



ORIGINAL RESEARCH PAPER

Anatomy

FORMATION OF THE SCIATIC NERVE IN RELATION TO THE PIRIFORMIS MUSCLE- A RARE VARIATION

KEY WORDS: Common Peroneal Nerve, Tibial Nerve, Gluteal Region

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ABSTRACT

Introduction- The sciatic nerve is the nerve of the posterior compartment of thigh. It arises in the pelvic cavity and divides into tibial and common peroneal nerves usually near the superior angle of the popliteal fossa. It may vary in formation, course and division into the tibial and common peroneal nerves. These variations may influence the surgical outcome of the operations around the hip joint and sacroiliac joints. The aim of the present study is to present a case of variable formation of the sciatic nerve in relation to the piriformis muscle.

Case report- During routine dissection of the gluteal region for the first year MBBS students, a sciatic nerve was reported with variable formation in relation to the piriformis muscle. The dissection was carried out according to Cunningham's manual of practical anatomy. The common peroneal component passed dorsal and tibial component passed ventral to the piriformis muscle to form the sciatic nerve at the lower border of the muscle on the right side of a 70 year old male cadaver.

Conclusion- The formation of the sciatic nerve varies widely in relation to the piriformis muscle, the knowledge of which is useful for the clinicians and surgeons.

INTRODUCTION

The sciatic nerve is the nerve of the posterior compartment of thigh. It has tibial and common peroneal components. The tibial component of the sciatic nerve arises from the ventral divisions of L4, L5, S1 to S3 and the common peroneal component arises from the dorsal divisions of L4, L5, S1 and S2. The sciatic nerve then passes through the greater sciatic foramen below piriformis and divides into tibial and common peroneal nerves usually near the superior angle of the popliteal fossa¹.

Piriformis is the key muscle of the gluteal region. It takes origin from anterior surface of the sacrum, from the gluteal surface of the ilium near posterior inferior iliac spine, from the capsule of the sacroiliac joint and from the sacrotuberous ligament. The muscle then passes through the greater sciatic foramen and gets inserted into the greater trochanter of the femur².

The sciatic nerve may vary in formation, course and division into the tibial and common peroneal nerves. The tibial and common peroneal components may unite to form the sciatic nerve in the gluteal region, in relation to the piriformis muscle, instead of forming it in the pelvic cavity³; or the two components may pass separately without forming the sciatic nerve⁴; or the sciatic nerve, after its normal formation in the pelvic cavity, may pass above the piriformis or through the piriformis, instead of passing below the piriformis muscle⁵. The sciatic nerve may also divide in relation to the piriformis muscle in which case, the common peroneal division may pass through the piriformis and the tibial division may pass below the piriformis; or the common peroneal division may pass above the piriformis and the tibial division may pass below the piriformis; or the common peroneal division may pass above the piriformis and the tibial division may pass through the piriformis⁶.

The sciatic nerve supplies the flexors of the knee joint and the muscles distal to the knee. The variable relationship of the sciatic nerve with the piriformis muscle may be responsible for the pain along the sciatic nerve due to trauma and inflammation in the piriformis muscle. Sometimes, the entrapment of the sciatic nerve, due to its passage through the piriformis muscle, may cause pain in the buttocks and along the course of the nerve, resulting in a controversial condition called the piriformis syndrome⁷.

The aim of the present study is to present a rare variation of formation of the sciatic nerve in relation to the piriformis muscle, which is important both clinically and surgically.

CASE REPORT

During routine dissection of the gluteal region for the first year

MBBS students, a sciatic nerve was reported with variable formation in relation to the piriformis muscle, on the right side of a 70 year old male cadaver. The dissection was carried out according to Cunningham's manual of practical anatomy⁸. The formation, course and division of the sciatic nerve was observed and photographed.

