SCIATIC NERVE INJURIES

ESSAY
SUBMITTED FOR PARTIAL FULFILLMENT
OF THE MASTER DEGREE
IN ORTHOPEDIC SURGERY

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MOHAMED KAMAL MOHAMED ALI

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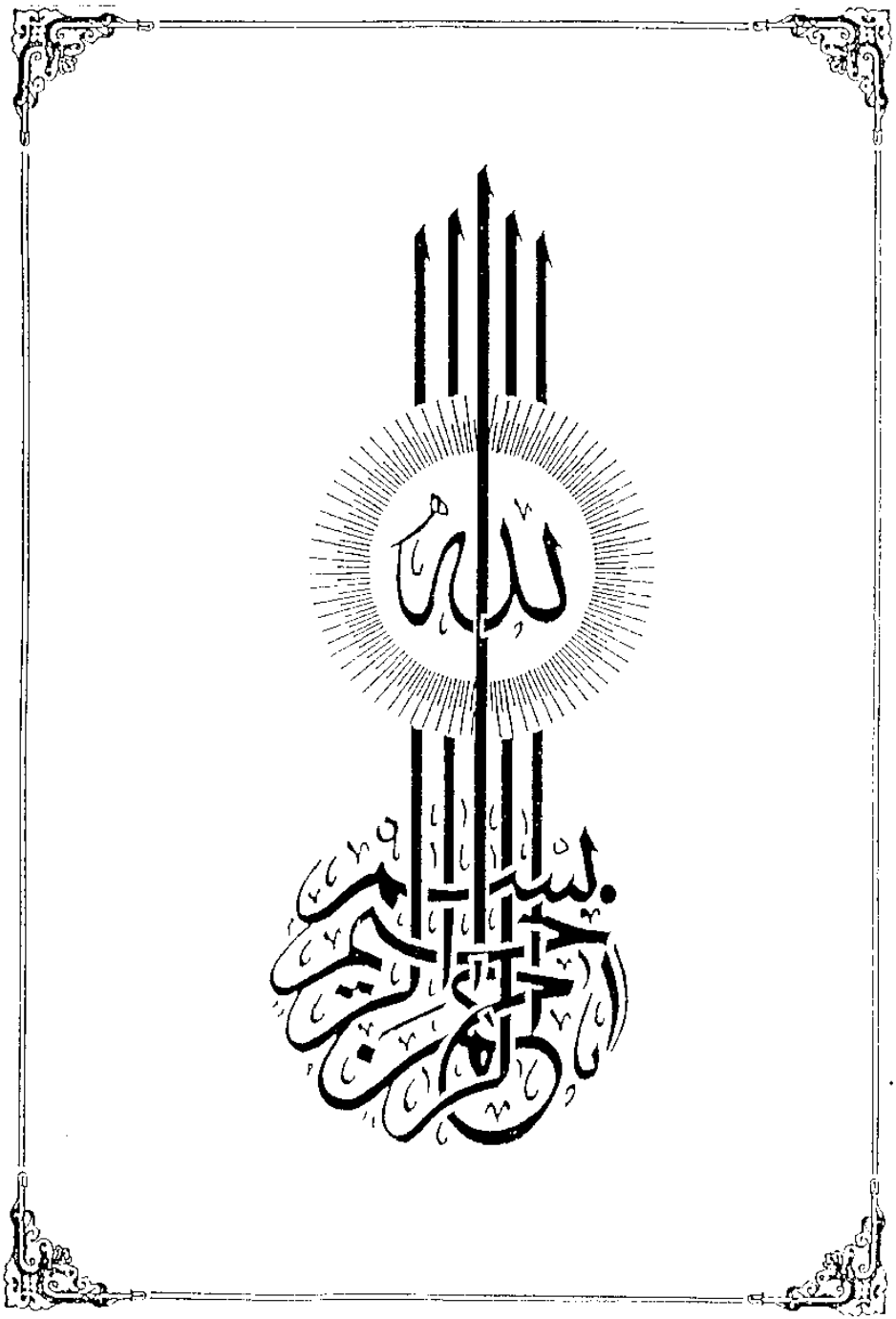

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INTRODUCTION

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Major nerve injuries occur less frequently in the lower extremity than in the upper extremity, but paralysis following injuries in the lower extremity results in major disability.

