

# **Anestésias Espinhais**

**Luís Vicente Garcia**

**Disciplina de Anestesiologia**

**FMRP - USP**

# **Anestésias Espinhais**

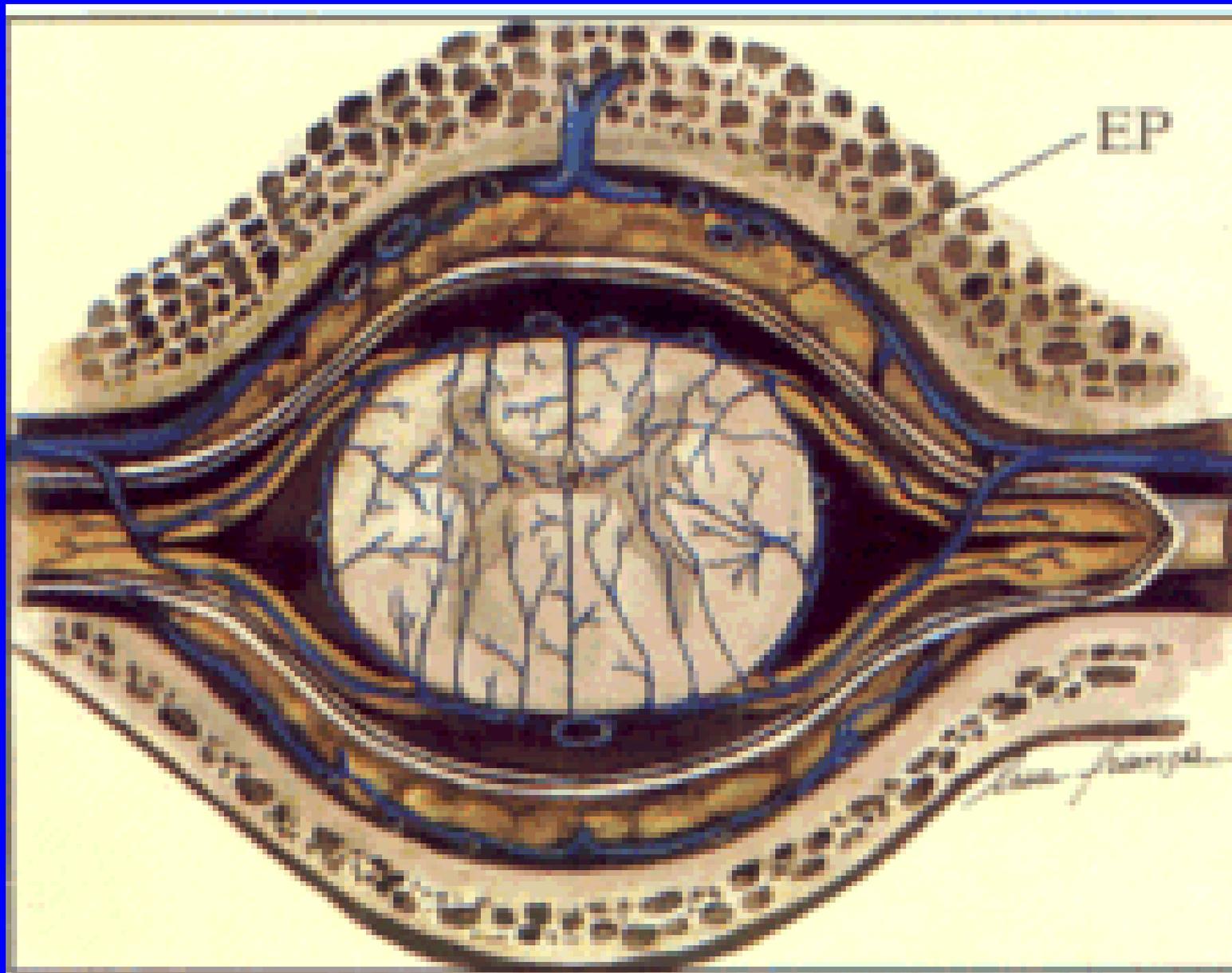
## **CONCEITO**

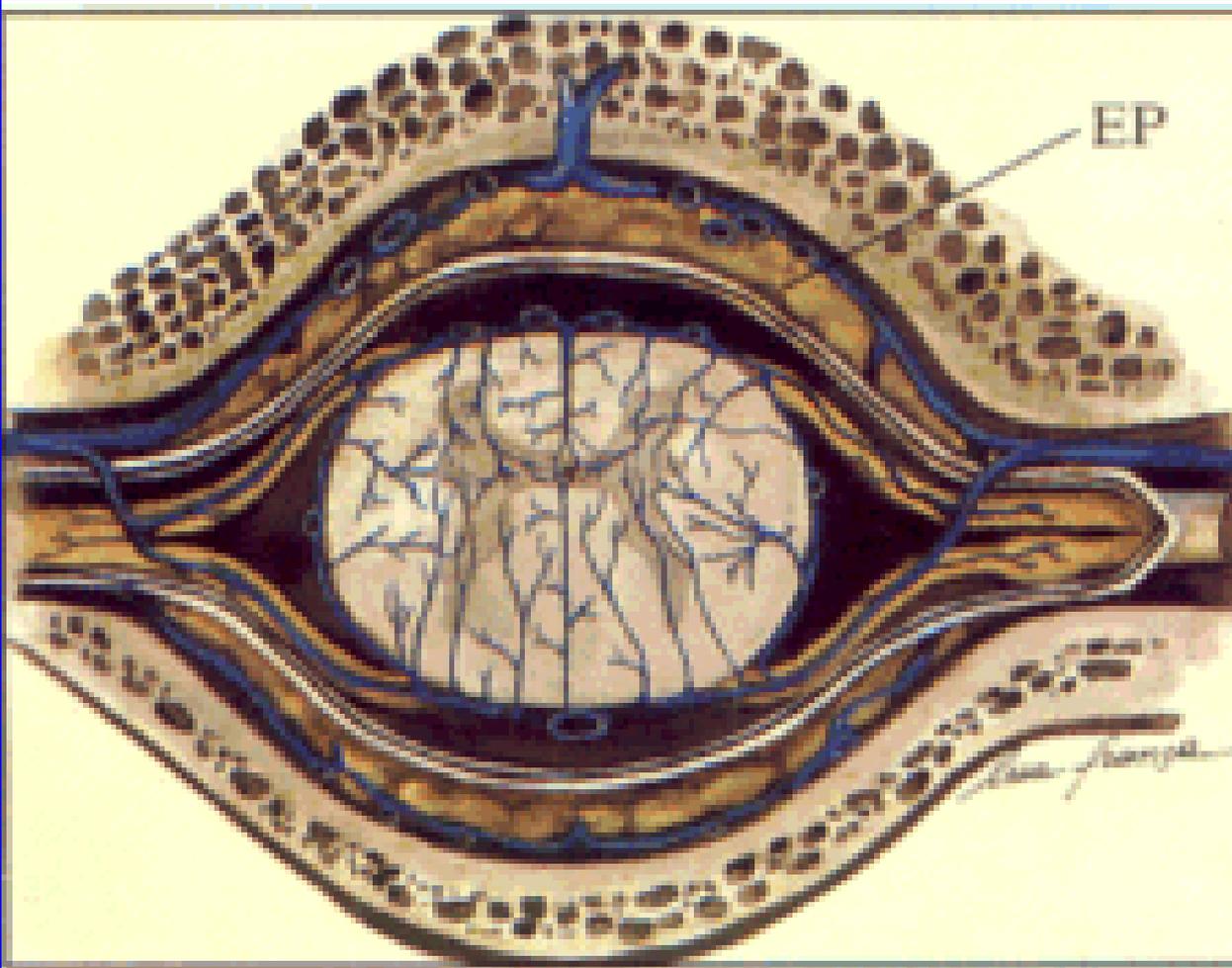
**Interrupção temporária da transmissão dos impulsos nervosos por meio da introdução de soluções anestésicas no interior do estojo raquidiano (espaço peridural e subaracnóideo)**

# Anestésias Espinhais

## CONCEITO

Interrupção da inervação  
aferente e eferente de  
estruturas somáticas e viscerais.





# Anestésias Espinhais

## INDICAÇÕES

 CIRURGIAS INFRA-UMBELICAIS

# Anestésias Espinhais

## CONTRA-INDICAÇÕES

■ **ABSOLUTAS**

■ **RELATIVAS**

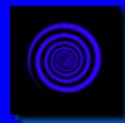
# CONTRA-INDICAÇÕES



## ABSOLUTAS

- SEPSIS
- BACTEREMIA
- INFECÇÃO LOCAL DA PUNÇÃO
- COAGULOPATIAS
- ANTICOAGULAÇÃO
- HIPERTENSÃO INTRACRANIANA
- RECUSA

# CONTRA-INDICAÇÕES



## RELATIVAS

- NEUROPATIA PERIFÉRICA
- CIRURIA PROLONGADA
- HIPERTENSÃO
- PSICOSE
- ESTENOSE AÓRTICA
- HIPERTENSÃO

# Espaços

## Peridural



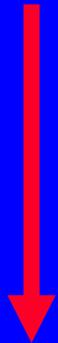
**VASOS**

**GORDURAS**

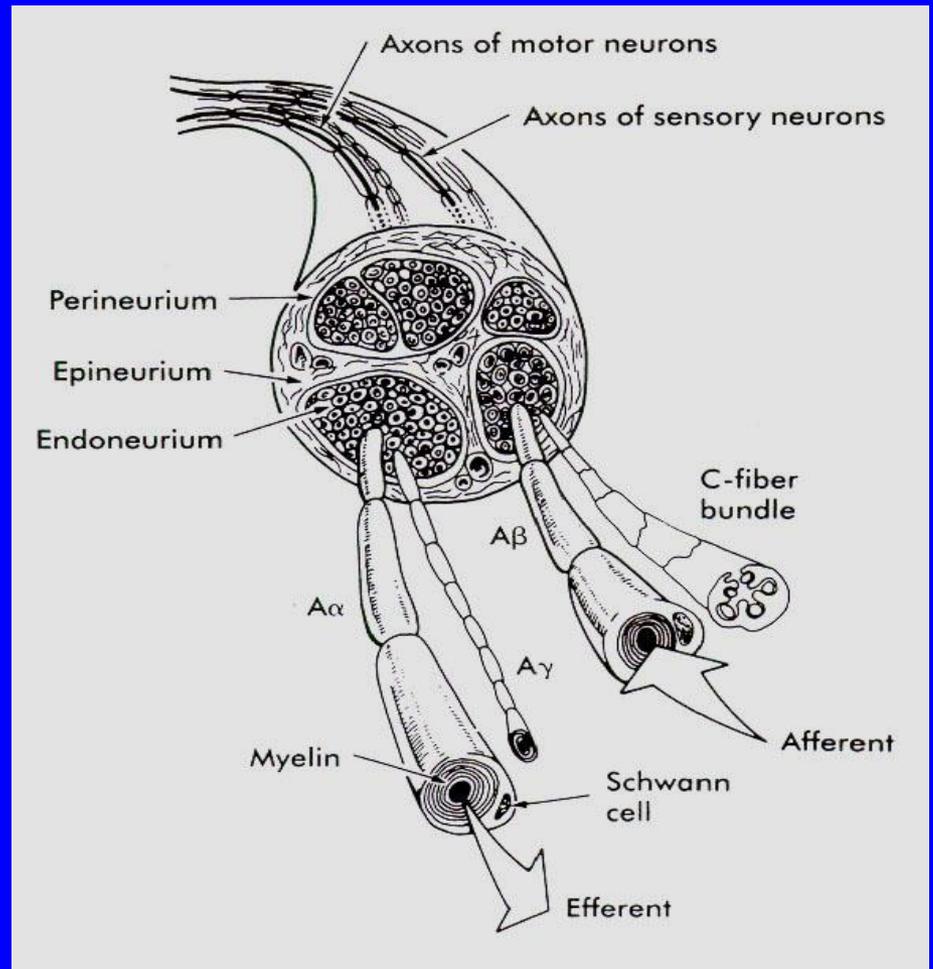
**NERVOS**

# espaços

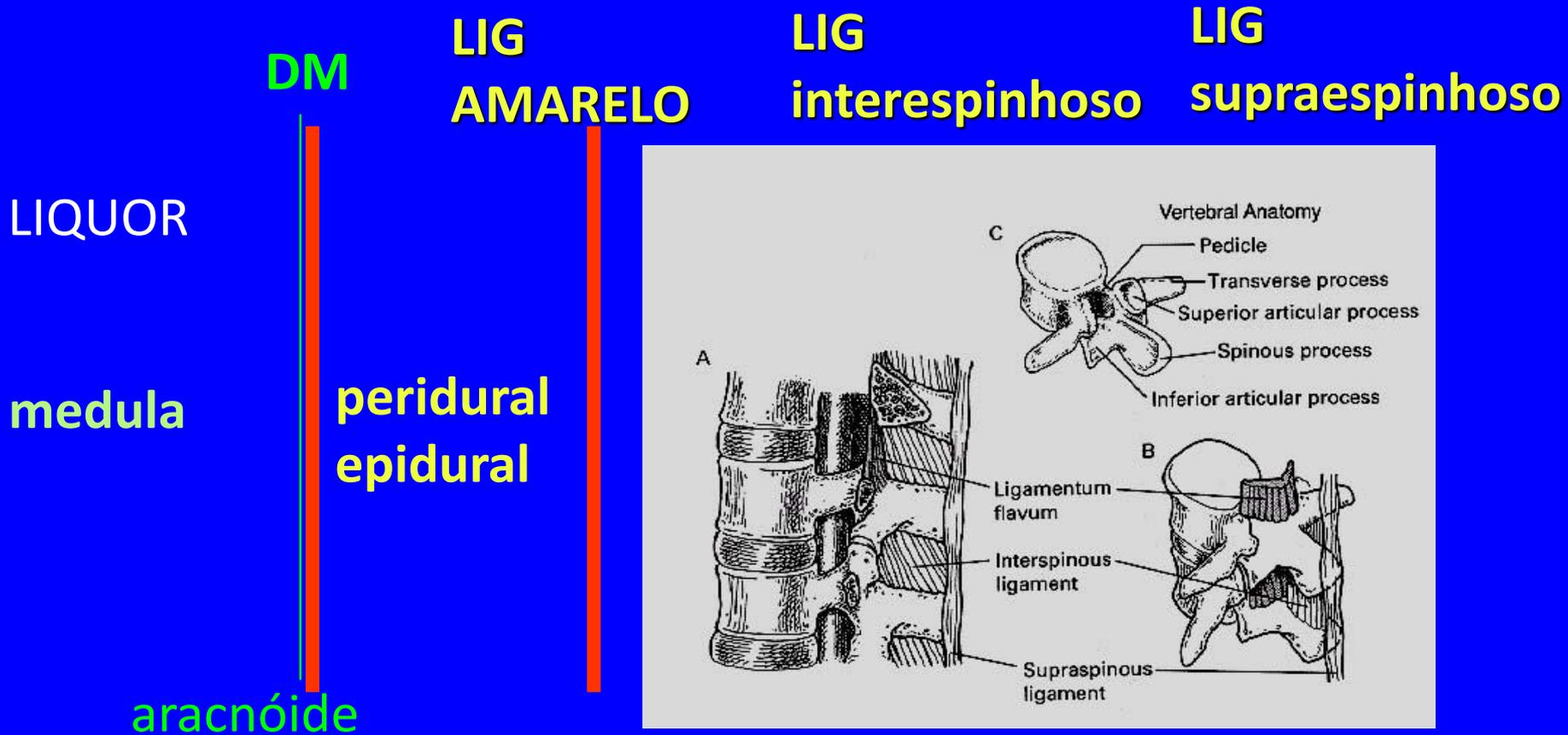
Peridural



**VASOS**  
**GORDURAS**  
**NERVOS**



# Espaços



# Espaços

subaracnóideo



# líquor

# Anestésias Espinhais

Interrupção da interação aferente e eferente de estruturas somáticas e viscerais.



