

THE ANATOMICAL VARIATIONS OF THE SCIATIC NERVE DURING DISSECTION CLASSES: THREE DIFFERENT CASE REPORTS

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INTRODUCTION

The ischiatic nerve, which thickness is about 2 cm, is the largest and the longest single nerve of the human body. Also called and better known as sciatic nerve (SN), it emerges from the pelvis originating from the roots of the lumbosacral plexus (L4-S3). The SN pass through the greater sciatic foramen, usually exiting below the piriformis muscle (PM). It travels in the posterior compartment of the lower limb towards the back of the knee, where the tibial and the fibular one. This is the most common and “normal” variation usually described in the books. However, as first recorded and classified in 1937, by Beaton and Anson [1], many other anatomical variations of the SN are present, especially focusing on its relationship with the PM. As previously reported, the SN can be undivided or divided into the common peroneal nerve (CPN) and the tibial nerve (TN). As showed in Figure 1 (panel A), usually the undivided nerve emerges from the pelvis passing below the undivided PM. However, two emergences of SN can pass between and below the undivided muscle (Figure 1, panel B), or above and below the undivided muscle (Figure 1, panel C), or the undivided SN can pass between the divided muscle (Figure 1, panel D) to quote the most relevant variations, even if many other and rarer variations can occur (Figure 1, panels E-G). Thus, the aim of our study is to focus the clinicians’ attention into the anatomical variations in relationship to the areas where the nerve divided and its paths that seems to be a factor for the piriformis syndrome.

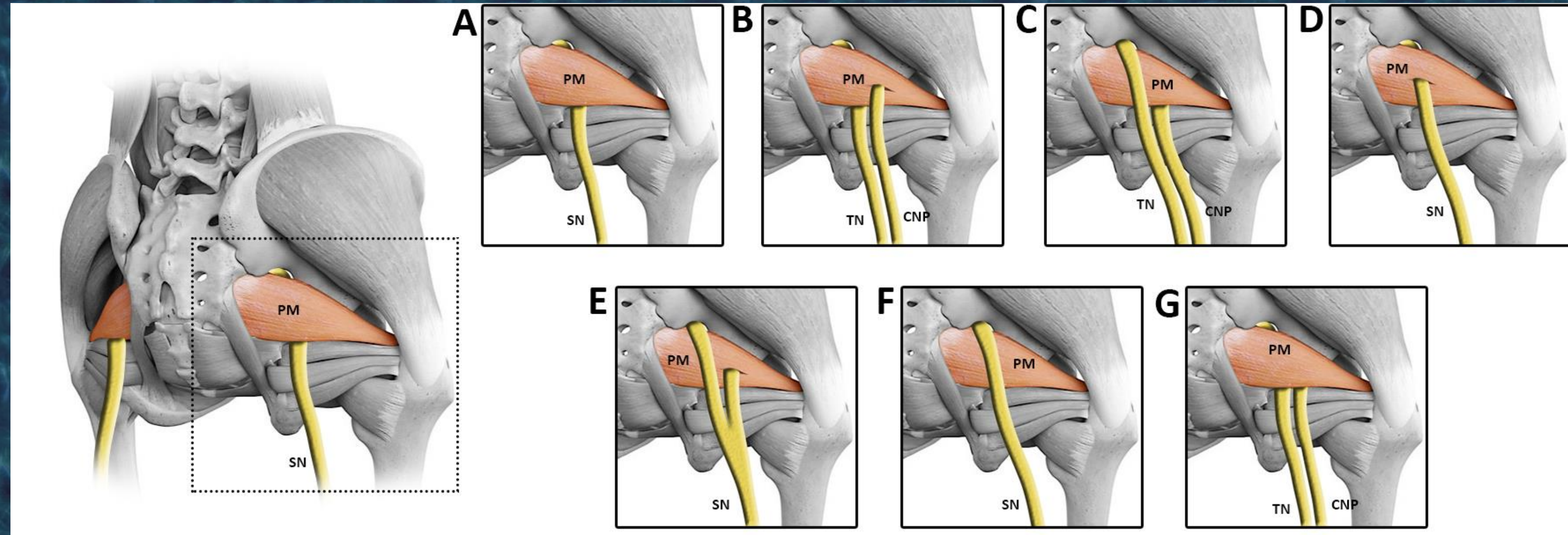


Figure 1

Different anatomical variations of the SN and its relationship with PM.

- (A) The “normal” most common SN path below the PM.
 - (B) The divided SN into its fibular and tibial part passing between and below the PM.
 - (C) The fibular and tibial part of the SN passing above and below the PM, respectively.
 - (D) The undivided SN passing through the PM.
 - (E) The divided SN passing above and between the muscle.
 - (F) The undivided SN emerging above the PM.
 - (G) Both the fibular and tibial parts of the SN passing below the muscle.
- PM=piriformis muscle; SN=sciatic nerve; TN=tibial nerve; CPN=common peroneal nerve.