There are numerous factors involving a damaged sciatic nerve that influence the therapeutic approach and these must be evaluated.

For accurate diagnosis of the level and the type of nerve involvement in an orthopedic disability, there is no substitute for familiarity with the anatomy of the nerve with various deep and superficial reflexes and the nerve centers through which it passes and with dermal sensory pattern.

With the systemic investigations of these parameters and the interpretation of the electrodiagnostic findings, the localization of neurologic dysfunction should be a reasonably routine procedure for the examiner and the treatment and prognosis should be clarified.

Because of the great length of sciatic nerve, regeneration is prolonged, and the repair should be undertaken as early as possible.

Our aim in this work is to review the literature regarding sciatic nerve injuries.

ANATOMY

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The sciatic nerve ($L_{4,5,}$ $S_{1,2,3}$) is composed of tibial and common peroneal nerves which usually become distinct in the thigh. Above this level however, these two nerves can be separated to their roots of origin. It is then found that the tibial nerve is formed by the union of the ventral division of the lumbo-sacral trunk and the first three sacral nerves ($L_{4,5,}$ $S_{1,2,3}$), while the common peroneal receives the dorsal divisions of the lumbo-sacral trunk and first two sacral nerves ($L_{4,5,}$ $S_{1,2}$).

The component nerves of the sciatic may, however, diverge anywhere along its course from the pelvis.

When the division occurs at the plexus the common peroneal usually pierces the piriformis at the greater sciatic foramen and descends lateral to tibial nerve which will follow the course of the sciatic nerve *(WILLIAMS and WARWICK, 1980)*.

The sciatic nerve (fig. "1"), the largest nerve in diameter in the body, measures at its commonest 2 cm in diameter. It passes out of the pelvis through the greater

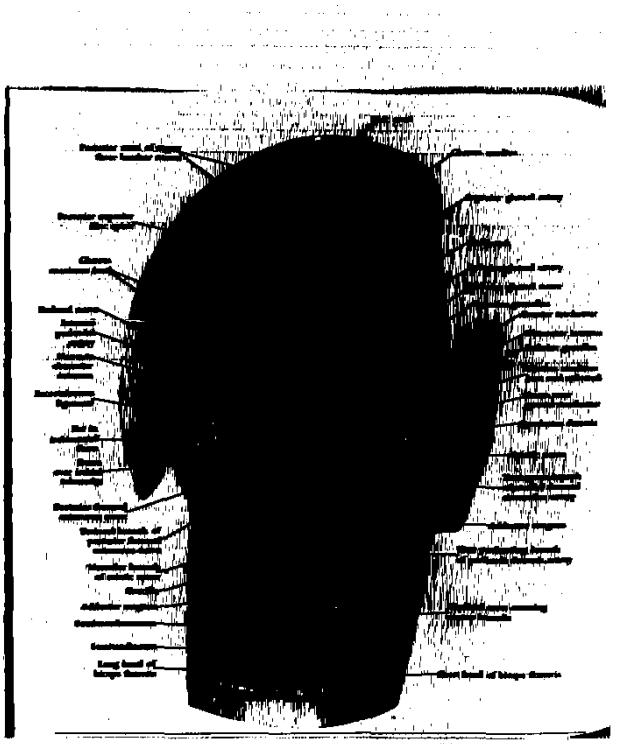

Fig."1" : Structures present in right gluteal region.
The greater part of gluteus maximus has been removed.

(From SNELL, 1978)

sciatic foramen, below the piriformis, descends between the greater trochanter of the femur and the tuberosity of the ischium, and along the back of the thigh to about its lower one-third, where it divides into two large branches, named the tibial and common peronel nerves (fig. "2").

In the upper part of its course the nerve is situated deep to the gluteus maximus, and rests first upon the posterior surface of the ischium, the nerve to quadratus femoris intervening, it then crosses the obturator internus and gemelli, and passes on to the quadratus femoris, by which it is separated from the obturator externus and the hip joint. It is accompained on its medial side by the posterior cutaneous nerve of the thigh and the inferior gluteal artery *(WILLIAMS and WARWICK, 1980)*. The rotators and the nerve are situated in a groove between the ischial tuberosity medially and the greater trochanter laterally, at this position it is exposed to pressure from the posterior displacing femoral head in dislocations *(TUREK, 1984)*.