inervação motora e sensorial

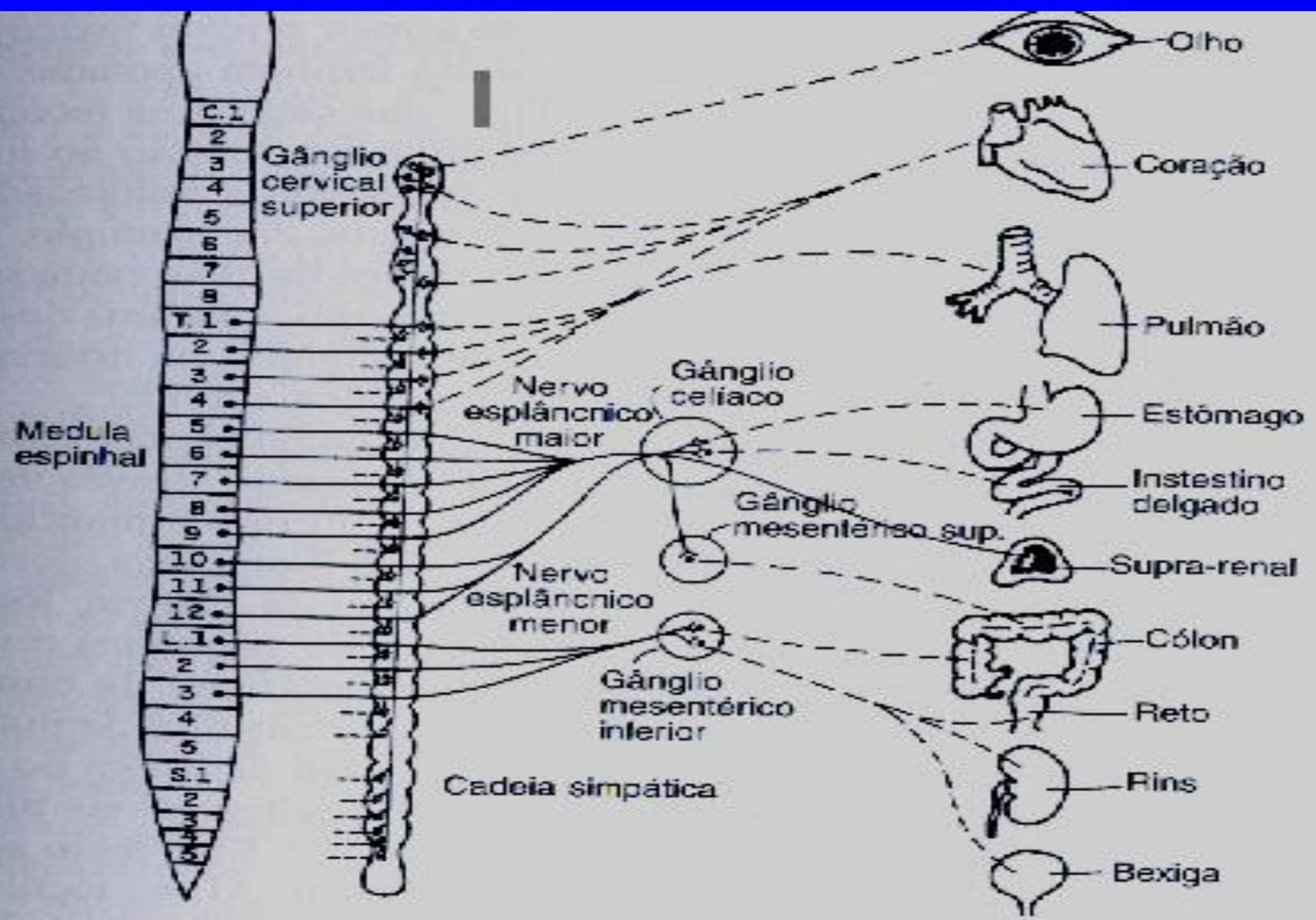
# Anestésias Espinhais

## CONCEITO

Interrupção a ineração aferente e eferente de estruturas somáticas e viscerais.



sistema nervoso autônomo



Medula espinhal

Gânglio cervical superior

Cadeia simpática

Nervo esplâncnico maior

Nervo esplâncnico menor

Gânglio celiaco

Gânglio mesentérica sup.

Gânglio mesentérico inferior

Olho

Coração

Pulmão

Estômago

Intestino delgado

Supra-renal

Cólon

Reto

Rins

Bexiga

# Anestésias Espinhais

## efeitos

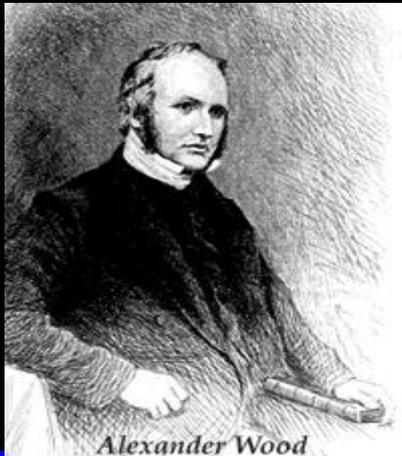
- bloqueio simpático
- analgesia
- bloqueio motor

# ANESTESIA REGIONAL

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Seringa hipodérmica



Pravaz & Wood

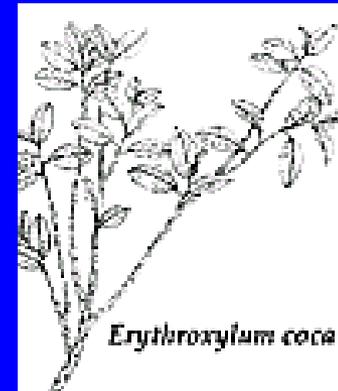
1840

# ANESTHESIA REGIONAL

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**FREUD & KOLLER**



# Anestésias Espinhais

## ANATOMIA

### COLUNA VERTEBRAL

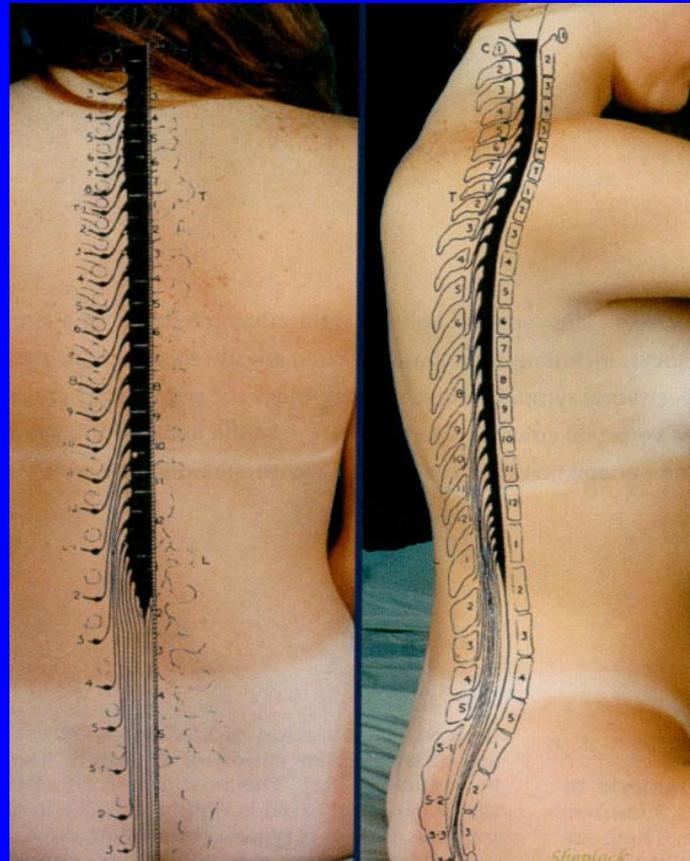
**33 VÉRTEBRAS**



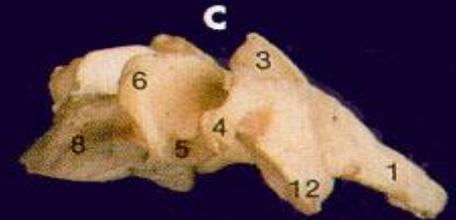
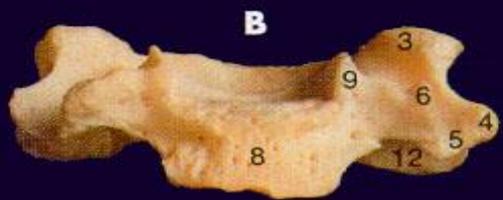
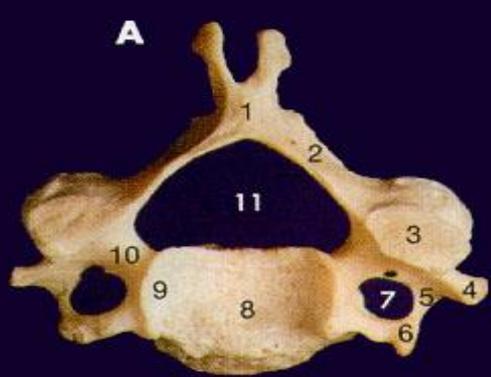
- 07 CERVICAIS**
- 12 TORÁNICAS**
- 05 LOMBARES**
- 05 SACRAS**
- 04 COCCÍGEAS**

# Anestésias Espinhais

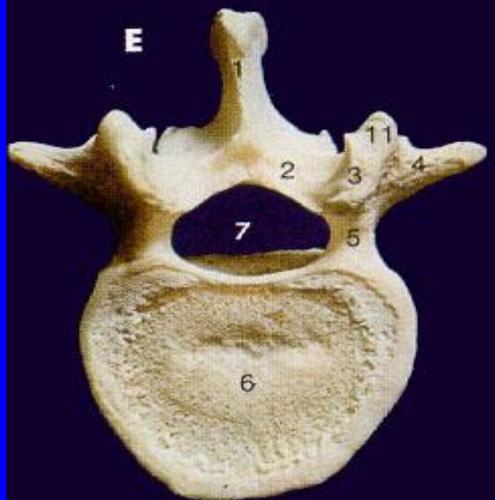
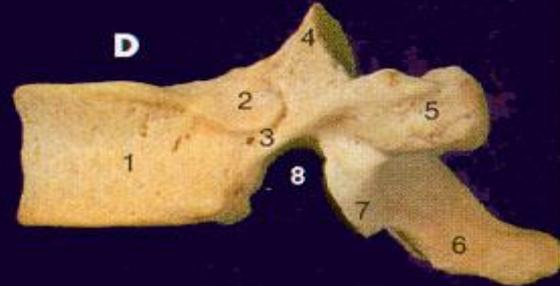
## ANATOMIA



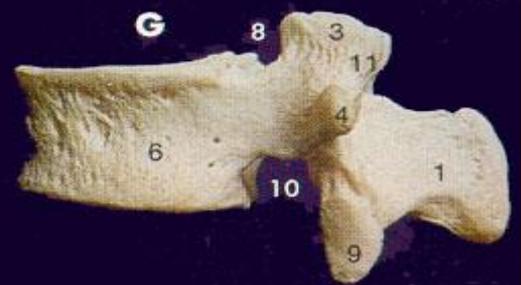
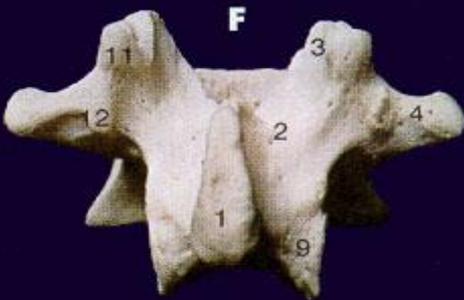
**Fifth Cervical Vertebra**

