MEDICAL EDUCATION RESOURCE

Gluteal Region: Facts to Remember & Clinicoanatomical Problem

Facts to Remember

- **Gluteus maximus** is the **antigravity and thickest muscle** of the human body, composed largely of **red muscle fibers**.
- **Sciatic nerve** is the **largest and thickest nerve** in the body.
- **Intramuscular injections** in the gluteal region are given in the **upper lateral quadrant** — specifically into the **gluteus medius** — to avoid injury to the sciatic nerve

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- The **greater sciatic notch** serves as the **gateway of the gluteal region**.
- Both the **sciatic** and **pudendal nerves** do **not supply** any structure in the gluteal region; they merely pass through it.
- **Piriformis** acts as the **key muscle of the gluteal region**, dividing structures passing above and below it.
- **Sciatic nerve and its branches** supply the **hamstring muscles**, **muscles of all three compartments of the leg**, and the **muscles of the sole**

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- The **sciatic artery**, a remnant of the **axial artery** of the embryo, accompanies the sciatic nerve.
- The **lesser sciatic foramen** serves as the **gateway of the perineal region**.
- The **sciatic nerve** lies close to the **femur** between the **quadratus femoris** and **adductor magnus**; prolonged sitting may compress it, causing temporary numbness ("**sleeping foot**")

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Clinicoanatomical Problem

Case:
A 30-year-old woman complains of pain in her elbows and calves and is advised **neurobion injections**.

Question:
Where should the injection be given, and why?

Answer:

- The injection should be given **intramuscularly in the upper lateral quadrant** of the **gluteal region**.
- The gluteal region extends from the **iliac crest** above to the **ischial tuberosity** below and laterally to the **greater trochanter**.
- The **upper lateral quadrant** is **safe**, containing no major nerves or vessels.
- The **lower and medial quadrants** must be **avoided**, as they contain the **sciatic nerve** and major arteries.

- The injection is ideally placed into the **gluteus medius muscle**, where absorption is efficient and nerve injury risk is minimal

Clinicoanatomical Problems — Gluteal Region

1. Sciatic Nerve Injury during Gluteal Injection

- **Case:** A nurse administers an intramuscular injection in the lower medial quadrant of the buttock. The patient develops severe shooting pain radiating down the posterior thigh.
- **Explanation:** The **sciatic nerve** lies deep to the gluteus maximus in the **lower medial quadrant**. Accidental injection or injury here may cause **neuropraxia** or even **sciatic neuritis**, leading to pain, numbness, or paralysis of hamstrings and leg muscles.
- **Prevention:** Always inject in the **upper lateral quadrant** of the gluteal region to avoid the sciatic nerve

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2. Paralysis of Gluteus Maximus

- **Case:** A patient with muscular dystrophy cannot rise from sitting without support.
- **Explanation:** The **gluteus maximus**, supplied by the **inferior gluteal nerve**, is the chief **extensor of the hip**. Paralysis causes weakness in climbing stairs or standing from sitting — the patient uses their hands to "**climb up their own thighs**," producing the classic **Gower's sign**

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3. Paralysis of Gluteus Medius and Minimus — Trendelenburg Gait

- **Case:** After hip surgery, a patient's pelvis drops on the opposite side when walking.
- **Explanation:** Paralysis of **gluteus medius and minimus** (supplied by the **superior gluteal nerve**) weakens the **abductor mechanism of hip**. When standing on one limb, the unsupported side of pelvis **drops** — known as **positive Trendelenburg's sign**.
- **Clinical Note:** To compensate, the patient lurches toward the affected side, producing a **waddling or lurching gait**

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4. Piriformis Syndrome

- **Case:** A runner experiences deep buttock pain radiating down the thigh.
- **Explanation:** The **sciatic nerve** may pass **through or below** the **piriformis muscle**. Spasm or hypertrophy of piriformis compresses the sciatic nerve, causing pain in the buttock and posterior thigh — **sciatica**.
- **Treatment:** Rest, stretching, and sometimes surgical decompression

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5. Injury to Inferior Gluteal Nerve

- **Case:** A patient after pelvic fracture shows difficulty in climbing stairs.

- **Explanation:** The **inferior gluteal nerve** supplies the **gluteus maximus**. Damage causes loss of hip extension power, affecting stair climbing, running, or rising from a chair.

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6. Injury to Superior Gluteal Nerve

- **Case:** A child after intramuscular injection walks with pelvis tilting on one side.

- **Explanation:** The **superior gluteal nerve** lies close to the upper margin of the greater sciatic foramen and may be injured by careless injection or pelvic fracture. This leads to paralysis of **gluteus medius and minimus**, resulting in **Trendelenburg gait**.

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7. Compression of Sciatic Nerve — "Wallet Neuritis"

- **Case:** A person carrying a thick wallet in the back pocket develops pain in buttock and thigh after long sitting.

- **Explanation:** Constant pressure on the **sciatic nerve** by a hard object compresses it between the **ischial tuberosity** and wallet — producing sensory and motor irritation termed **wallet neuritis**.

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8. Gluteal Bursitis ("Weaver's Bottom")

- **Case:** A tailor complains of painful swelling in the lower buttock after prolonged sitting.

- **Explanation:** Inflammation of the **ischial bursa** (between gluteus maximus and ischial tuberosity) due to friction or pressure causes pain and tenderness — **ischial bursitis** or **weaver's bottom**.

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9. Abscess in Gluteal Region

- **Case:** A patient with pelvic infection develops a swelling in the gluteal area.

- **Explanation: Pelvic abscesses** can spread through the **greater sciatic foramen** below piriformis into the **gluteal region**, presenting as deep-seated swelling in the buttock.

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10. Injury to Internal Pudendal Nerve or Artery

- **Case:** Trauma near the ischial spine causes perineal numbness.

- **Explanation:** The **internal pudendal vessels and pudendal nerve** wind around the **ischial spine**; injury here can cause **loss of perineal sensation** and **erectile dysfunction**.