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The cutaneous branches of the superior gluteal nerve with special reference to the nerve to tensor fascia lata

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ABSTRACT

Cutaneous branches from the superior gluteal nerve were studied in 39 half pelves (18 right, 21 left) of 23 adult Japanese cadavers. A detailed description of the branches is not currently available in the literature. Most of these branches perforated tensor fascia lata and were distributed to the centre of the lateral gluteal region.

INTRODUCTION

During dissection of the gluteal region it was found that some cutaneous nerves perforated the gluteal fascia. These did not arise from the usually accepted origins; a more detailed examination showed that they originated from the superior gluteal nerve. A detailed description of the cutaneous branches of the superior gluteal nerve is not currently available in the literature or in textbooks. Here we report an investigation of the cutaneous branches of this nerve to the lateral surface of the gluteal region in man.

MATERIALS AND METHODS

Observations were made on 39 half pelves (18 right, 21 left) of 23 adult Japanese cadavers during student dissection (26 sides from 15 males, 13 sides from 8 females). During dissection of the gluteal surface region, the cutaneous branches which perforated the fascia lata were marked with coloured thread. The fascia lata was carefully removed and the origin of each of the marked branches was examined. The intramuscular distribution of the nerve to the tensor fascia lata was examined thoroughly under a stereomicroscope and then recorded.

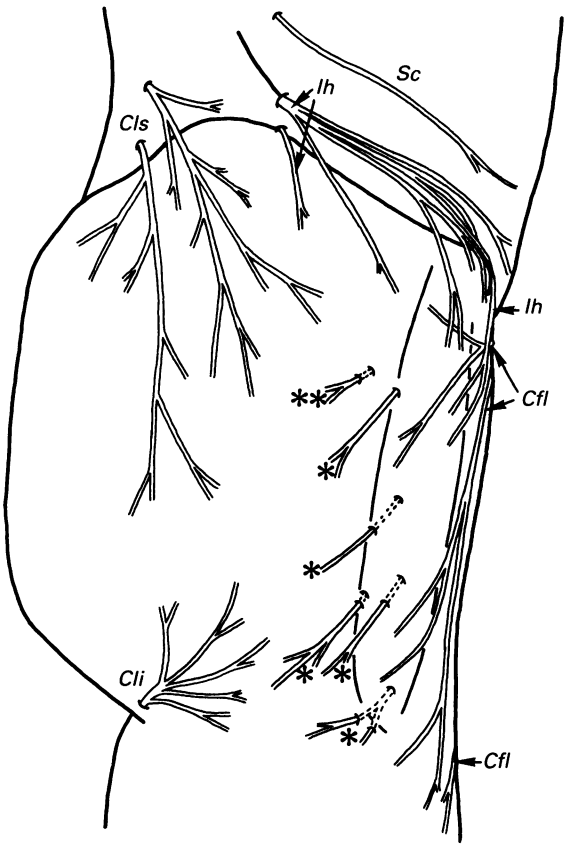

Fig. 1. Lateral view of the cutaneous nerves of the lateral gluteal region in specimen 1 (no. 1836, right). The cutaneous branches of the superior gluteal nerve (asterisks) are situated deep to the fascia lata and are therefore shown by interrupted lines. *Cls*, Nn. clunium superiores (branches of the dorsal rami of the lumbar nerves); *Cli*, Nn. clunium inferiores (branches of posterior femoral nerve); *Ih*, branches of iliohypogastric nerve; *Sc*, cutaneous branches of subcostal nerve; *Cfl*, branches of lateral femoral cutaneous nerve.

OBSERVATIONS

Muscles and fasciae

The outer surface of tensor fascia lata was completely covered with the fascia lata, and the cranial inner surface of the muscle fused with gluteus medius.

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Tensor fascia lata originated from a small area of the iliac crest just lateral to the origin of sartorius from the anterior superior iliac spine. Tensor fascia lata was supplied by the terminal branches of the superior gluteal nerve which ran between gluteus medius and minimus.

Distribution of the cutaneous nerves of the gluteal region

Figure 1 shows the cutaneous nerves of the lateral gluteal region of specimen 1 (no. 1836, right). The lower and lateral part of the gluteal region was supplied by the gluteal branches of the posterior femoral cutaneous nerve (Nn. clunium inferiores), and the upper and dorsal part by the dorsal rami of the sacral nerves (Nn. clunium superiores). The upper and ventral part was supplied by the branches of the iliohypogastric nerve, and the ventral and lateral part by branches from the lateral femoral cutaneous nerve. Some cutaneous branches (indicated by asterisks and double asterisks) which were surrounded by these nerves were dissected.