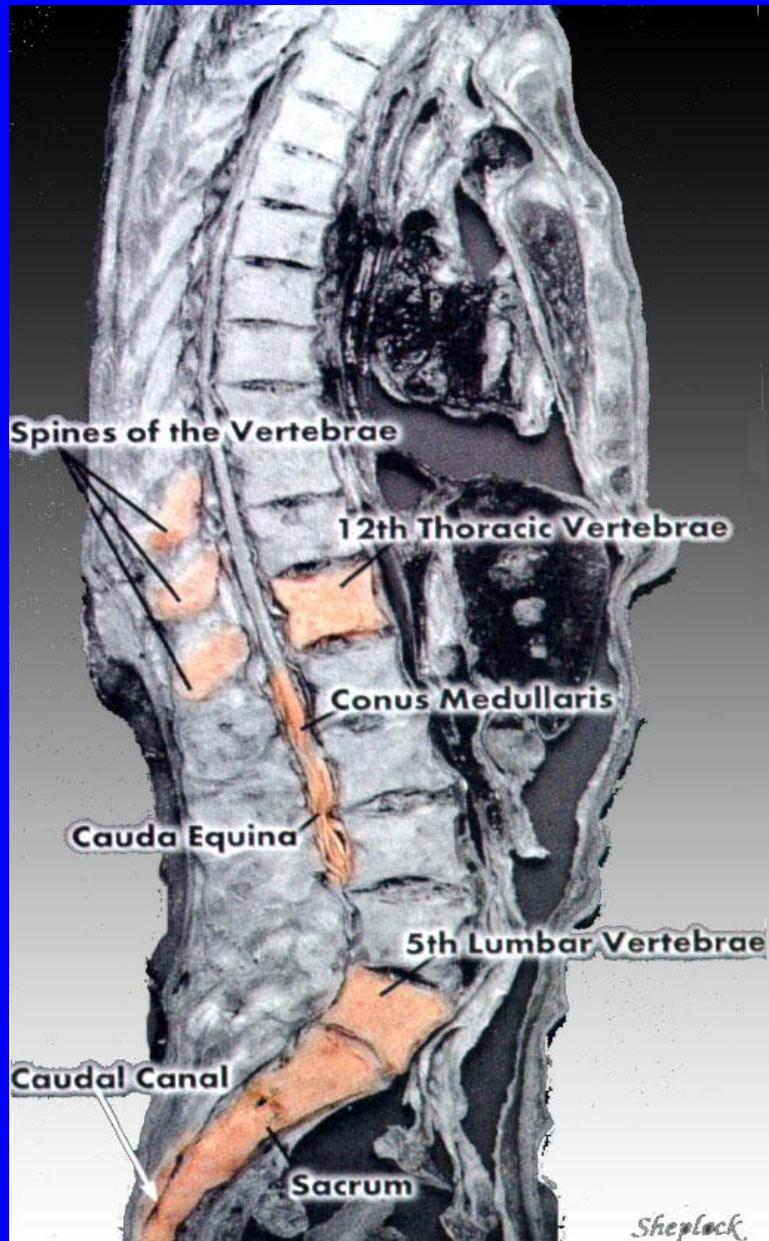


**Tenth Thoracic Vertebra**

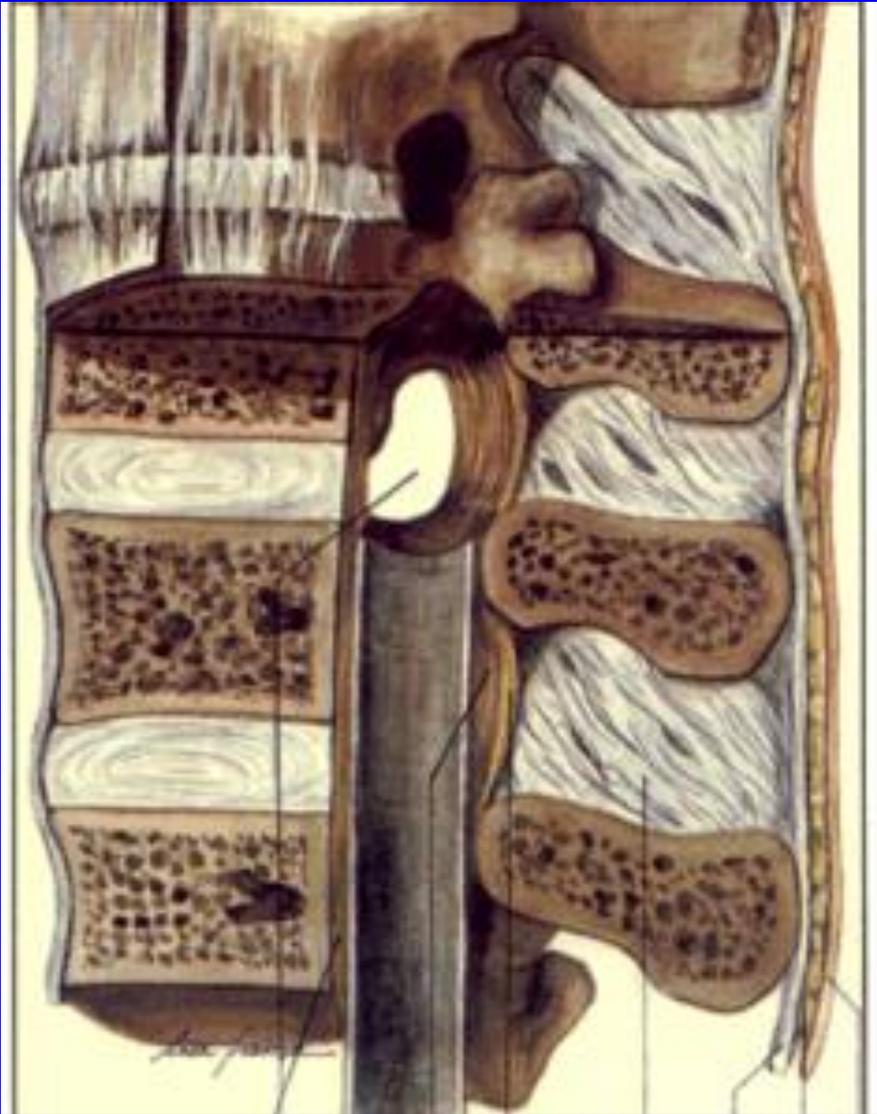


**First Lumbar Vertebra**

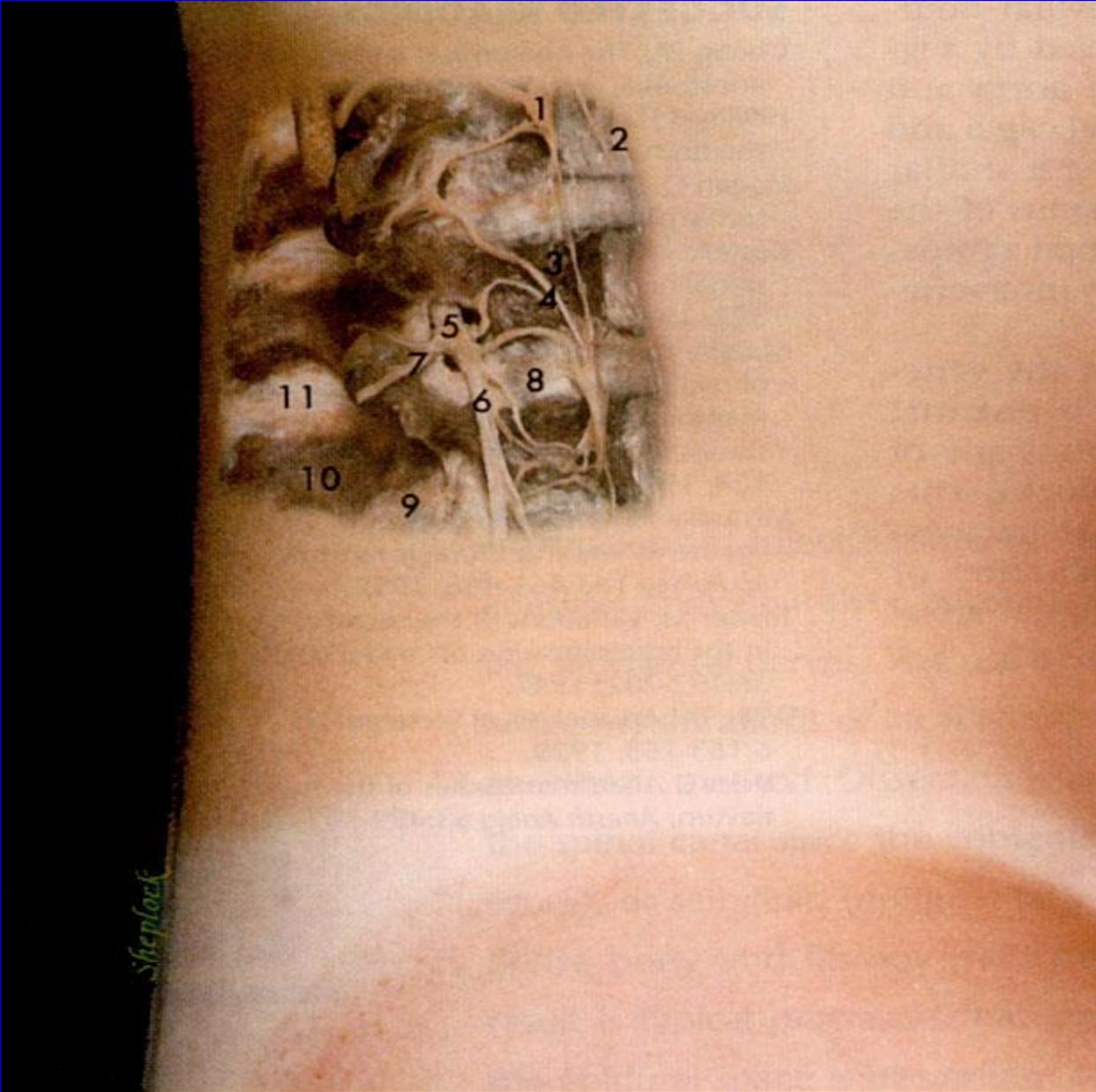


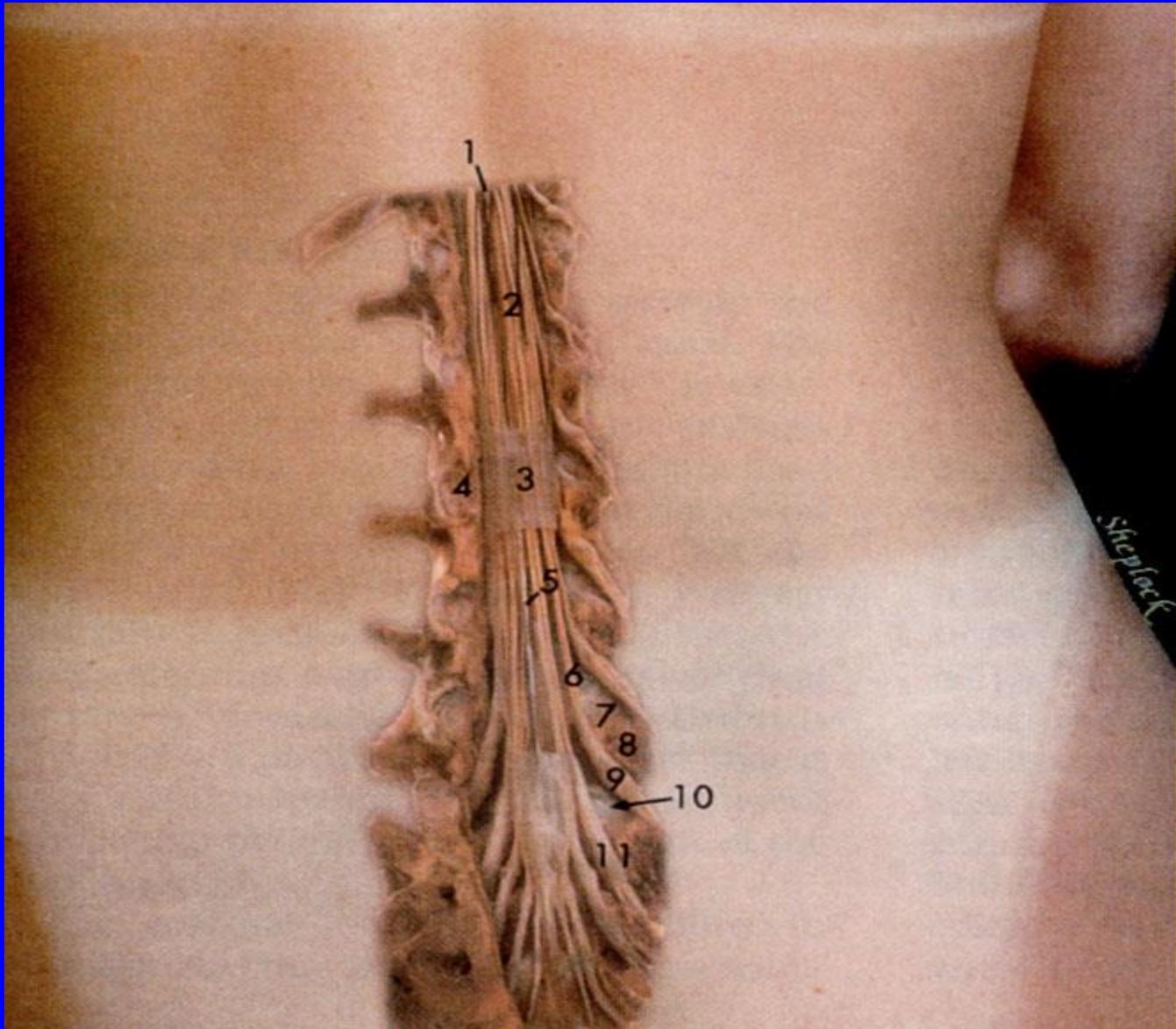


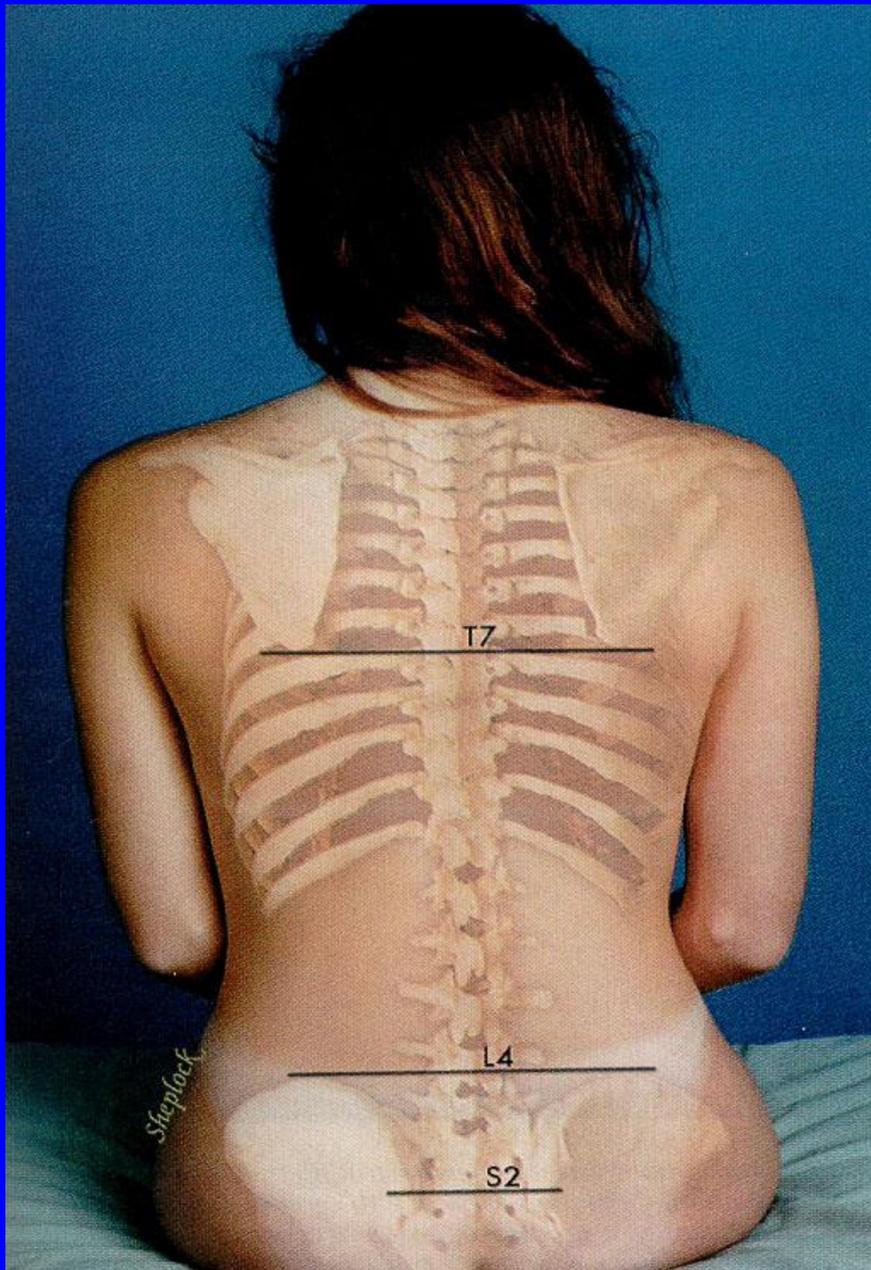
## Cauda equina











# Relações anatômicas

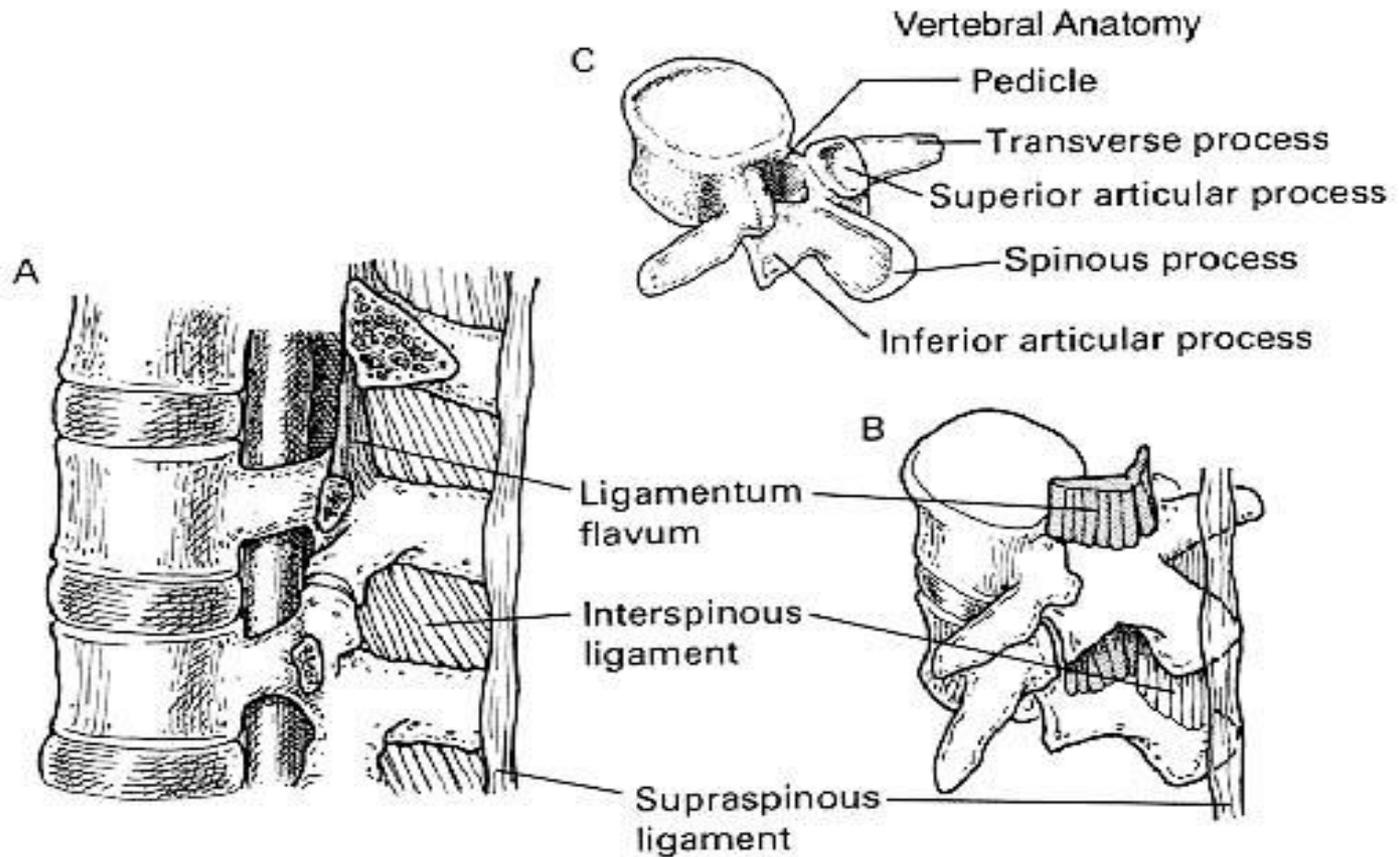
# Anatomia



Final da medula

L1

# Ligamentos



**RAQUIANESTESIA**

# RAQUIANESTESIA

## História



Corning (1885)



Bier (1898)

# ANESTESIA REGIONAL

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BIER



1899

# Espaços

subaracnóideo



# líquor

# Espaços

Subaracnóideo → **LÍQUOR**

Volume: 150 ml (renovação diária: 50 ml)