MATERIALS AND METHODS

The anatomical variability on the relationship between the SN and the PM were observed during dissection classes at the ICLO Teaching and Research Center (Verona, Italy). In the present study, we describe three different case reports of the anatomical variations of the SN and its relationship with the PM, observed during dissection classes at the ICLO Teaching and Research Center (Verona, Italy), both in male and female fresh, no-fixed, bodies aged between 79 and 84 years old. The consent to conduct the study on the self-donated cadavers was obtained by the same donor before death. The study protocol conformed to the guidelines set out by the Declaration of Helsinki.

RESULTS

In Figure 2 it is reported the SN divided into the common peroneal nerve (CPN) and the tibial nerve (TN) that, respectively, passed between and below the PM. This anatomical variation was observed in a 79 years old male.

The second case observed in a 83 years old female, as reported in Figure 3, clearly showed the SN divided in its two components, the CPN and the TN, passed above and between the PM, respectively.

The last case was observed in a 81 years old female, clearly show the TN that pass between the PM, and the CNP emerging below the PM.

DISCUSSION and CONCLUSION

In the scientific literature, the anatomical variability was collected so far in different districts of the human body, thus underlining how important are these evidences, both from a clinical and surgical point of view. These intriguing observations constantly increase also thanks to the increase of different techniques ranging from imaging to surgery and autopsy. Obviously, the anatomical variations may occur on different body compartment such as the circulatory system[2–4] or organs [5,6], as previously reported. Focusing on the pelvis, the SN has an intricate anatomy both concerning its structure and path in relation to the PM. Thus, the understanding of this variability is essential in order to effectively treat the patient with the appropriate medical approach. For example, the piriformis syndrome is a rare syndrome which is one of the main causes of nondiscogenic sciatica causing severe low back pain due to entrapment of SN, either by the hypertrophy or by inflammation of the PM [7].

In conclusion, a deep knowledge of the SN anatomical features such as division, if present, and its path and contacts with the PM, is useful for clinicians in order to make correct diagnoses together with better planning and executing surgical procedures if necessary, thus limiting adverse events.

