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ORIGINAL ARTICLE

# The venous patterns of the cubital fossa in subjects from Brazil

## *Les variations du réseau veineux de la fosse cubitale chez des sujets Brésiliens*

L. Pires<sup>a,b,\*</sup>, A.L. Ráfare<sup>b</sup>, B.U. Peixoto<sup>a,b</sup>, T.O.J.S. Pereira<sup>b</sup>,  
D.M.M. Pinheiro<sup>b</sup>, M.E.B. Siqueira<sup>b</sup>, R.D. Vaqueiro<sup>b</sup>,  
R.C. de Paula<sup>b</sup>, M.A. Babinski<sup>a,b</sup>, C.A.A. Chagas<sup>b</sup>

<sup>a</sup> Medical Sciences Post Graduation Program, Fluminense Federal University, Niterói, Rio de Janeiro, Brazil

<sup>b</sup> Department of Morphology, Biomedical Center, Fluminense Federal University, Rua Professor Ernani Mello, 101, São Domingos, 24210-150 Niterói, Rio de Janeiro, Brazil

### KEYWORDS

Superficial veins;  
Cubital fossa;  
Venipuncture;  
Anatomy

**Summary** Venous punctures are among the most common procedures performed by healthcare professionals. In particular, the cubital fossa is the site where the venous accesses are frequently made due to the number of superficial veins and the numerous anastomoses in this region. The arrangement of these venous connections is of particular interest for clinical application in several areas, thus, the healthcare professional must possess knowledge about these vessels and their anatomical relationships. The present study aims to analyze the venous pattern of the cubital fossa among individuals from Brazil. This study was approved by a Research Ethics Committee. The sample had 100 healthy individuals (50 men and 50 women). The superficial veins of the cubital fossa were analyzed with the aid of a sphygmomanometer. When inflated, the pressure in the forearm increased and the veins became prominent. It was observed that in the selected sample the types with the highest prevalence were the Type I and Type VII, both with 22% in 200 limbs studied. The chi<sup>2</sup> test showed a significant statistical difference between the anastomosis pattern and the sex of the studied sample. The anastomotic pattern of the superficial veins of the studies sample is similar to African, European and Asian populations. The study of these variations is necessary to provide scientific basis for the healthcare professional during a venipuncture in order to avoid iatrogenic errors and damages in cutaneous nerves or neighboring arteries.

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\* Corresponding author. Department of Morphology, Biomedical Center, Fluminense Federal University, Rua Professor Ernani Mello, 101, São Domingos, 24210-150 Niterói, Rio de Janeiro, Brazil.

E-mail address: [lucaspirez@id.uff.br](mailto:lucaspirez@id.uff.br) (L. Pires).

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## MOTS CLÉS

Veines superficielles ;  
Fosse cubitale ;  
Ponction veineuse ;  
Anatomie

**Résumé** Les ponctions veineuses sont un des gestes les plus courants effectué par les professionnels de santé. La fosse cubitale est le site où les accès veineux sont fréquemment réalisés en raison du nombre de veines superficielles et des nombreuses anastomoses dans cette région. La disposition de ces connexions veineuses est d'un intérêt particulier en clinique dans plusieurs domaines, ainsi, le professionnel de santé doit posséder des connaissances sur ces vaisseaux et leurs relations anatomiques. La présente étude vise à analyser les variations du réseau de la fosse cubitale chez des sujets Brésiliens. Cette étude a été approuvée par un comité d'éthique de la recherche. L'échantillon comptait 100 sujets en bonne santé (50 hommes et 50 femmes). Les veines superficielles de la fosse cubitale ont été analysées à l'aide d'un sphygmomanomètre. Une fois gonflée, la pression dans l'avant-bras augmente et les veines deviennent proéminentes. Il a été observé que dans l'échantillon sélectionné, les types ayant la prévalence la plus élevée étaient le type I et le type VII, tous deux avec 22 % dans 200 membres étudiés. Le test du Khi<sup>2</sup> a montré une différence statistique significative entre le profil de l'anastomose et le sexe de l'échantillon étudié. Le profil anastomotique des veines superficielles de l'échantillon étudié est similaire à celui des populations africaines, européennes et asiatiques. L'étude de ces variations est nécessaire pour fournir une base scientifique au professionnel de santé lors d'une ponction veineuse afin d'éviter les erreurs iatrogènes et les lésions des nerfs cutanés ou des artères voisines.

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## Introduction

The cubital fossa is commonly chosen as the election site to perform venipunctures due to the disposition and arrangement of the superficial veins in this particular region [1].

Venipunctures are among the most performed procedures by healthcare professionals. Despite being technically simple, venipuncture is an invasive and painful procedure [2–4]. Multiple tries of venipuncture often lead to severe pain, crying, discomfort and irritation, especially in pediatric patients. Thus, knowledge of the venous arrangements and knowledge regarding the anatomy of the cubital fossa may contribute to minimizing puncture errors [3,5].

Several studies have observed that the venous connections in the cubital fossa possess numerous patterns. Some of these patterns are similar to the letters M and V, and it has been shown that the venous arrangement possess disparities among different populations [1,4,6–10]. However, there are no studies of this matter in a sample from Brazil.

Thus, the research presented herein aimed to perform an analysis of the venous patterns among healthy individuals from Brazil and to discuss its clinical aspects.

## Material and methods

This study was approved by the Research Ethic Committee of the Fluminense Federal University (51980015.6.0000.5243). Furthermore, this work complied with the Declaration of Helsinki of 2008 [11].

## Sample and procedures

The sample was chosen randomly. One hundred healthy individuals (50 men and 50 women) were evaluated. There was no restriction of age without any previously known disease.

After signing the consent form, the subjects had their upper limb pressured with the aid of a sphygmomanometer.

When the veins became prominent, the pattern of the superficial veins anastomosis was assessed in both arms and catalogued afterwards.

## Venous patterns classification

According to a meta-analysis performed by Yammine and Eric [10], there are eight types of patterns (1–8). Their classification was used in the present study:

- type 1: the venous arrangement has the shape of an "M" (also known as Classic "M"). A dominant median antebrachial vein (MAV) divides in two terminal branches, the median cephalic vein (MCV) and the median basilic vein (MBV), which respectively joins the cephalic vein (CV) and the basilic vein (BV);
- type 2: this venous pattern has the shape of an "N" (or "H"). It is also known as the embryonal type. A poorly developed MAV ends into the median cubital vein (MCuV) which connects the CV and BV in the cubital fossa;
- type 3: known as the "I" or "O" type. It possess no communicating branch between CV and BV;
- type 4: in this pattern, the CV enters the BV while the MAV drains in either one of them. Furthermore, the CV is absent or poorly developed above the cubital fossa;
- type 5: here the MCuV is doubled;
- type 6: in this type a venous arch connects the CV with the BV, while two or more veins from the forearm drains into this arch;
- type 7: similar to the Type 1 (M), although the MCV does not flow to the CV (subtype 1) or the CV divides into MCV and MBV (subtype 2);
- type 8: includes all non-classifiable patterns.

These patterns are depicted in Fig. 1.

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