25% - sistema ventricular

75% - espaço subaracnóideo

20% intracraniano

55% - canal espinhal

# Espaços

Subaracnóideo → **LÍQUOR**

## CARACTERÍSTICAS

- ⇒ **INCOLOR**
- ⇒ **CLARO**
- ⇒ **CRISTALINO**
- ⇒ **NÃO COAGULÁVEL**

# Espaços

Subaracnóideo



LÍQUOR

CARACTERÍSTICAS

PRESSÃO

SENTADO: 35 a 55 cm de água

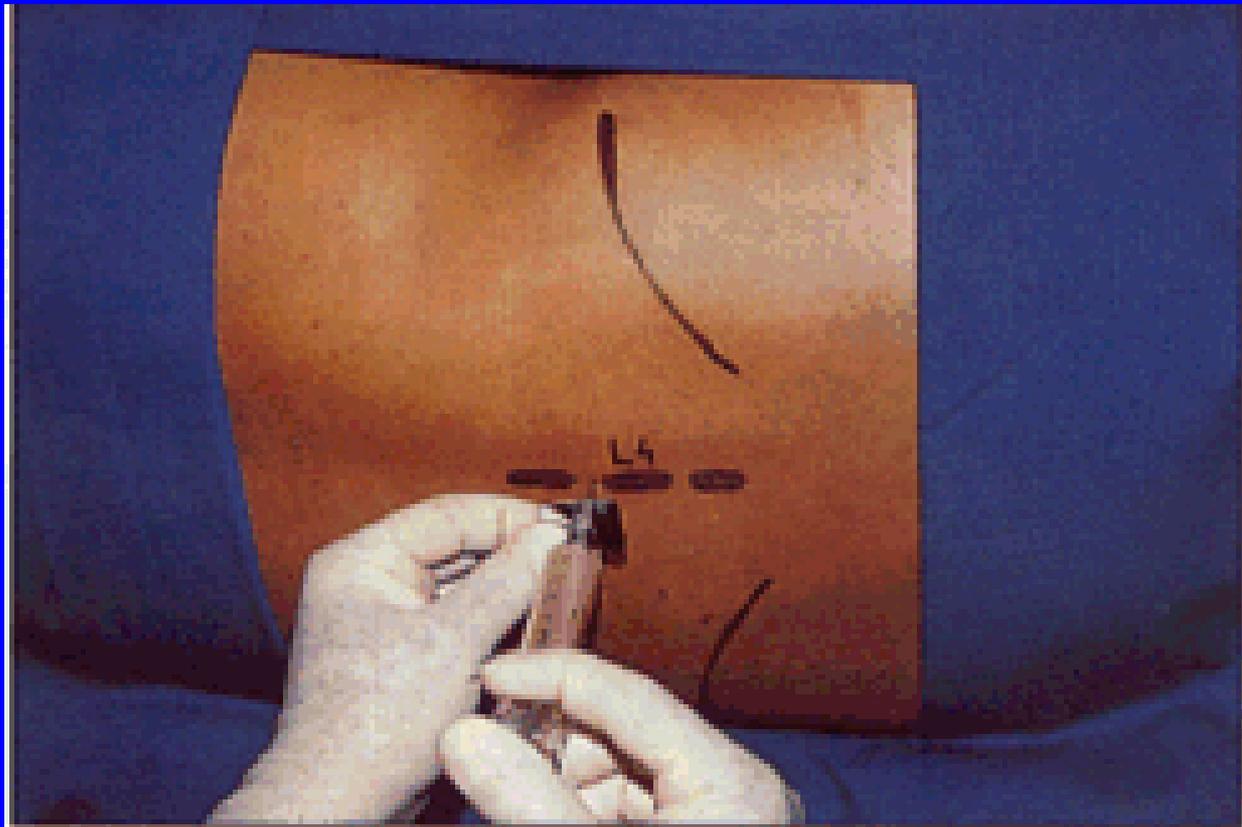
DEITADO: 7 cm de água

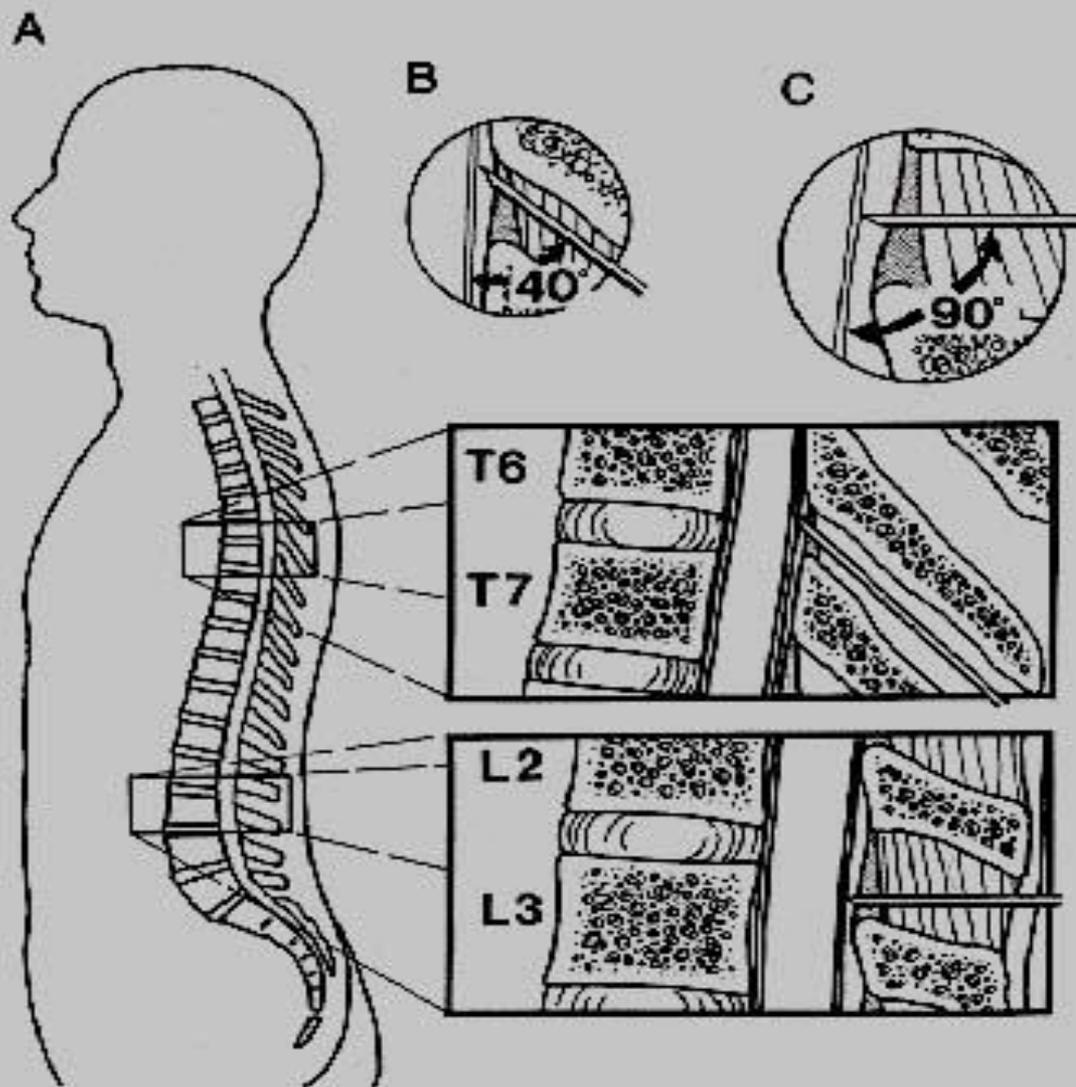
# Espaços

## COMPOSIÇÃO DO LÍQUOR

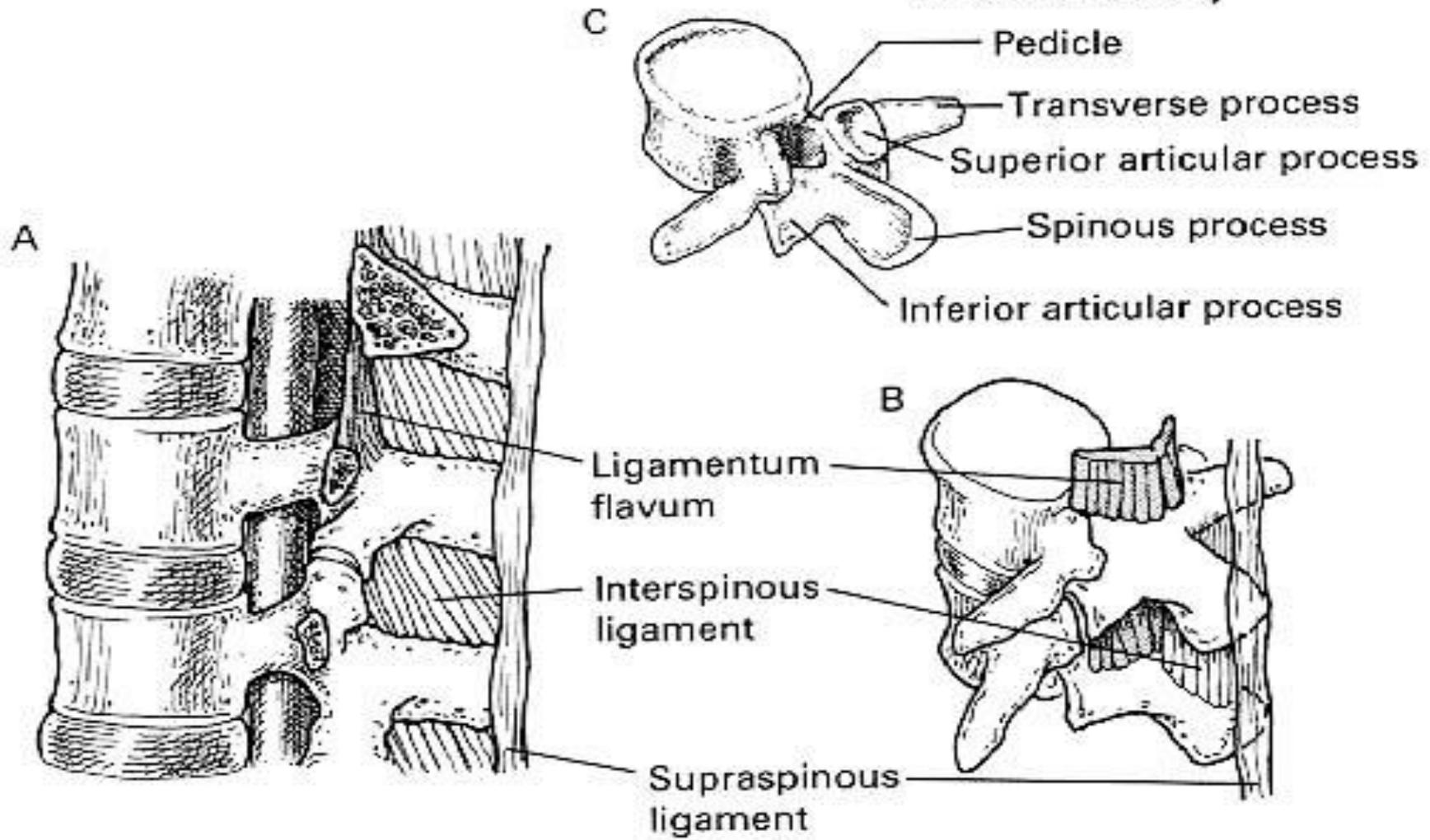
<b>pH</b>		<b>7,4</b>
<b>Densidade</b>		<b>1003-1009</b>
<b>Bicarbonato</b>		<b>25-30 mmol/l</b>
<b>Proteínas</b>		<b>20-30 mg</b>
<b>Glicose</b>		<b>45-85 mg%</b>
<b>Cloro</b>		<b>720-750 mg%</b>
<b>Sódio</b>		<b>140-150 mg%</b>
<b>Linfócitos</b>		<b>&lt; 5 per ml</b>

# Técnica





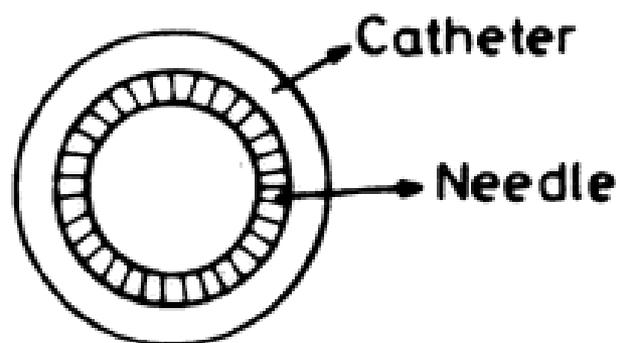
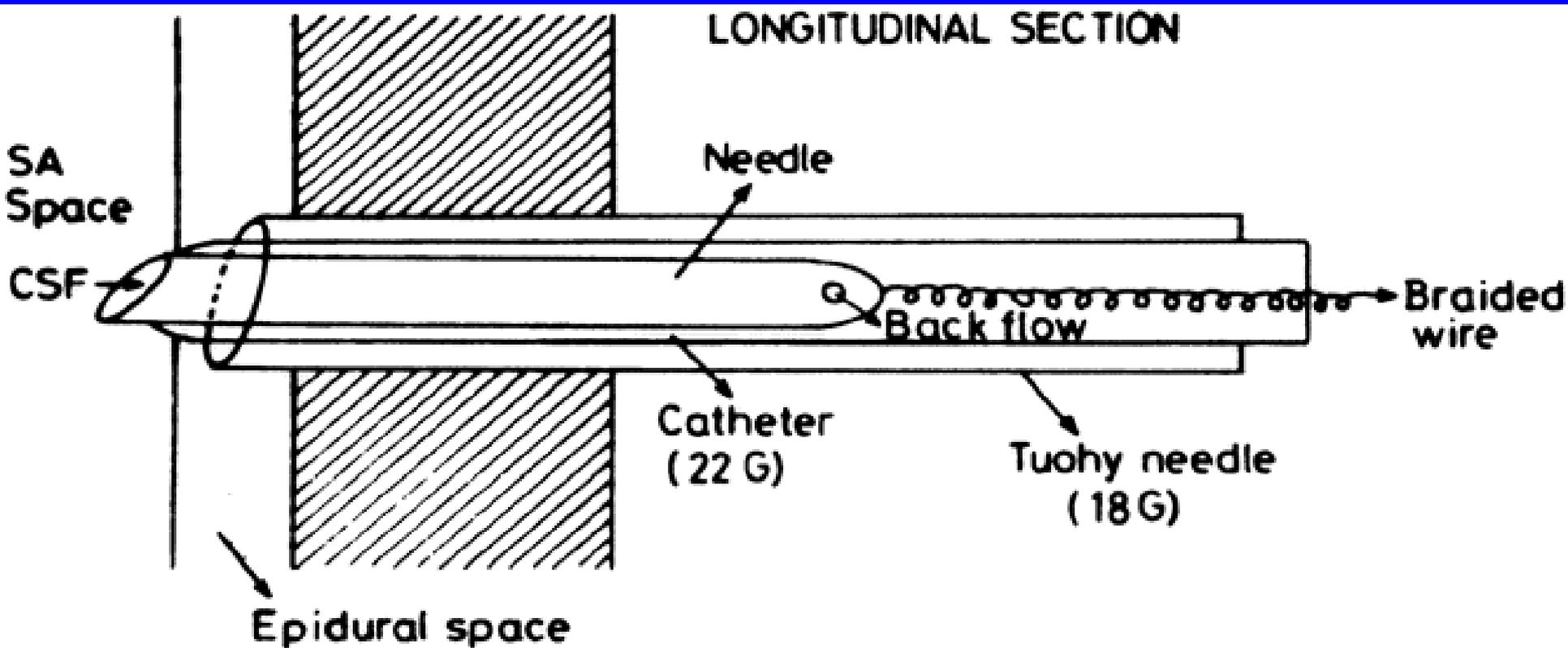
# Vertebral Anatomy