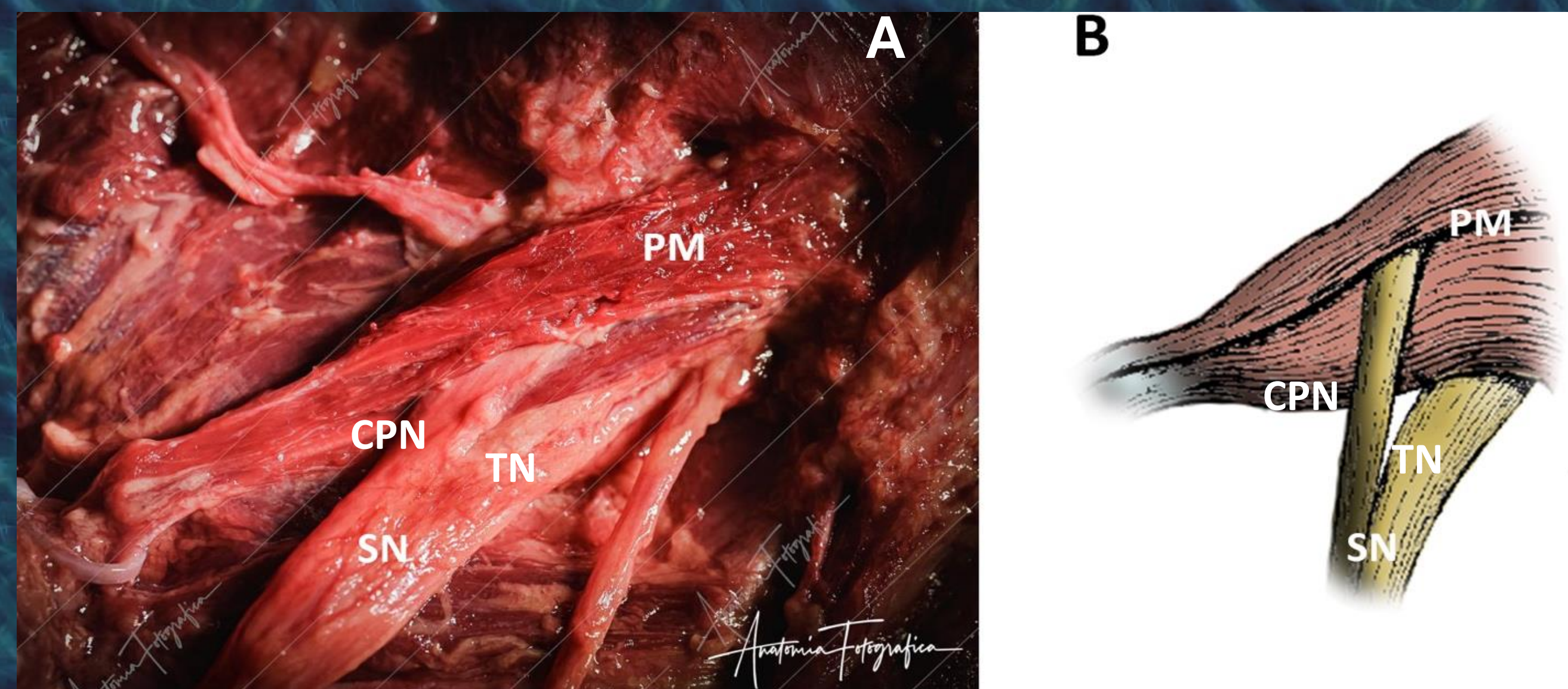


Figure 2

The SN division passing between and below the PM.

- (A) Anatomical variation observed in a 79 years old male.
- (B) Representative picture (modified from Beaton and Anson, 1937) of the SN variant and its relationship with PM.

PM=piriformis muscle; TN=tibial nerve; CPN=common peroneal nerve.

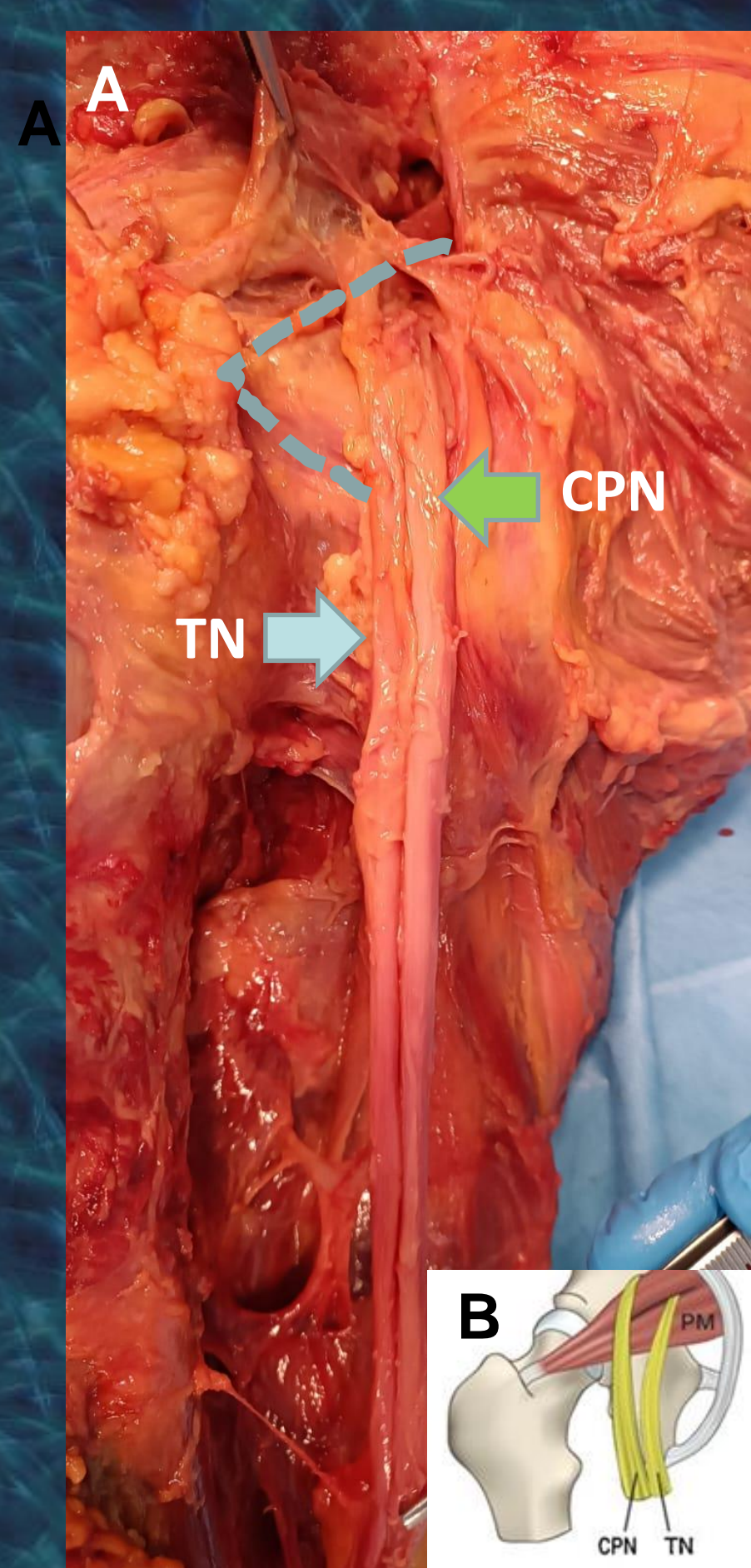


Figure 3

The SN division passing above and between the PM.

