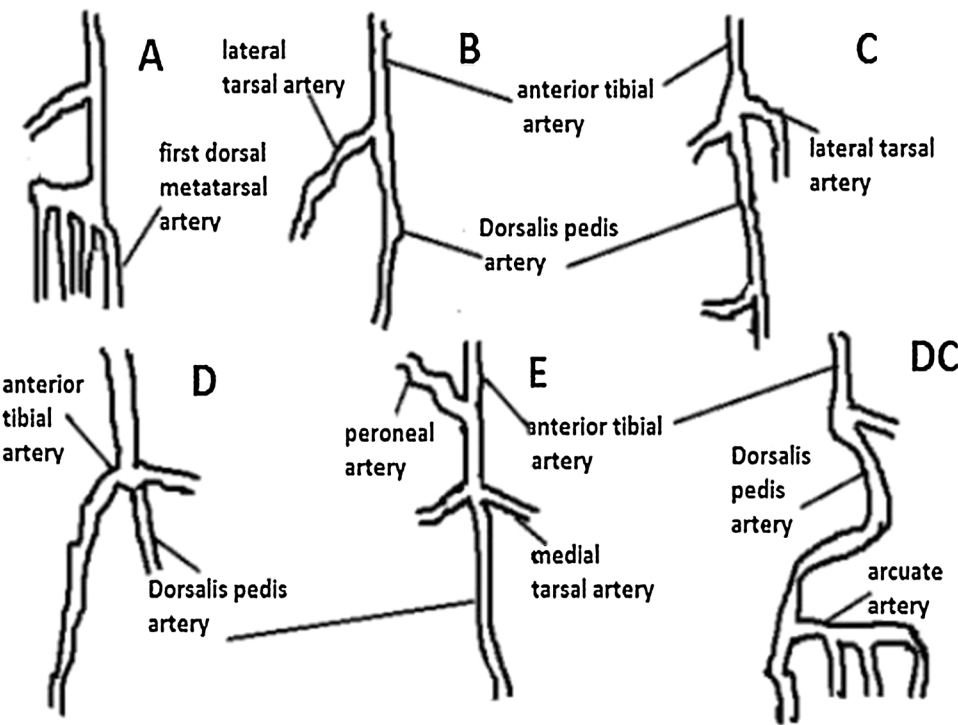
A number of studies have previously examined and confirmed the anatomical variations in the *dorsalis pedis* artery [5,7,8–10] and only one, which investigated the size and branching pattern of the DPA [11] in a South African population.

A recent study by Kulkarni and Ramesh classified branching differences of the *dorsalis pedis* artery into five types, each representative of a particular branching pattern of the artery [8]. They collected data from 33 partial limbs, all of which were from Indian population. They

Abbreviations: DPA, *dorsalis pedis* artery; UJ, University of Johannesburg; SA, South Africa

* Corresponding author.

E-mail address: sntuli@uj.ac.za (S. Ntuli).



with its branch lateral tarsal artery is clinically not palpable.
Type DC—*dorsalis pedis* artery exhibits lateral deviation.

Fig. 1. Types of variations of *dorsalis pedis* artery (with permission Kulkarni and Ramesh [8]).

Suggested key to Types or patterns *dorsalis pedis* artery variations as suggested by Kulkarni and Ramesh is presented below:

Key to Types (Kulkarni and Ramesh [8]):

Type A—usual pattern of arterial tree of the dorsum of the foot. *Dorsalis pedis* artery along its course divided into lateral and medial tarsal artery, first dorsal metatarsal artery and arcuate artery.

Type B—anterior tibial artery divides into a larger lateral tarsal artery and a smaller *dorsalis pedis* artery.

Type C—*dorsalis pedis* artery is absent as an independent vessel and becomes merely a loop in the dorsum arterial pattern.

Type D—reduction of the anterior tibial artery and its branches and increasing participation of arteries of sole in the supply of dorsum. *Dorsalis pedis* artery is not recognizable even as a loop and anterior tibial artery continue downwards as a central channel with reduced size. Pulses not clinically palpable.

Type E—increasing presence of anterior peroneal branch from the posterior tibial artery. Plantar tibial vessels still take a prominent part in arterial supply. *Dorsalis pedis* artery along

Dorsalis Pedis Variations

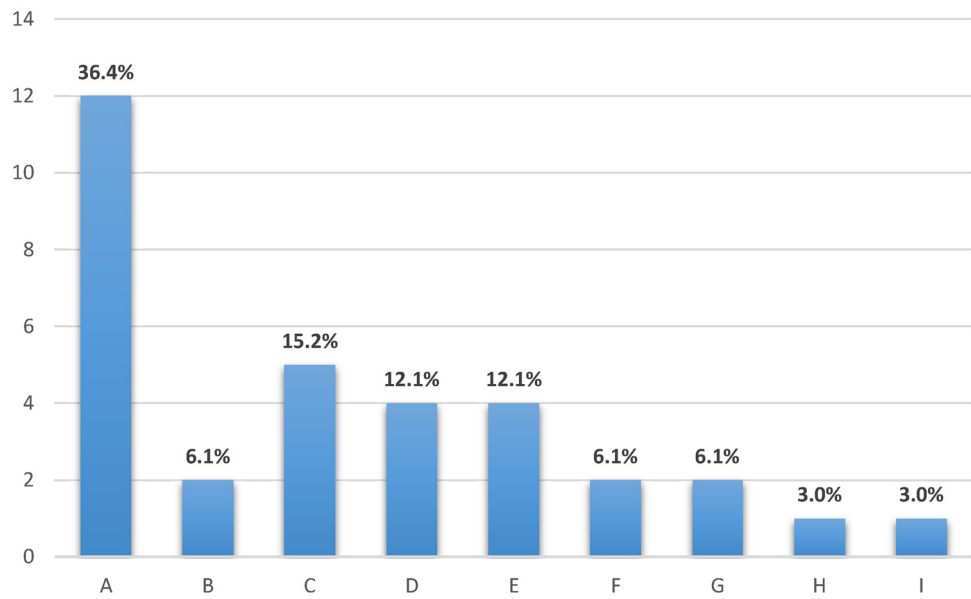


Fig. 2. *Dorsalis pedis* patterns. (For the definitions of A to I, refer to Table 2 and Figs. 3.1–3.9).

subsequently classified variations into five types and their incidence noted. In addition to these classification types, Kulkarni and Ramesh found that only two of the partial specimens demonstrated a laterally deviated *dorsalis pedis* artery, and as such, no classification was assigned to this variation [8]. The standardised pattern of vascularisation was an uncommon finding in their study, with only 15.2% of specimens

demonstrating this pattern (Fig. 1) [8].

Rajeshwari et al. on a sample of 42 Indian population specimens found the classic vascularisation pattern in 54.76% of the specimens and they described six types of variations of the *dorsalis pedis* artery and its branches [12]. Their results were similar to a study conducted by Vijayalakshmi et al., which also established six types of variation in the

Download English Version:

<https://daneshyari.com/en/article/8602199>

Download Persian Version:

<https://daneshyari.com/article/8602199>

[Daneshyari.com](https://daneshyari.com)