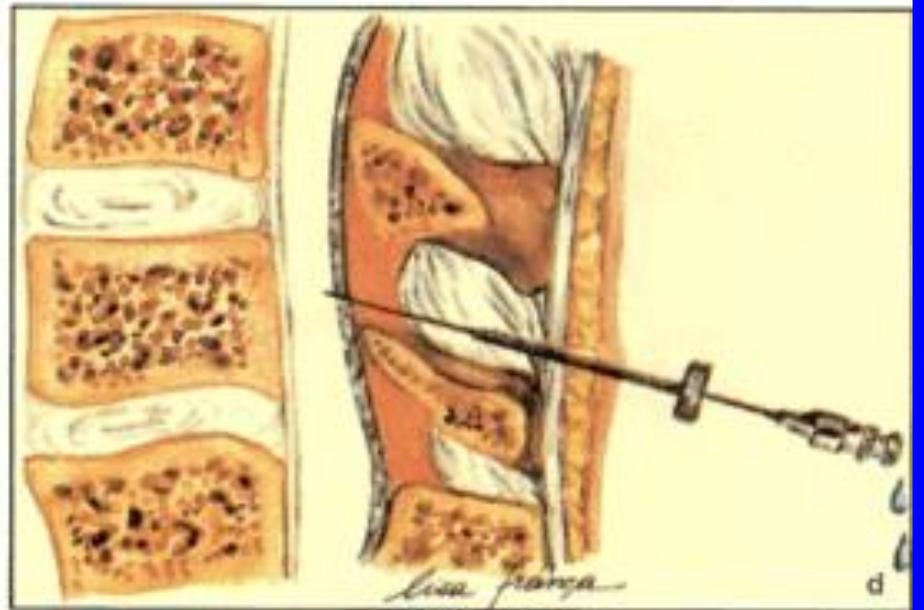
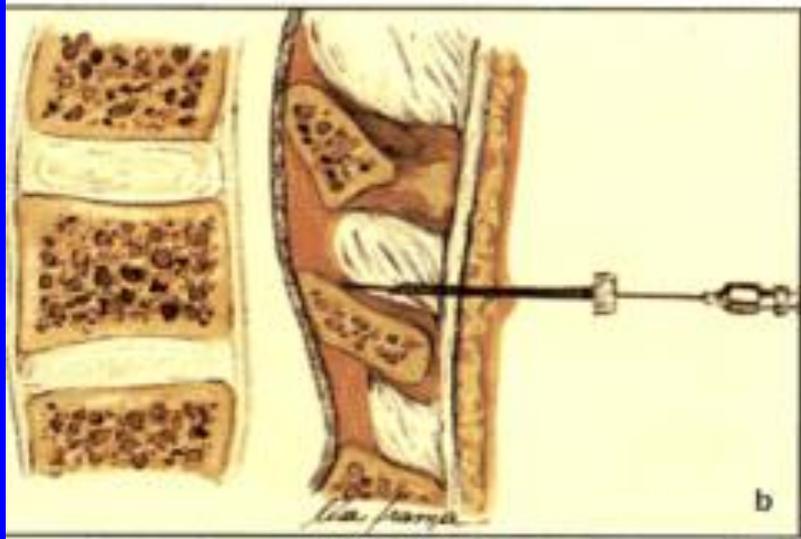
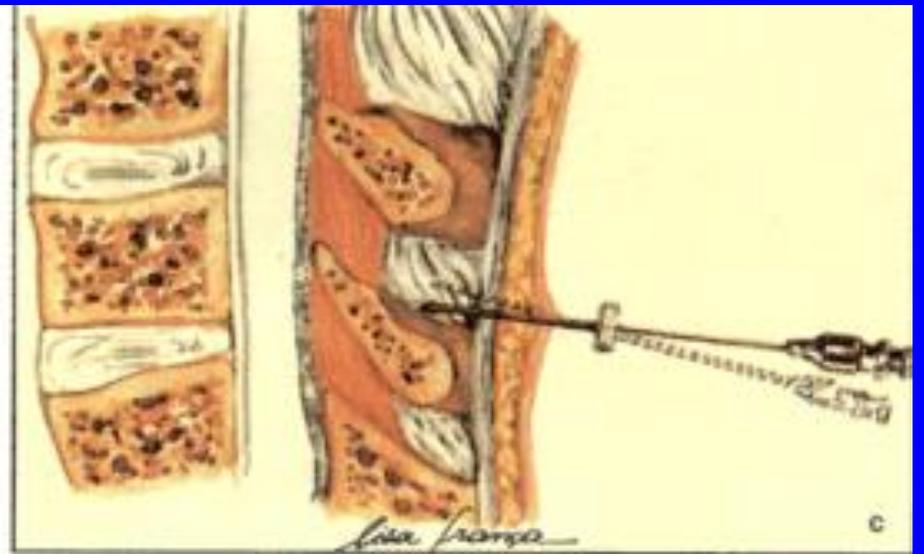
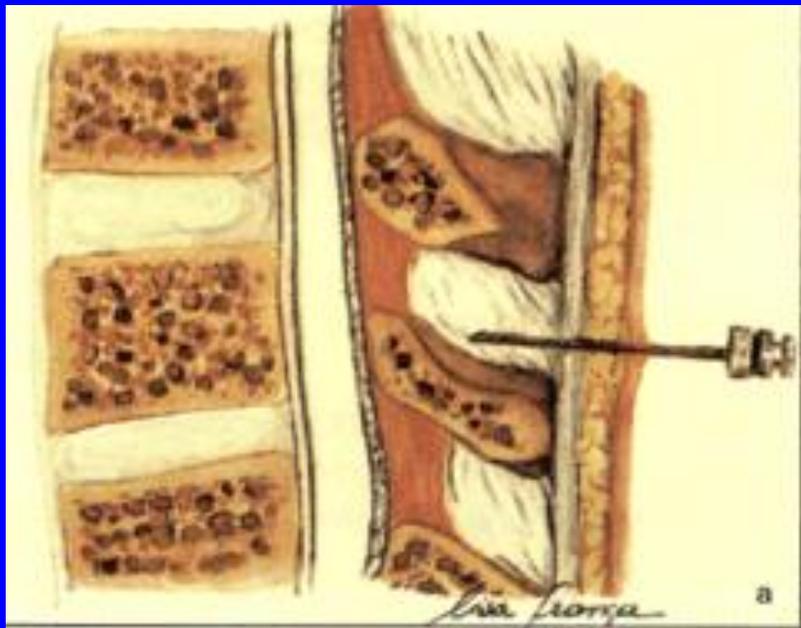
# **RAQUIANESTESIA**

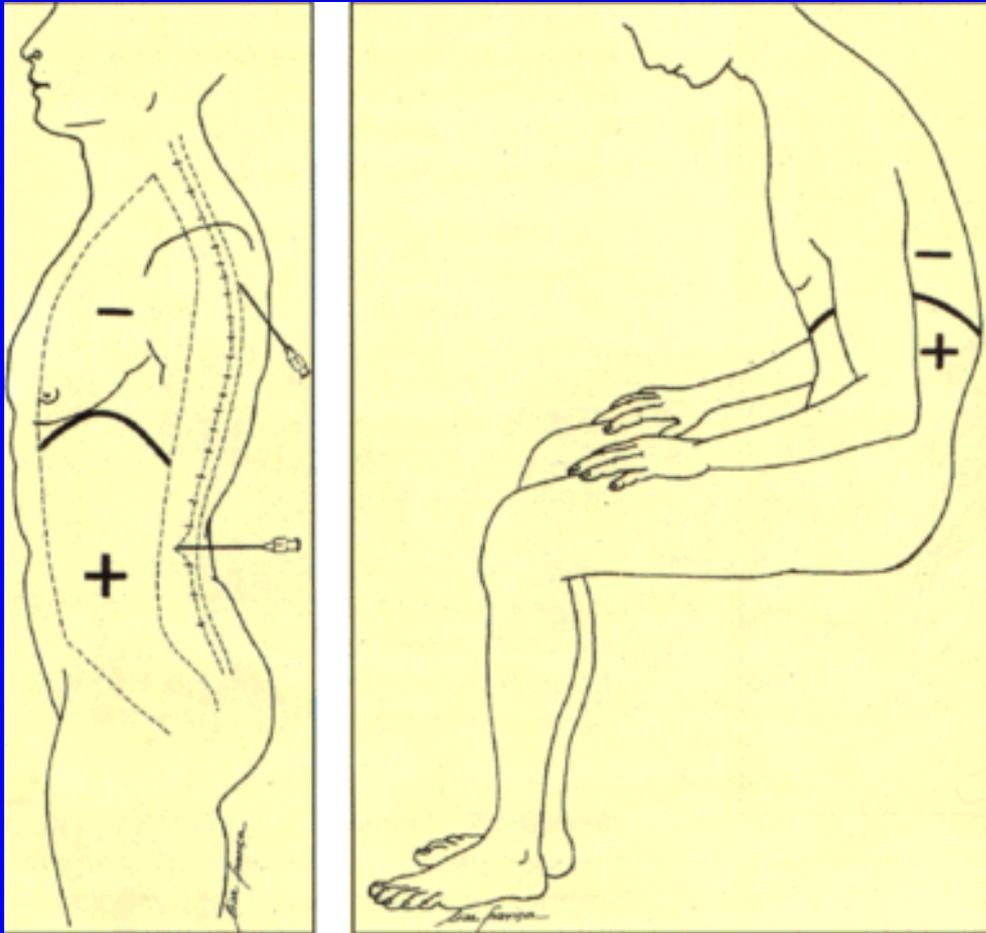
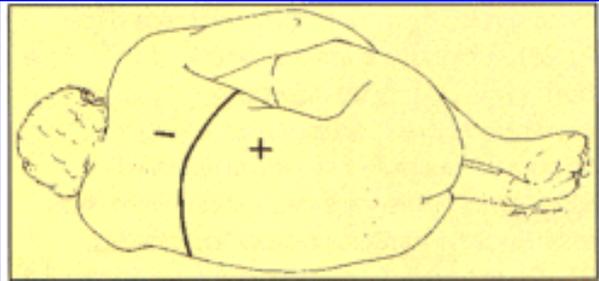
**Identificação do espaço**