The common peroneal component passed dorsal and tibial component passed ventral to the piriformis muscle, and united to form the sciatic nerve at the lower border of the muscle instead of uniting in the pelvic cavity (Figure: 1). The sciatic nerve then descended in the back of thigh and divided into tibial and common peroneal nerves at the superior angle of the popliteal fossa. The rest of the course of the nerves in the popliteal fossa and leg was normal.

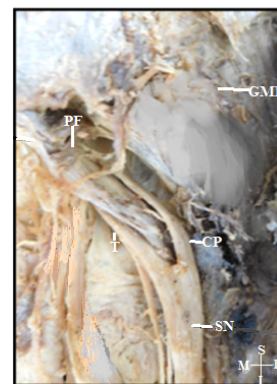


FIGURE 1: Showing formation of the sciatic nerve in relation to the piriformis muscle (right side).

Abbreviations: Key: GMD- gluteus medius; PF- piriformis; SN- sciatic nerve; CP- common peroneal, T- tibial; S- superior; I- inferior; M- medial; L- lateral.

DISCUSSION

Nayakanti et al³ reported a case in which the common peroneal component passed dorsal and tibial component passed ventral to the piriformis muscle and fused below it to form the sciatic nerve in the gluteal region instead of forming it in the pelvic cavity.

Khan et al⁹ reported two cases with variable formation of the sciatic nerve. In one case, the common peroneal component

passed through and tibial component passed below the piriformis to form the sciatic nerve at the lower border of the quadratus femoris muscle. In another case, the common peroneal component passed above and tibial component passed below the piriformis to form the sciatic nerve in the upper part of the thigh.

Anbumani et al¹⁰ reported two cases in which the common peroneal component passed above the piriformis and tibial component passed below the piriformis to join inferior to piriformis. In one of these cases, the sciatic nerve then trifurcated into tibial, sural and common peroneal nerves at the superior angle of the popliteal fossa. In two cases, the common peroneal component pierced the piriformis and tibial component passed below the piriformis to join inferior to piriformis.

Kotian et al¹¹ reported a case in which the common peroneal component of the sciatic nerve passed between the two heads of the piriformis and the tibial component passed inferior to it to form the sciatic nerve in the gluteal region which after passing a few centimeters divided into tibial and common peroneal nerves.

Patil et al¹² reported a case in which the common peroneal component passed dorsal to the piriformis and tibial component passed ventral to the piriformis to form the sciatic nerve in the distal part of the gluteal region below the piriformis muscle. The sciatic nerve then divided into tibial and common peroneal nerves in the upper part of the popliteal fossa.

Vicente et al¹³ reported a case in which the common peroneal and tibial components fused at the level of gamellus superior; in another case, at the level of the quadratus femoris and in another one, they fused at the superior border of the gamellus superior muscle.

Gunnal et al¹⁴ reported a case in which the lumbosacral trunk entered the gluteal region by piercing the piriformis and the three sacral roots passed below the piriformis to form the sciatic nerve nine cm below the lower border of the piriformis muscle.

Berihu et al¹⁵ reported cases in which the common peroneal component and tibial component passed separately below the piriformis to form the sciatic nerve posterior to the quadratus femoris muscle and finally divided at the superior angle of the popliteal fossa.

In the present case, similar to Nayakanti et al³, Anbumani et al¹⁰ and Patil et al¹², the common peroneal component passed dorsal and tibial component passed ventral to the piriformis muscle, but they united at the lower border of piriformis, which is unique in this case. Then, the sciatic nerve divided into tibial and common peroneal nerves at the superior angle of the popliteal fossa, similar to Berihu et al¹⁵.

CONCLUSION

The formation of the sciatic nerve varies widely in relation to the piriformis muscle. The knowledge of these variations is not only useful for the clinicians to diagnose and treat conditions like piriformis syndrome and sciatica, but also necessary for the surgeons in surgeries of the hip joints and sacroiliac joints to avoid injury to the sciatic nerve and its major components.

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