Figure 2 is a photograph of the same view as in Figure 1 after removal of the fascia. Five of the branches, indicated by asterisks, perforated tensor fascia lata. One branch, indicated by double asterisks, perforated gluteus medius.

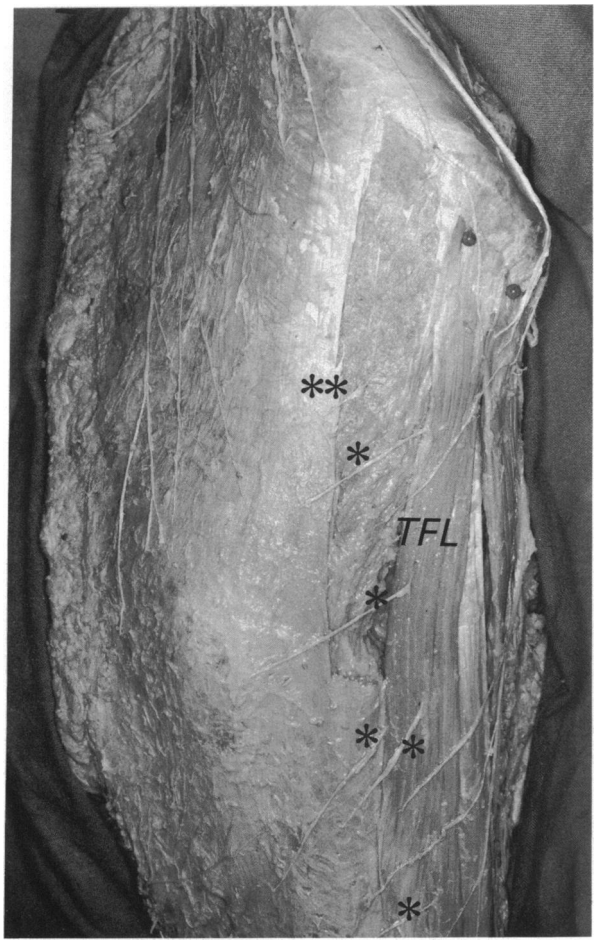

Fig. 2. Photograph of the same region as in Figure 1 but the fascia lata has been removed. The cutaneous branches of the superior gluteal nerve (single asterisk) perforate tensor fascia lata (*TFL*) and gluteus medius (double asterisks).

Intramuscular nerve distribution within the tensor fascia lata

In order to determine the relationship between these perforating cutaneous branches and the nerve to tensor fascia lata, the intramuscular distribution of the nerve was studied (Fig. 3*a*, *b*). In specimen 2 (Fig. 3*a*), 2 of the 3 cutaneous branches perforated tensor fascia lata (Cut 2, Cut 3). The other branch (Cut 1) wound around the dorsal margin of the muscle and perforated the fascia. In specimen 3 (Fig. 3*b*), 3 branches perforated the dorsal margin of tensor fascia lata. For 2 of these branches (Cut 1, Cut 2), the nerve to tensor fascia lata divided into muscular and cutaneous branches immediately after reaching the muscle. The other branch (Cut 3) arose from the nerve to tensor fascia lata, ran on the inner surface of the