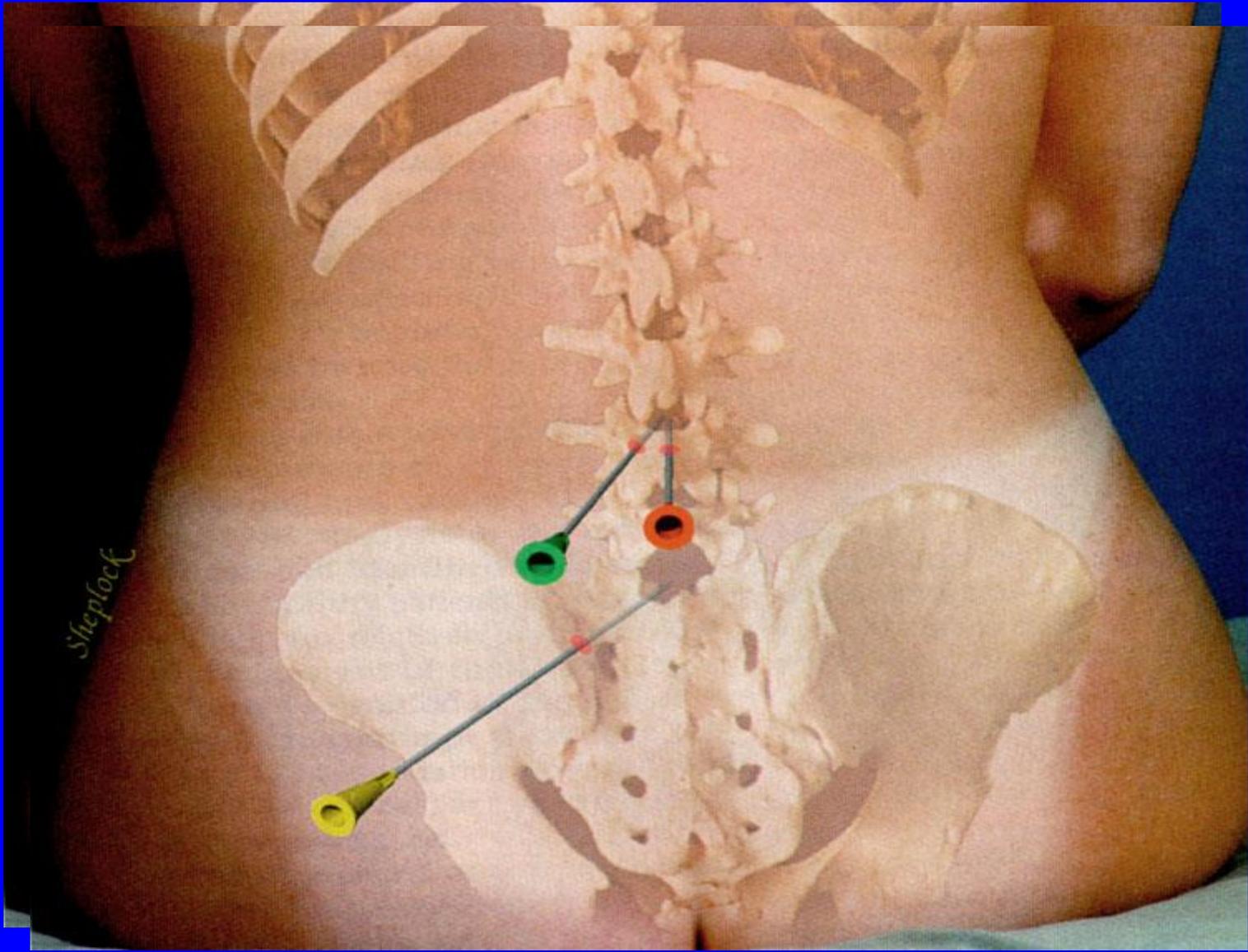
**Gotejamento do líquido**



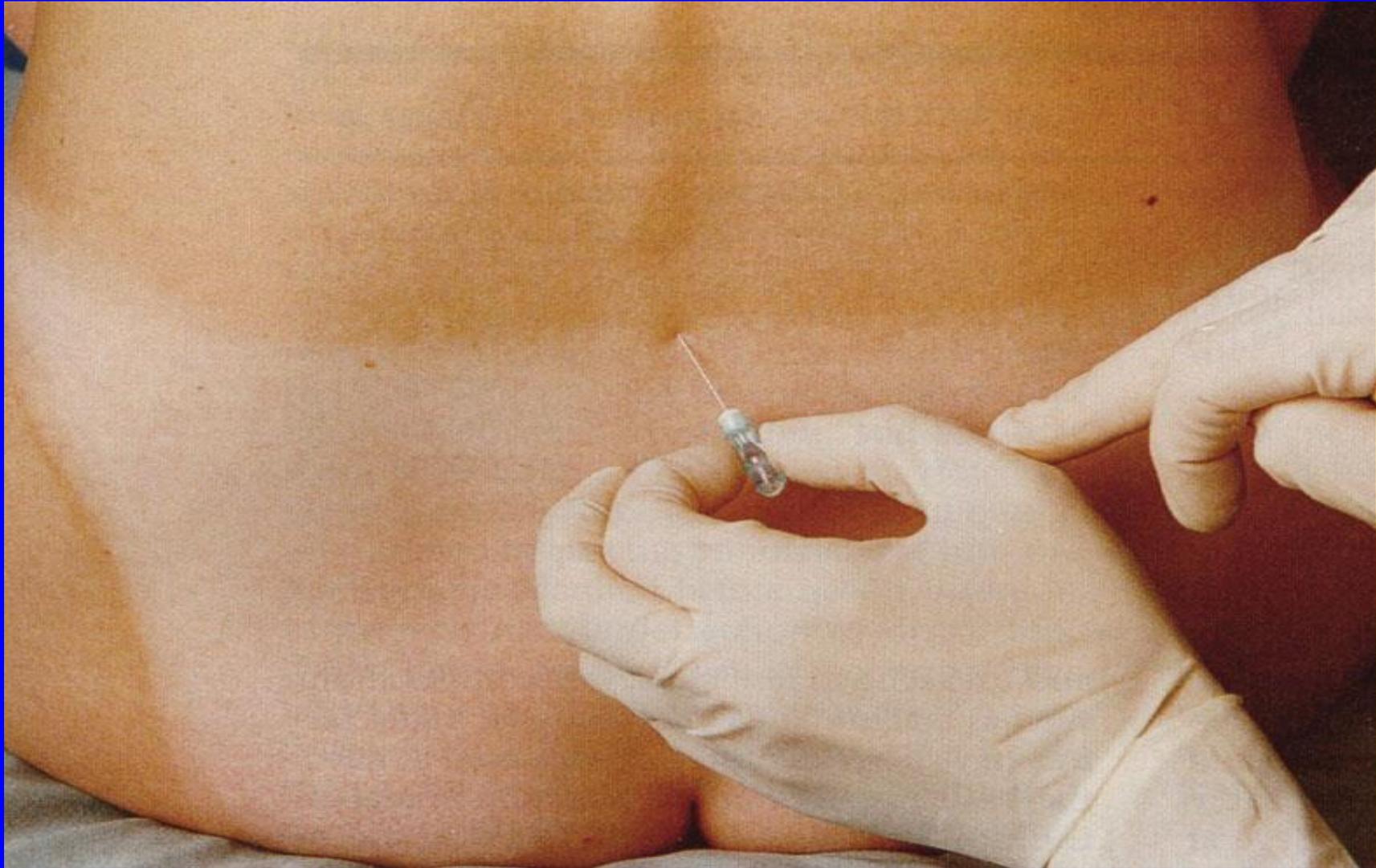
### CROSS SECTION

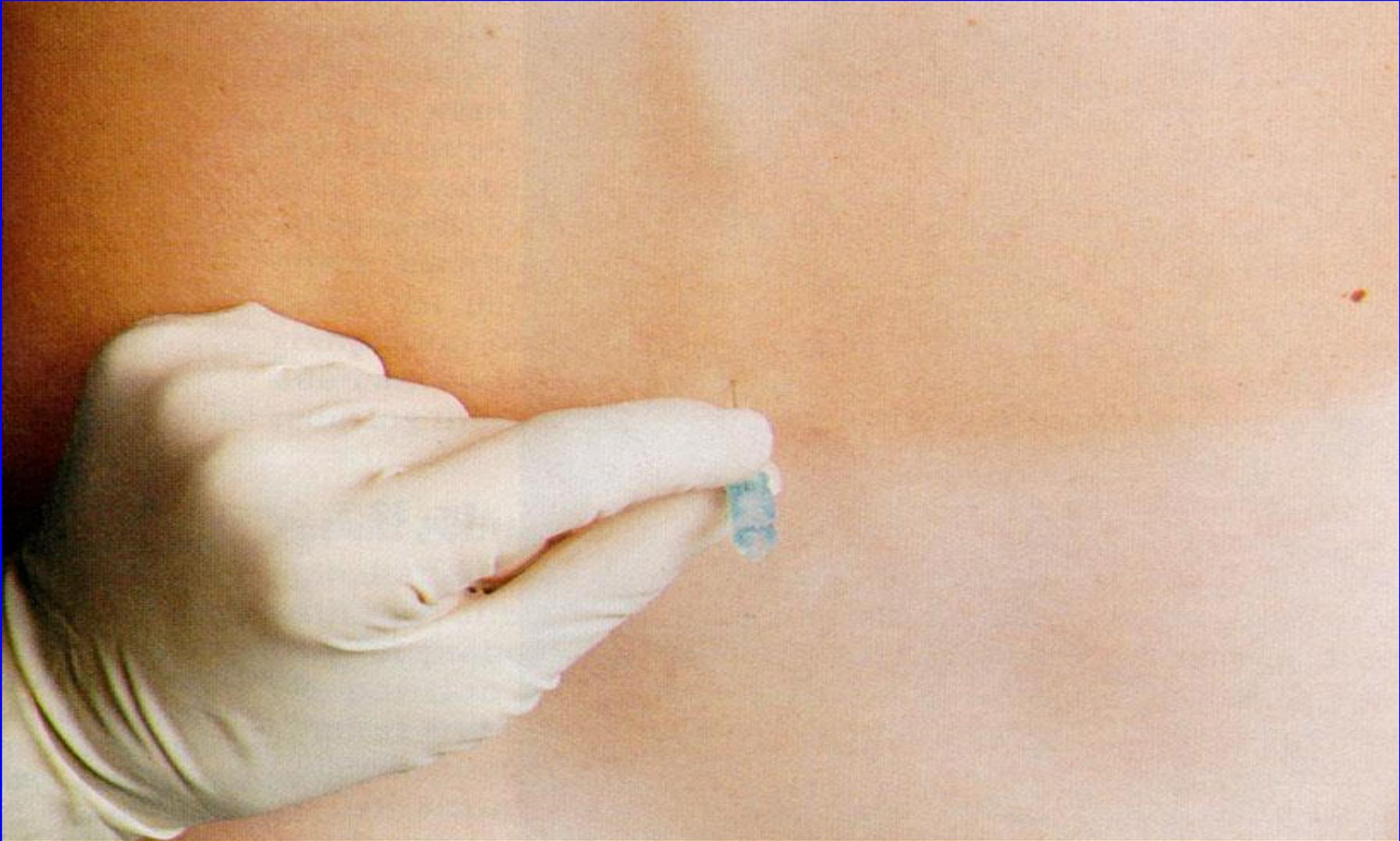


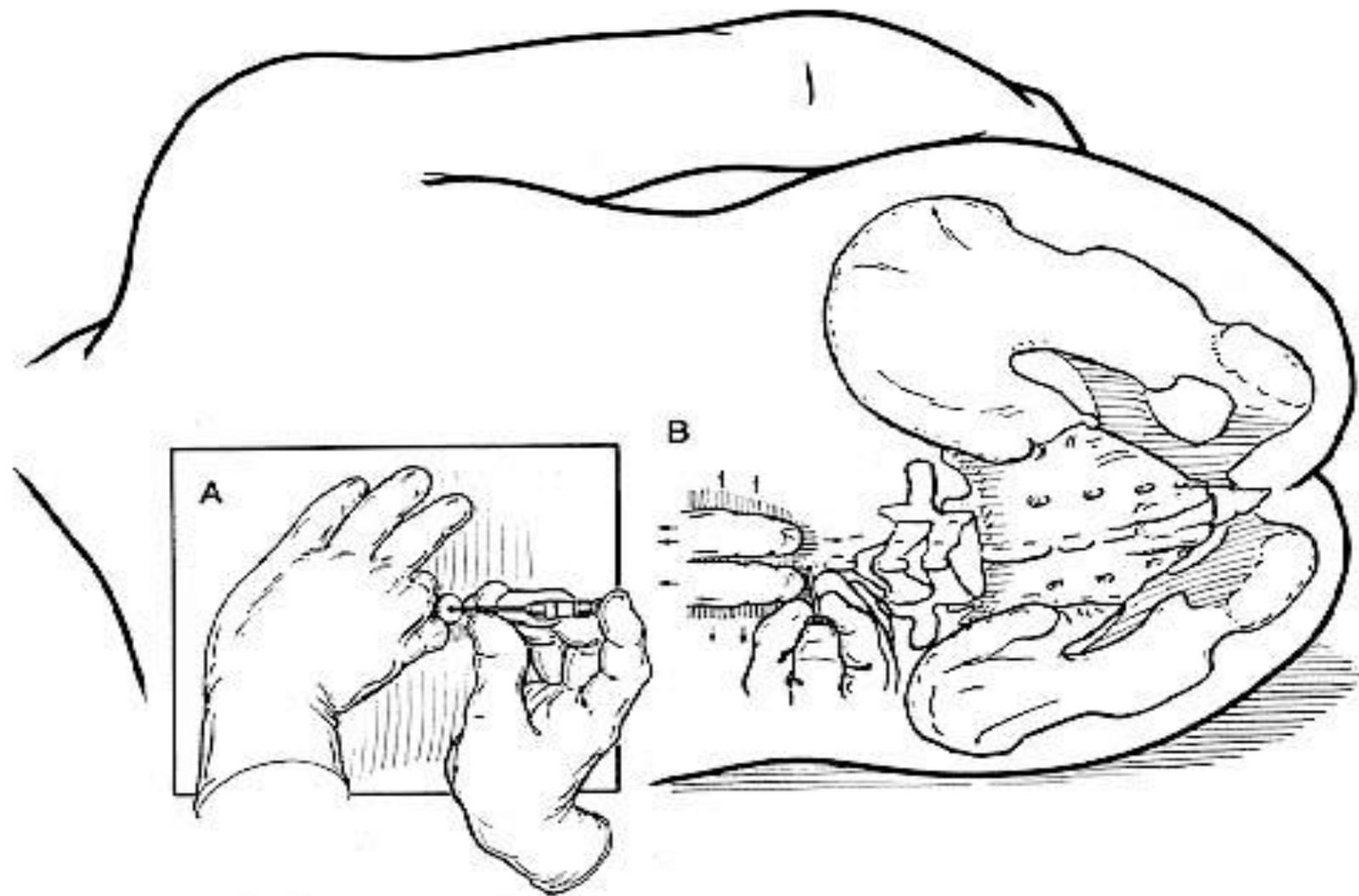


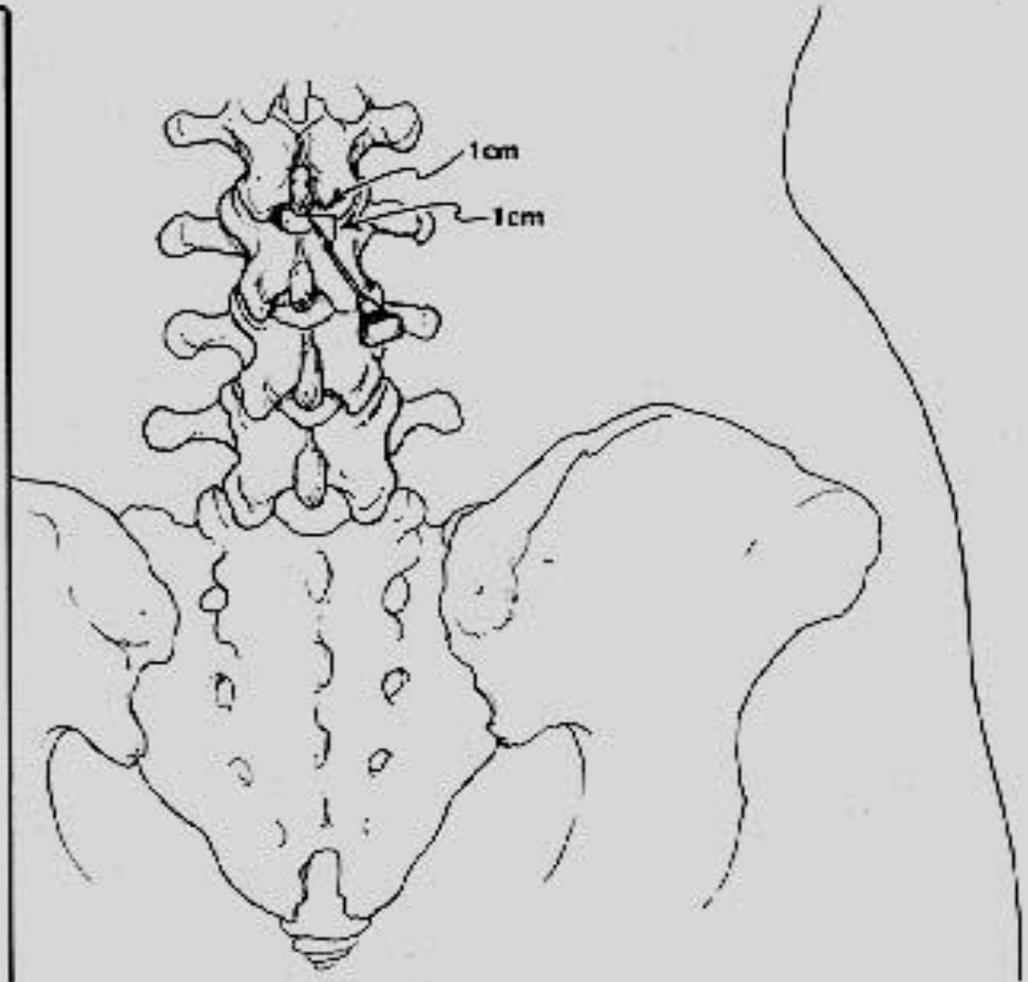
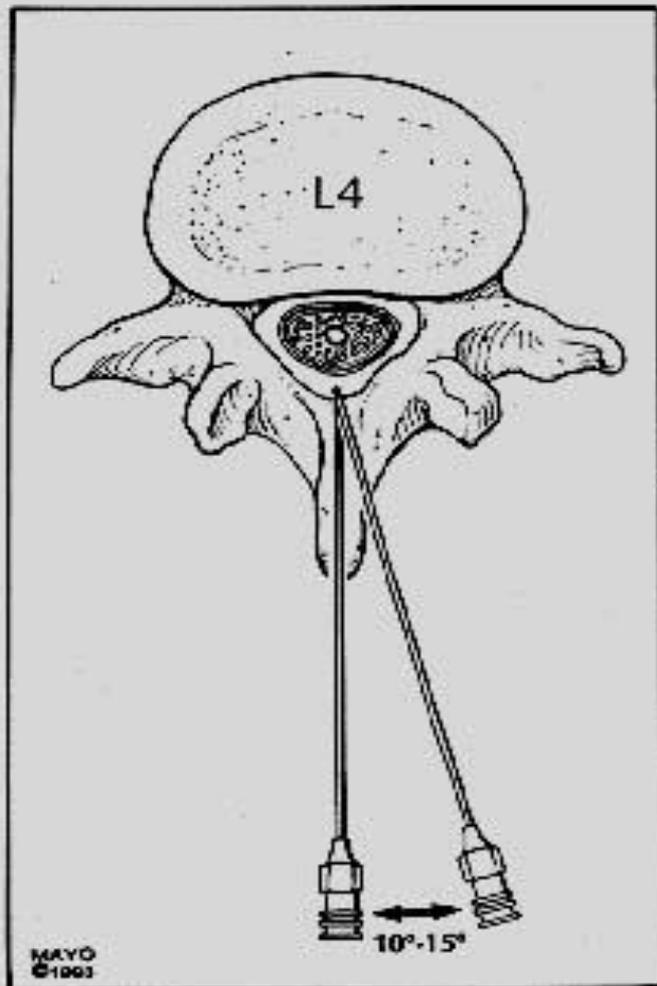


Sheplock









# RAQUIANESTESIA

## Extensão do bloqueio

### ● Paciente

Idade  
Altura  
Peso  
Sexo  
Anatomia  
Posição

### ● Técnica

Local da injeção  
Direção da Agulha  
Bisel  
Barbotage  
Velocidade

### ● Líquor

Volume  
Pressão  
(tosse, Valsalva)  
Densidade

### ● Anestésico

Densidade  
Massa  
Concentração  
Temperatura

# RAQUIANESTESIA

## Extensão do bloqueio

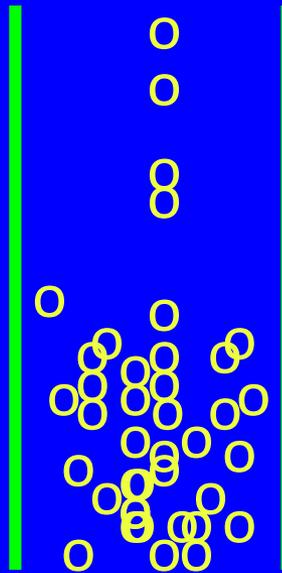
- **Volume**
  - **Massa**
  - **Baricidade**
- velocidade de injeção
  - local da punção
  - barbotagem

# RAQUIANESTESIA

## Extensão do bloqueio

Concentração não Efetiva

Concentração Efetiva

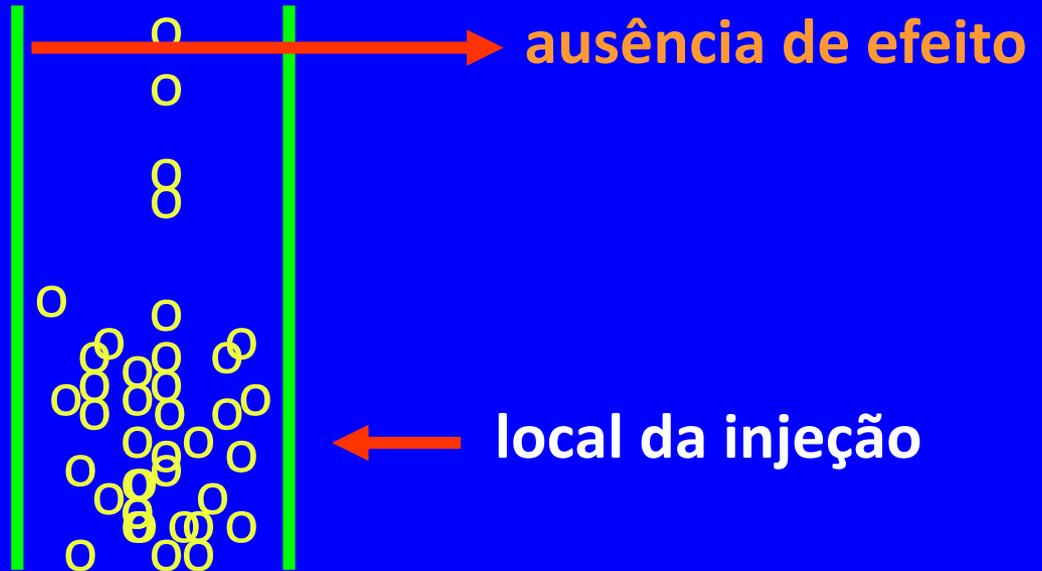


← local da injeção

# RAQUIANESTESIA

## Extensão do bloqueio

Concentração não Efetiva



Concentração Efetiva

local da injeção

# RAQUIANESTESIA

## ESCOLHA DO ANESTÉSICO

- LATÊNCIA
- DURAÇÃO

# RAQUIANESTESIA

## ESCOLHA DO ANESTÉSICO

- LIDOCAÍNA
- BUPIVACAÍNA

# RAQUIANESTESIA

## Efeitos Colaterais

- Hipotensão
- Bradicardia ?
- Taquicardia ?