More distally, it lies upon the adductor magnus and is crossed obliquely by the long head of biceps femoris, very close to the back of the femur *(WILLIAMS and WARWICK, 1980)*.

Fig."2" : Deep structures present in right popliteal fossa.

(From SNELL, 1978)

In this position, it is easily compressed between the bone and a hard chair seat and gives rise to the sensation of the foot falling asleep ; or it may be involved in tumour or callus formation, sharp jagged edges of fragments may sever the nerve *(TUREK, 1984)*.

It can be represented on the back of the thigh by a broad line drawn distally to the apex of the popliteal fossa from just medial to the mid-point of the line joining the ischial tuberosity to the apex of the greater trochanter.

The articular branches of the sciatic nerve arise from the upper part of the nerve, and supply the hip joint by perforating the posterior part of its capsule ; they are sometimes derived directly from the sacral plexus.

The muscular branches of the sciatic nerve are distributed to the biceps femoris, semitendinosus, semimembranosus and the ischial head of the adductor magnus ; the nerve to the short head of biceps femoris comes from the common peroneal division, the other muscular branches from the tibial division of the sciatic nerve *(WILLIAMS and WARWICK, 1980)*.

Nerves supply to the biceps and the semitendinosus arise quite high so that these muscles are usually spared in lesions of the sciatic nerve in the thigh and knee flexion is preserved *(TUREK, 1984)*.

The tibial nerve (the medial popliteal nerve) :

The tibial nerve, the largest terminal division of the sciatic, arises from the ventral branches of the ventral rami of the fourth, fifth lumber and first, second and third sacral nerves. It descends along the back of the thigh and through the middle of the popliteal fossa, to the distal border of the popliteus, thereafter it is continued into the leg as posterior tibial nerve.

In the thigh, it is overlapped by the hamstring muscles above, but it becomes more superficial in the popliteal fossa (fig."3"). At the upper part of the popliteal fossa, the nerve lies lateral to the vessels (but in a more superficial plane) ; in the middle, the nerve crosses superficial to the vessels and lowerdown, it runs on the medial side of the vessels. In the lower part of the popliteal fossa, the nerve is covered by the contiguous margins of the two heads of the gastrocnemius. If the

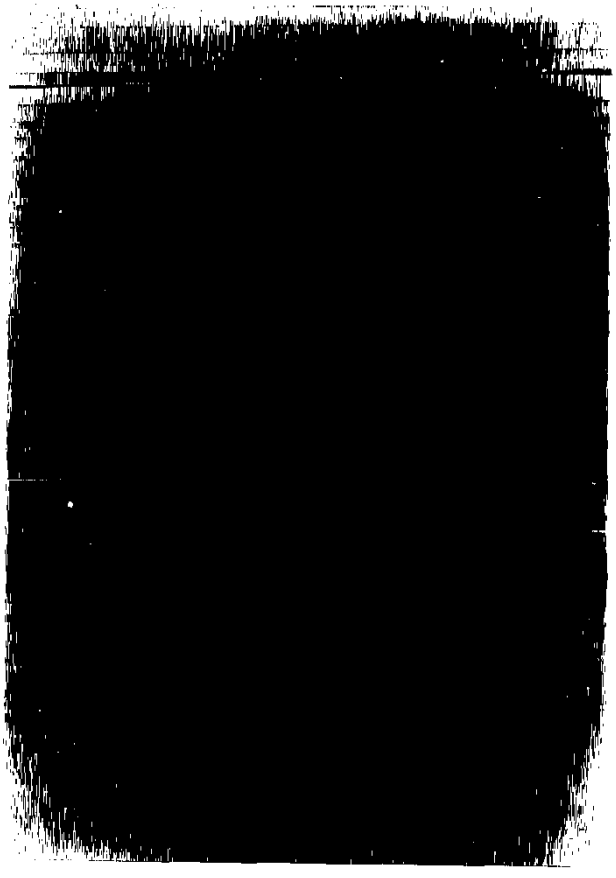

Fig."3" : Deep structures present on the posterior aspect of right leg.

(From SNELL, 1978)