- (A) The real anatomical variation observed in a 83 years old female.
- (B) Representative illustration (modified from Beaton and Anson, 1937) showing the SN division into CPN and TN and their relationship with PM.

PM=piriformis muscle; TN=tibial nerve; CPN=common peroneal nerve.

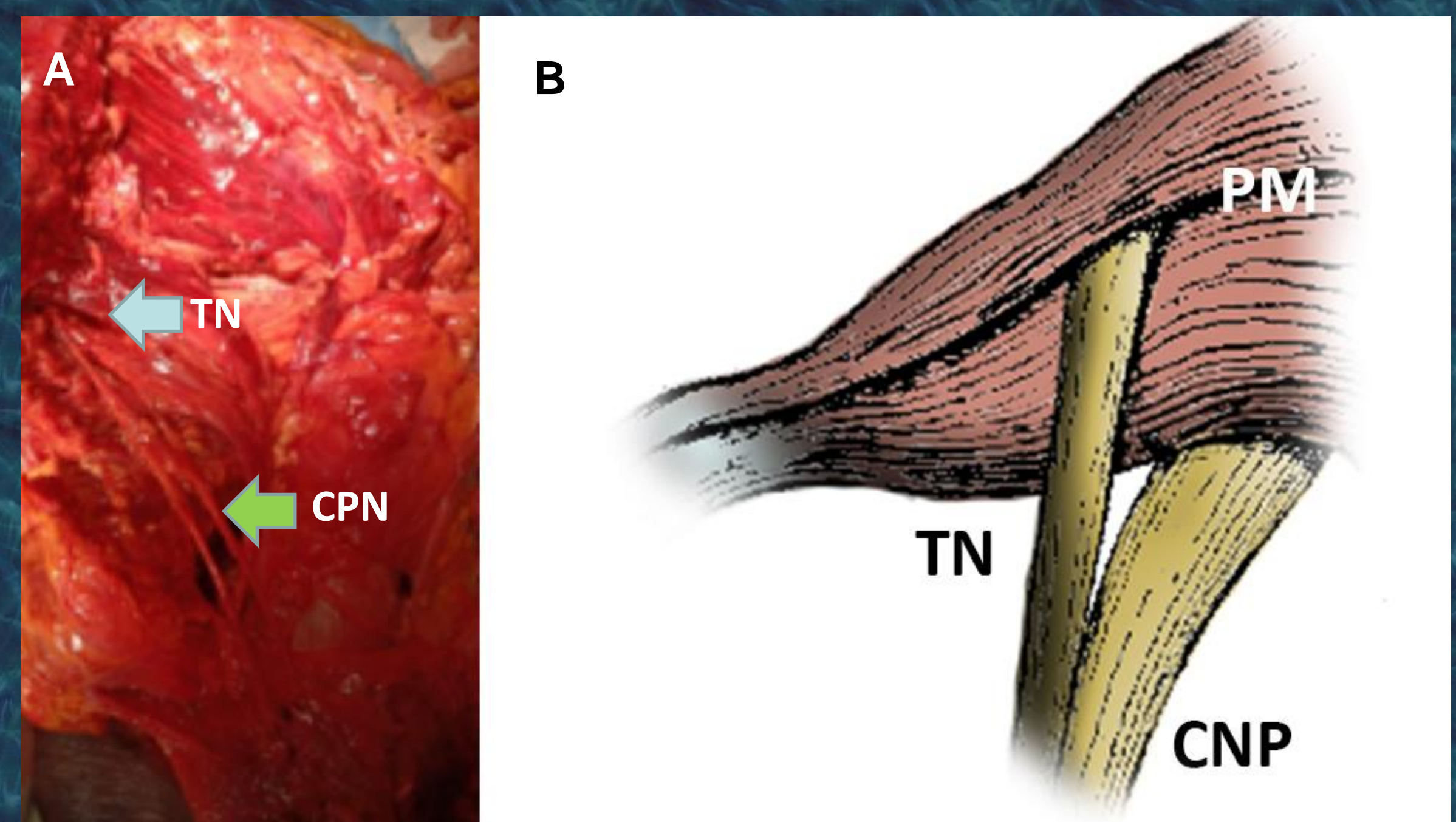


Figure 4

The SN division passing between and below the PM.

- (A) The SN anatomical variant observed in a 81 years old female.
 - (B) Representative image (modified from Beaton and Anson, 1937) showing the relationship between the PM and the TN and CPN passing below and between the muscle, respectively.
- PM=piriformis muscle; TN=tibial nerve; CPN=common peroneal nerve.

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