# RAQUIANESTESIA

## Complicações

-  **Dor local injeção**
-  **Dor lombar**
-  **Retenção urinária**
-  **Meningite**

# RAQUIANESTESIA

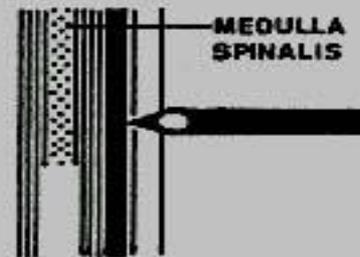
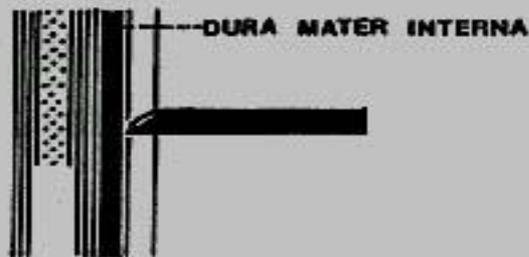
## Complicações

-  Lesão de Nervo
-  raqui “alta”
-  cefaléia pós-raqui

# Cefaléia pós-raqui

**VERTICAL INSERTION**

**PARALLEL INSERTION**

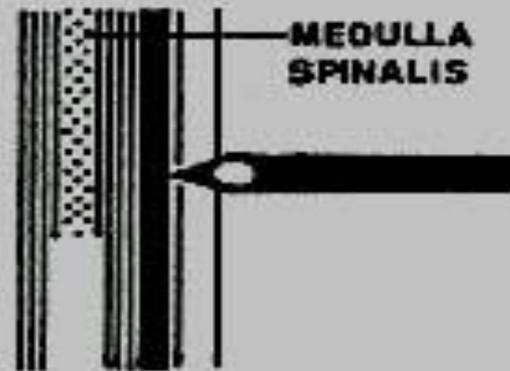
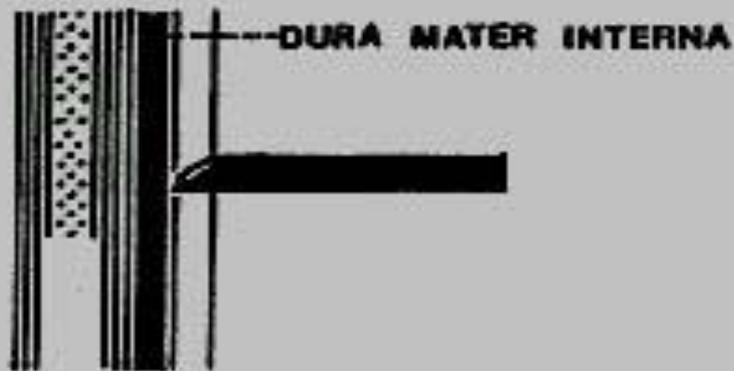


**DURAL HOLE**

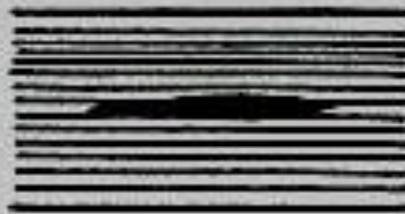


**VERTICAL INSERTION**

**PARALLEL INSERTION**



**DURAL HOLE**



**Cefaléia pós-raqui**

**Característica**

**cefaléia de decúbito**

# Cefaléia pós-raqui

**PROFILAXIA**

**X**

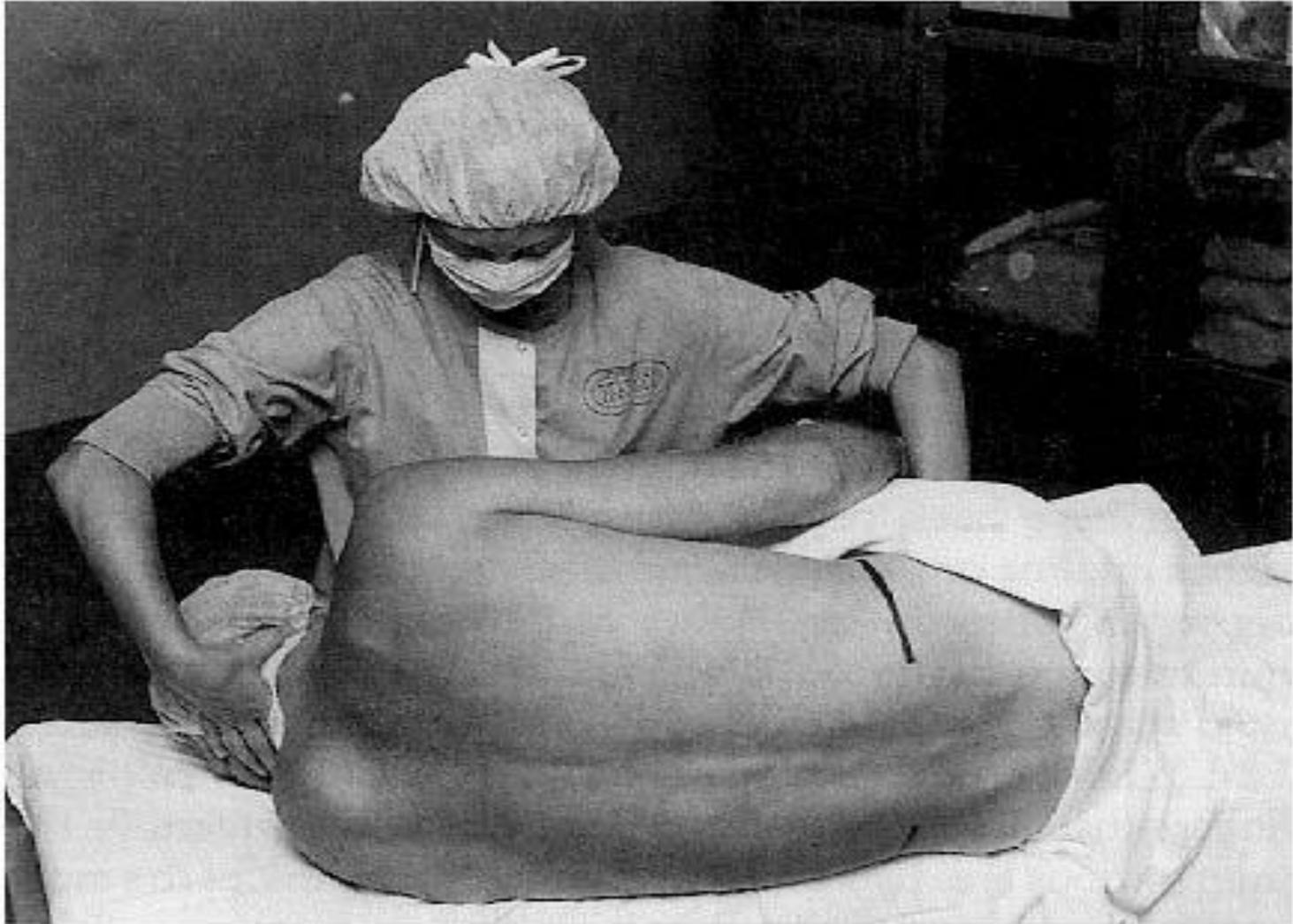
**TRATAMENTO**

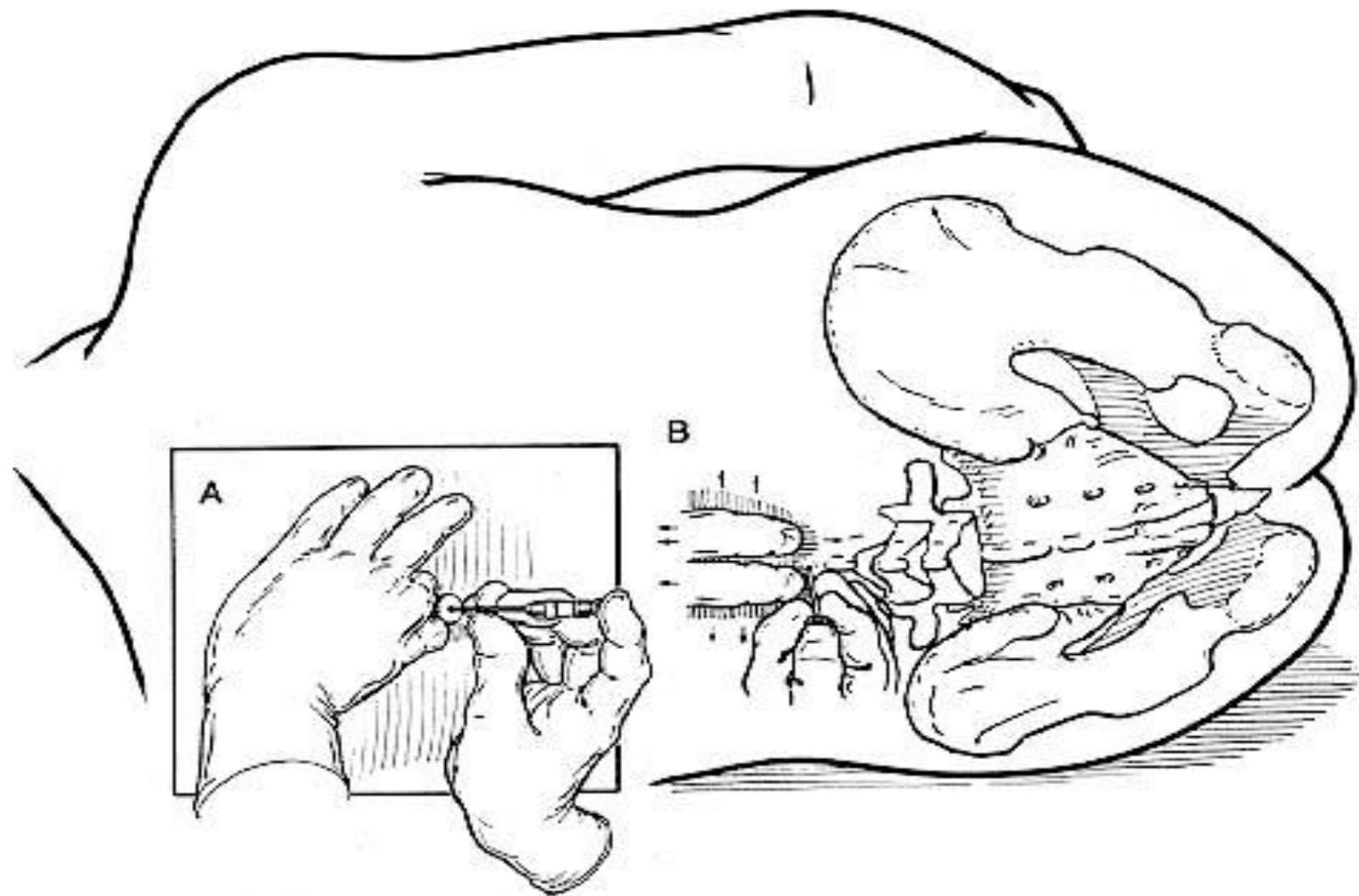
# Cefaléia pós-raqui

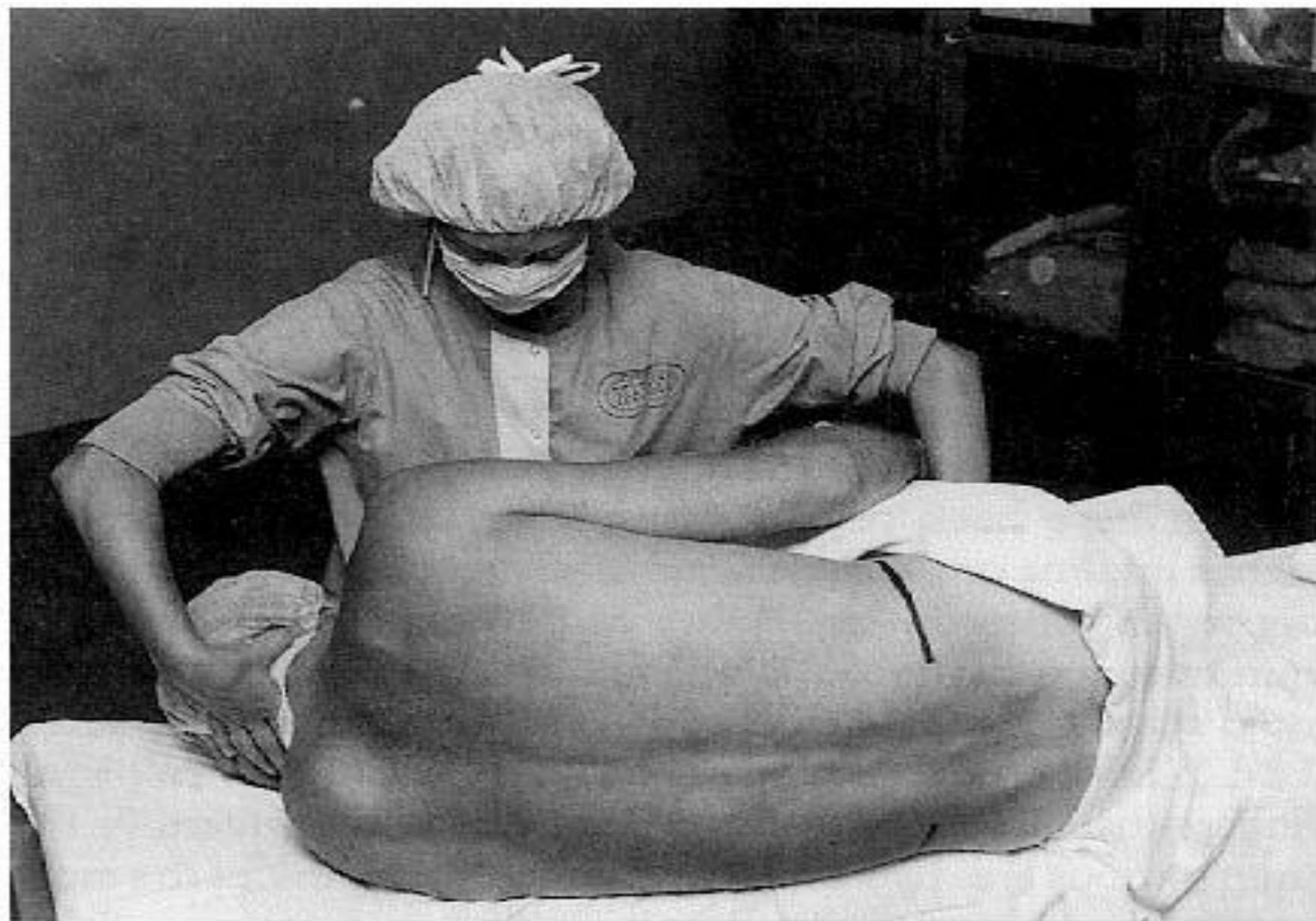
## Tratamento

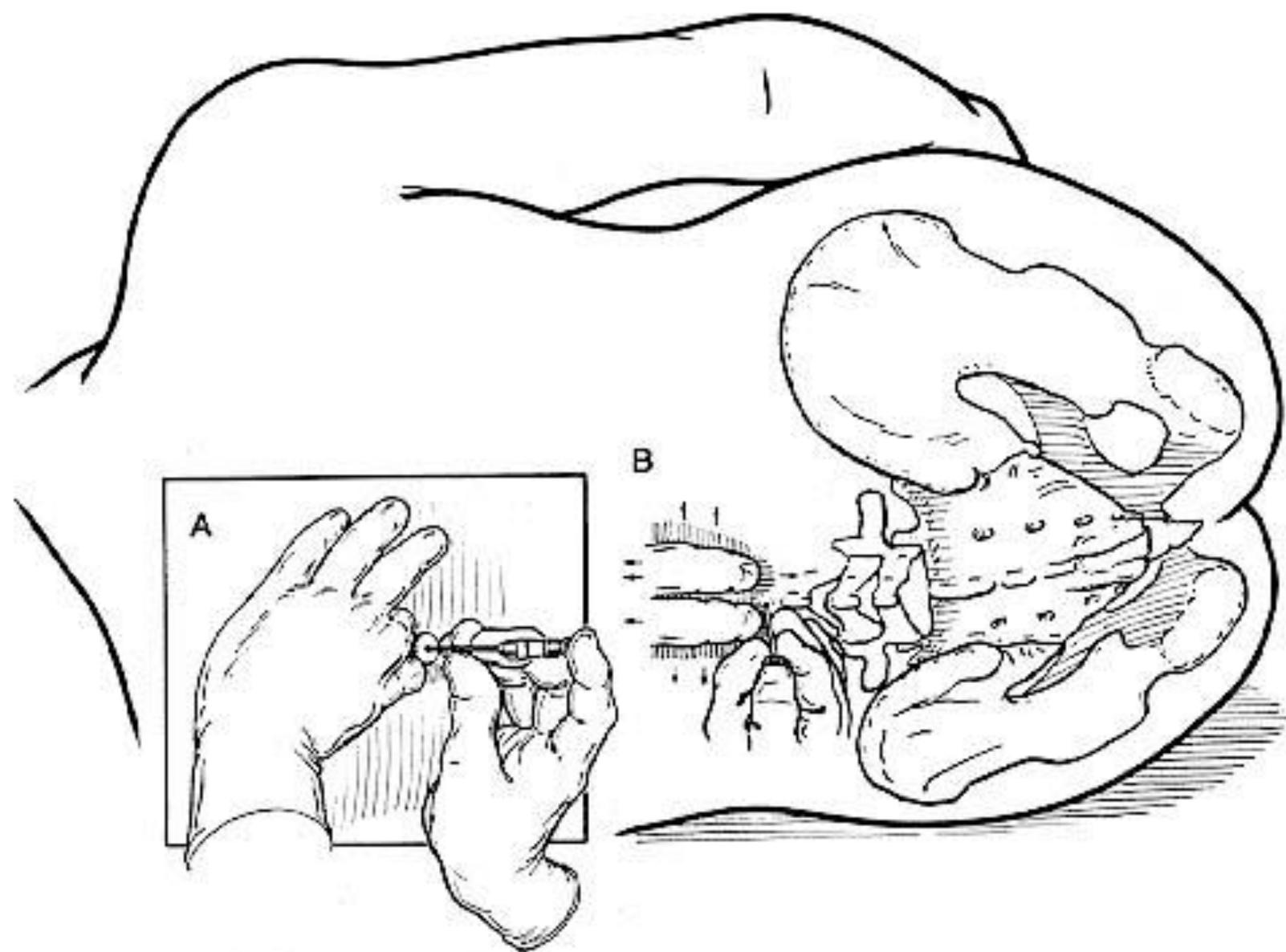
-  analgésicos potentes
-  repouso
-  solução fisiológica epidural
-  “blood patch”