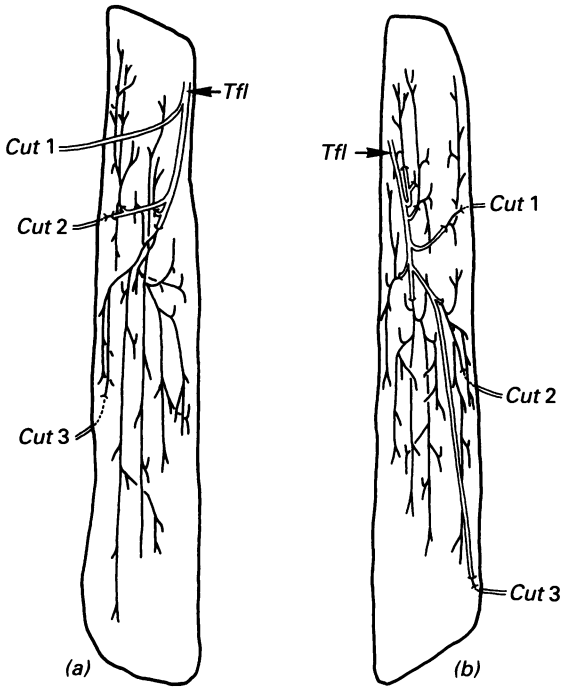

Fig. 3. Diagrams showing intramuscular distribution of the nerve to tensor fascia lata (*Tfl*) (inner aspect). (*a*) Left side (specimen 2, no. 1843, left); *Cut 1* is an example of a cutaneous branch of the superior gluteal nerve that wound around the dorsal border of the muscle; *Cut 2* and *Cut 3* are 2nd and 3rd branches that traversed tensor fascia lata, as did all 3 branches in (*b*) right side (specimen 3, no. 1843, right).

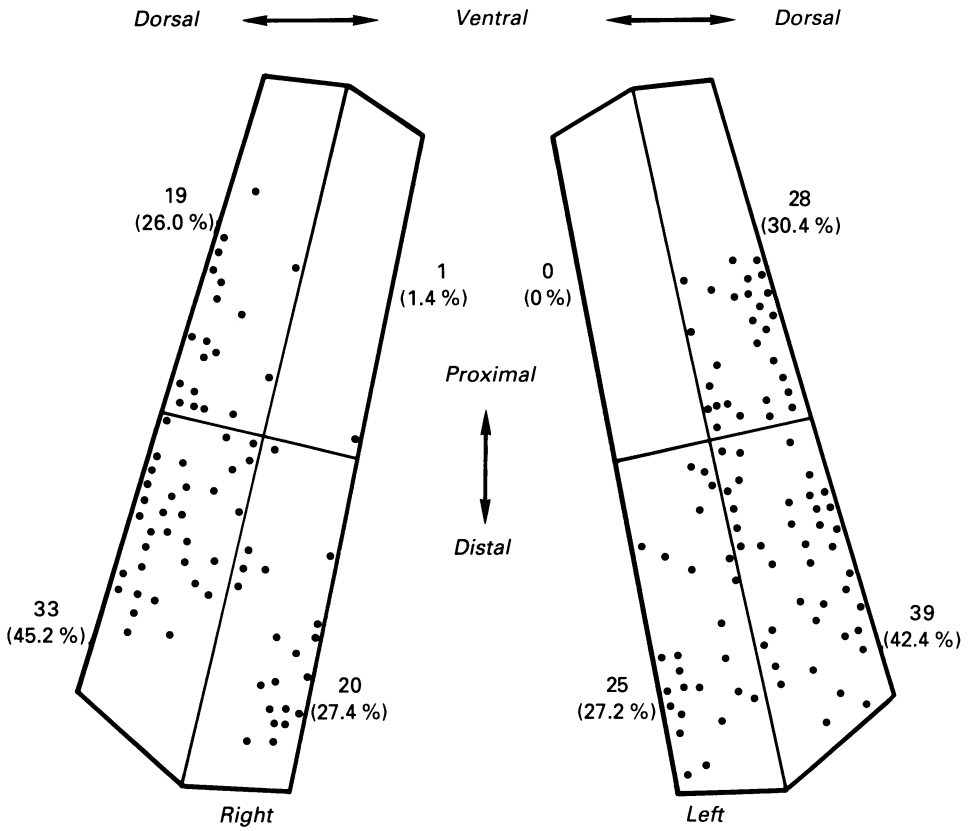

Fig. 4. Exit points of the perforating cutaneous branches of the superior gluteal nerve from tensor fascia lata. This muscle was divided into 4 regions; ventroproximal, ventrodistal, dorsoproximal, and dorsodistal. The numbers indicate the total number of exit points found in each region.

muscle and perforated the dorsal border of the muscle without giving off a muscular branch.

Number of cutaneous branches

Cutaneous branches originating from the nerve to tensor fascia lata were observed in all specimens. One cutaneous branch wound around the dorsal border of the muscle in 9 of 18 right sides (50.0%) and in 7 of 21 left sides (33.3%). An average of 3.9 (S.D. 1.4) perforating branches was found in sides with a winding branch, and 4.4 (S.D. 1.3) in those without one.

Figure 4 shows the exit points of the perforating cutaneous branches from tensor fascia lata. The muscle was divided into 4 regions: ventroproximal, ventrodistal, dorsoproximal and dorsodistal. The number of exit points in each region is indicated in the figure.

