

Neuraxial

Neuraxial refers to the [central nervous system](#) structures within the [spinal column](#), particularly the [spinal cord](#), [meninges](#), and associated spaces used in medical interventions. It commonly describes procedures or therapies targeting the epidural, subarachnoid (intrathecal), or other spinal canal spaces.

Neuraxial Anatomy

Spinal Cord:

Protected by vertebrae, cerebrospinal fluid (CSF), and meninges.

Extends from the brainstem to the lower back (typically ending at L1-L2 in adults).

Spaces:

Epidural Space: Outer layer between the dura mater and the vertebrae.

Subarachnoid Space: Inner layer containing CSF, between the arachnoid mater and pia mater.

Meninges:

Layers surrounding the brain and spinal cord: dura mater (outer), arachnoid mater (middle), and pia mater (inner).

Neuraxial Techniques

These techniques are used for drug delivery, anesthesia, or diagnostics and include:

Epidural:

Local anesthetics, opioids, or steroids injected or infused into the epidural space.

Common in childbirth (labor epidural) and postoperative pain control.

Spinal (Intrathecal):

A single injection into the subarachnoid space, typically for short-term anesthesia or pain relief (e.g., cesarean sections).

Combined Spinal-Epidural (CSE):

Combines benefits of both spinal (fast onset) and epidural (long duration) techniques.

Diagnostic Lumbar Puncture:

Sampling CSF from the subarachnoid space for analysis.

Indications

Anesthesia: During surgery or labor.

Pain Management: Acute or chronic pain, especially unresponsive to systemic medications.

Spasticity Control: Baclofen delivery for conditions like multiple sclerosis.

Neurological Testing: Diagnosing infections, malignancies, or inflammatory conditions.

Advantages of Neuraxial Techniques

Targeted Drug Delivery: Localized effect with minimal systemic exposure.

Rapid Pain Relief: Effective for severe pain management.

Lower Drug Dosage: Compared to systemic administration.

Versatility: Used in childbirth, surgeries, chronic pain, and spasticity management.

Risks and Complications

Infection: Meningitis or abscess.

Bleeding: Epidural hematoma.

Neurological Issues: Nerve damage or transient symptoms like numbness.

Cardiovascular Effects: Hypotension or bradycardia.

Drug Reactions: Respiratory depression or allergic responses.

Neuraxial approaches are critical in modern medicine for effective, localized treatment with a wide range of applications. Let me know if you'd like specific details about procedures, medications, or innovations

Neuraxial drug delivery

[Neuraxial drug delivery](#).

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