DISCUSSION

In this study cutaneous branches from the superior gluteal nerve were found in all specimens. It is interesting that to date no description of these branches is available. In *Grant's Atlas of Anatomy* (1963), the cutaneous branches in this region are drawn as originating from the posterior branch of the lateral femoral cutaneous nerve. The cutaneous branches of the superior gluteal nerve appear to have been disregarded in the literature, because branches perforating the fascia lata were presumed to arise from the lateral femoral cutaneous nerve; the fascia lata was not removed to allow examination of their true origin.

The points of perforation of the cutaneous branches through the tensor fascia lata were covered by the sartorius, which originated from the anterior superior iliac spine. The area of distribution of the cutaneous branches of the superior gluteal nerve is shown schematically in Figure 5. The lateral gluteal region is generally thought to be supplied by branches of the iliohypogastric nerve (cranioventral), branches of the lateral femoral cutaneous nerve (caudoventral), gluteal branches of the posterior femoral cutaneous nerve (Nn. clunium inferiores; caudodorsal), and branches of the dorsal rami of the lumbar nerves (Nn. clunium superiores; craniodorsal). The cutaneous

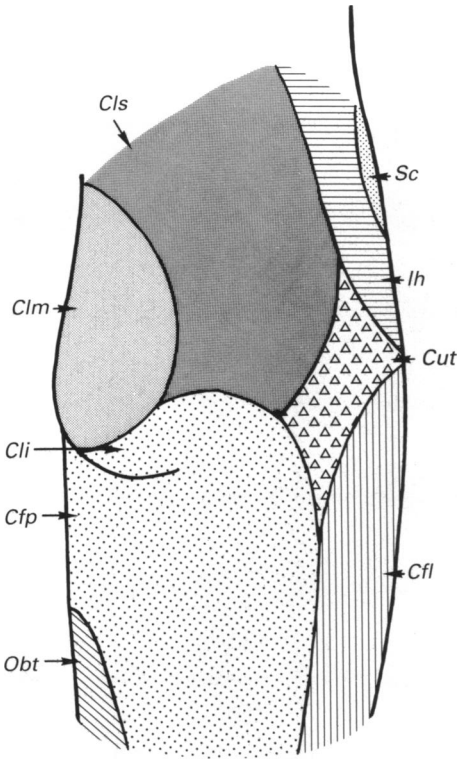

Fig. 5. Distribution areas of the cutaneous nerves and branches of the lower trunk and lower limb, viewed from the back (modified from Williams et al. 1989). *Cls*, branches of dorsal rami of lumbar nerves (Nn. clunium superiores); *Clm*, branches of dorsal rami of sacral nerves (Nn. clunium medii); *Cli*, branches of posterior femoral nerve (Nn. clunium inferiores); *Cfp*, branches of posterior femoral nerve; *Obt*, cutaneous branches of obturator nerve; *Sc*, cutaneous branches of subcostal nerve; *Ih*, branches of iliohypogastric nerve; *Cut*, cutaneous branches of superior gluteal nerve; *Cfl*, branches of lateral femoral cutaneous nerve.

branches of the superior gluteal nerve are distributed to the centre of this region, surrounded by the above-mentioned nerves.

With respect to the segmental derivation of the cutaneous branches to the lateral gluteal region, according to *Gray's Anatomy* (Williams et al. 1989), the iliohypogastric nerve originates from L1, the lateral femoral cutaneous nerve from L2 and L3, and the gluteal branches of the posterior femoral nerve from S1 and S2. Thus a contribution from L4 and L5 has not been included. The demonstration of cutaneous branches of the superior gluteal nerve, which originates from L4, L5 and S1, therefore shows that the cutaneous distribution from the ventral rami to the lateral gluteal region is truly segmentally arranged.

Some branches of the posterior femoral cutaneous nerve are reported to arise from the inferior gluteal nerve (Nakanishi et al. 1976). The origin of the superior gluteal nerve from the sacral plexus is known to be located more proximally and dorsally than that of the inferior gluteal nerve (Eisler, 1892; Akita et al. 1991). Further detailed studies of these cutaneous branches of the superior gluteal nerve are therefore necessary to clarify the relationships between the ramification of the lumbosacral plexus and the distribution of the cutaneous nerves of the lower limb.

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