**PERIDURAL**

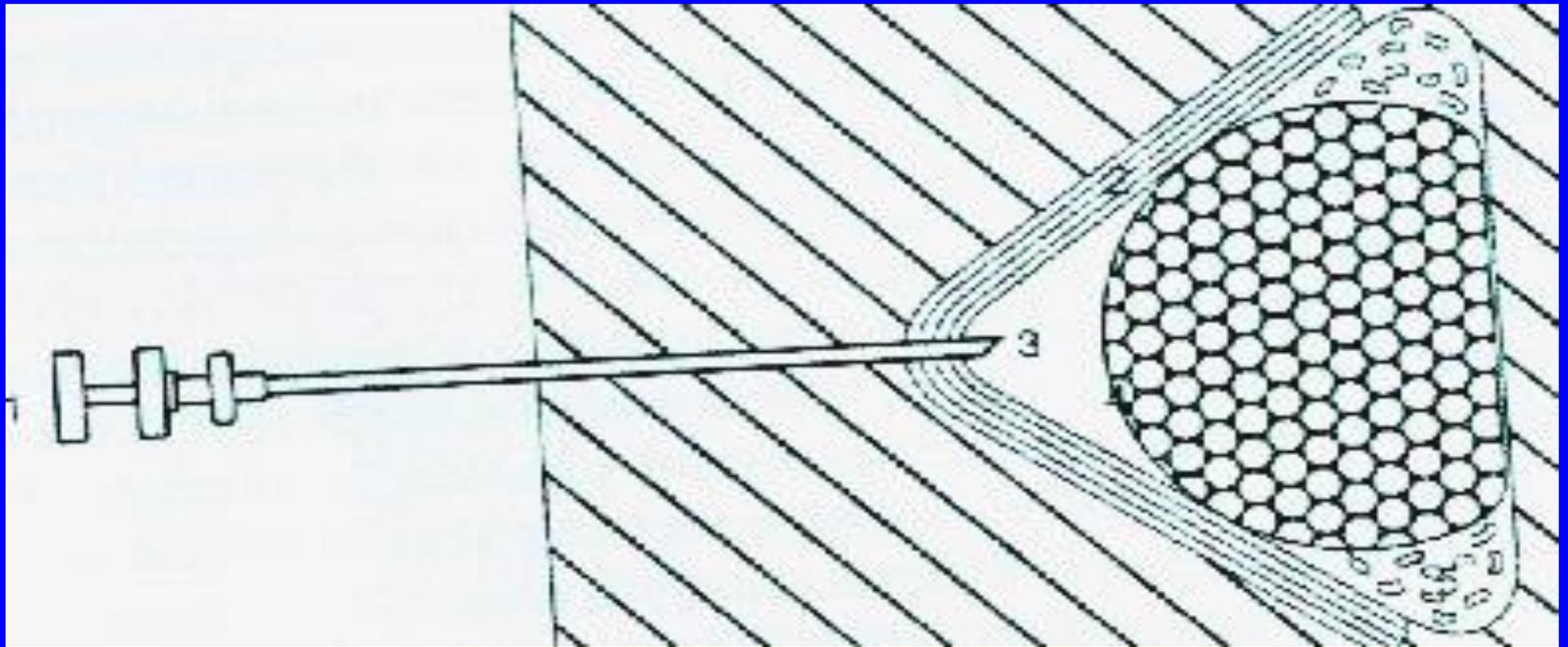








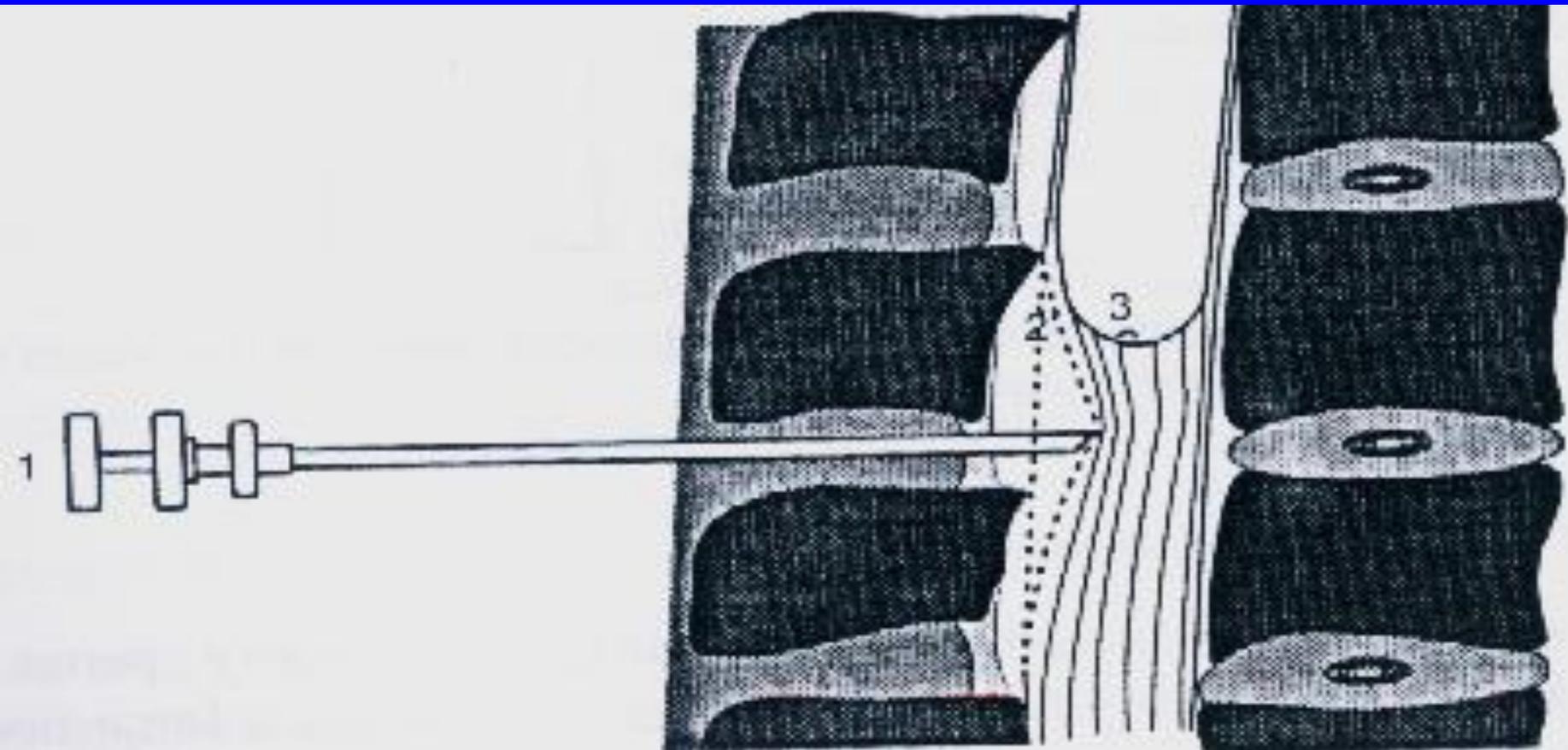
# PERIDURAL



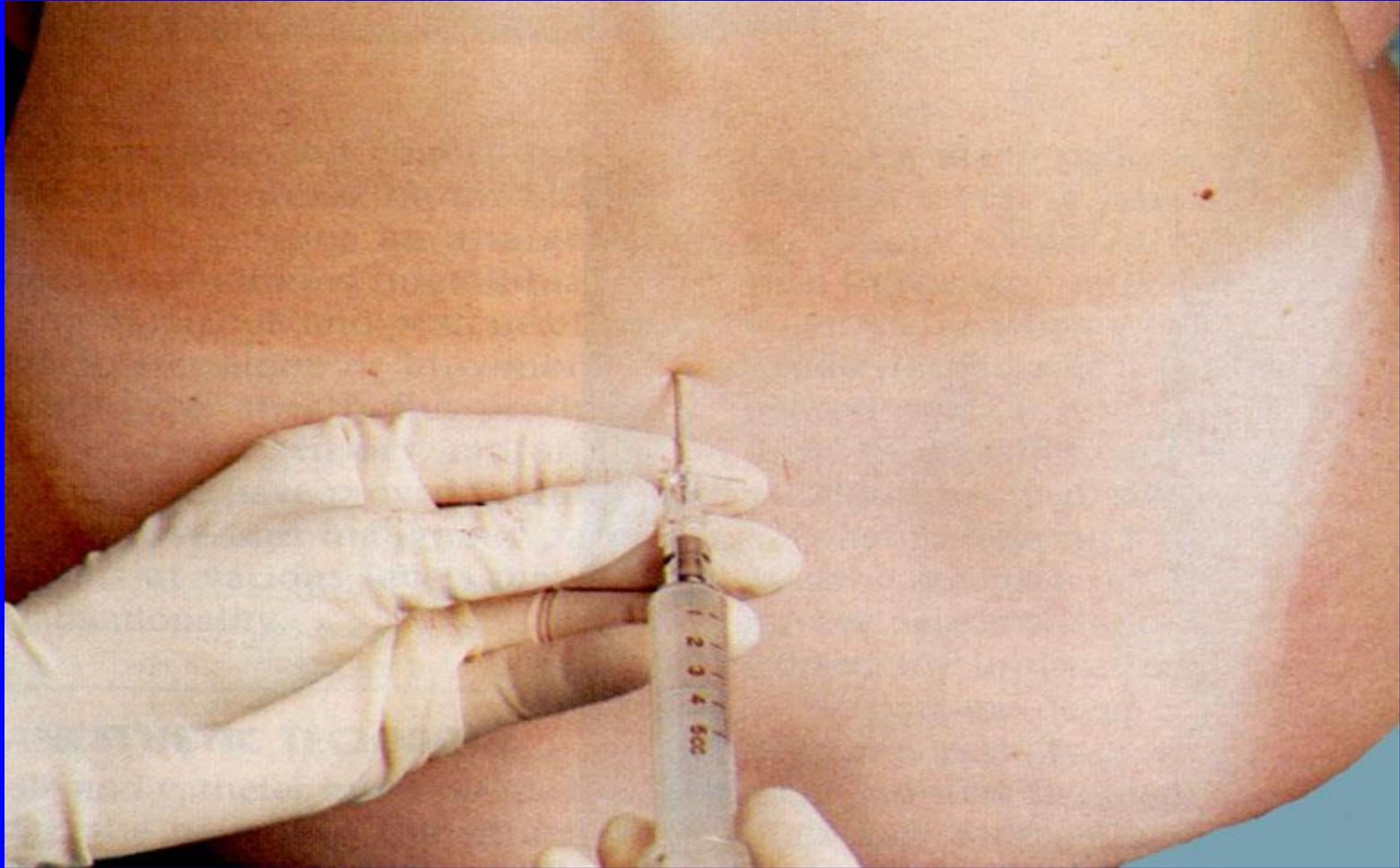
# PERIDURAL

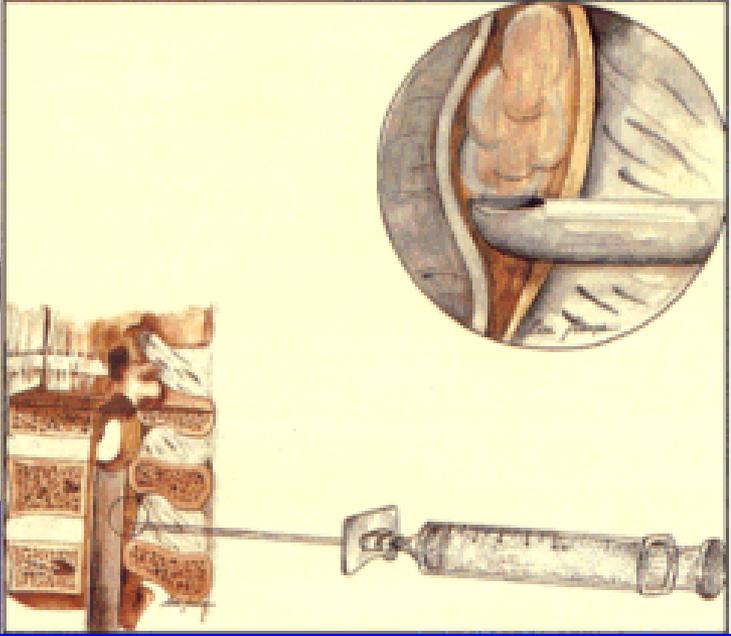
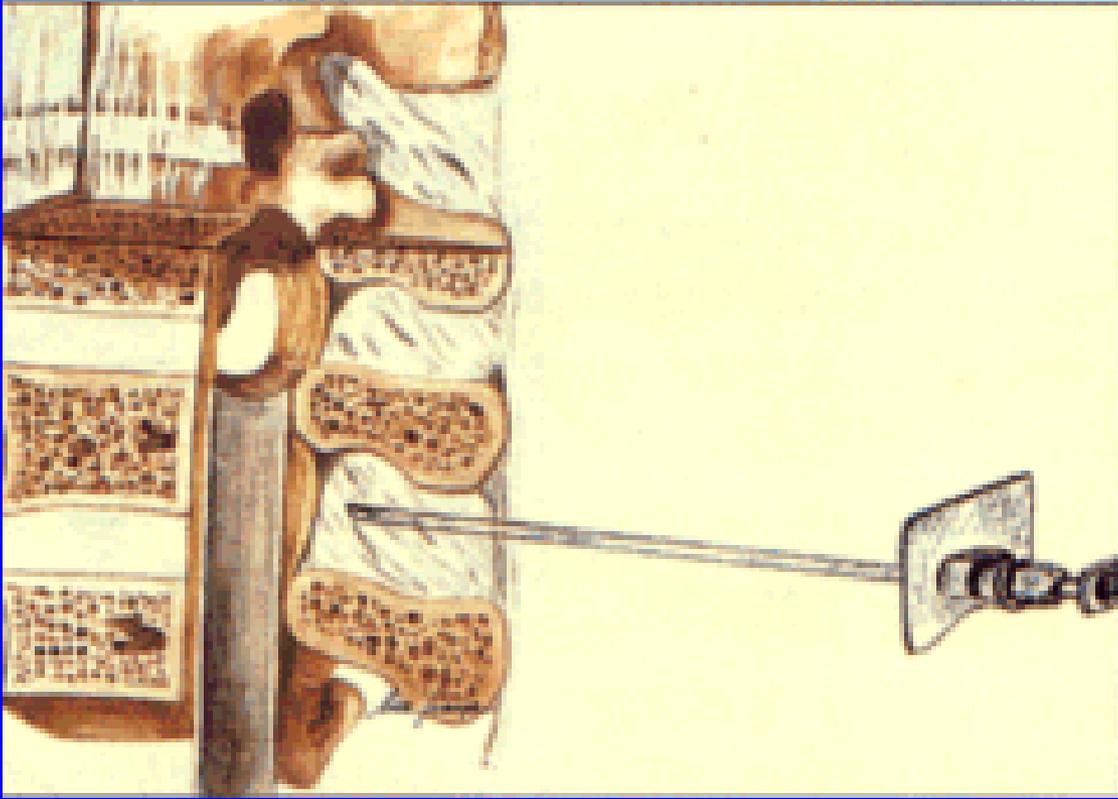
## Identificação do Espaço

- Perda da Resistência (Dogliotti)
- Gota pendente (Gutierrez)

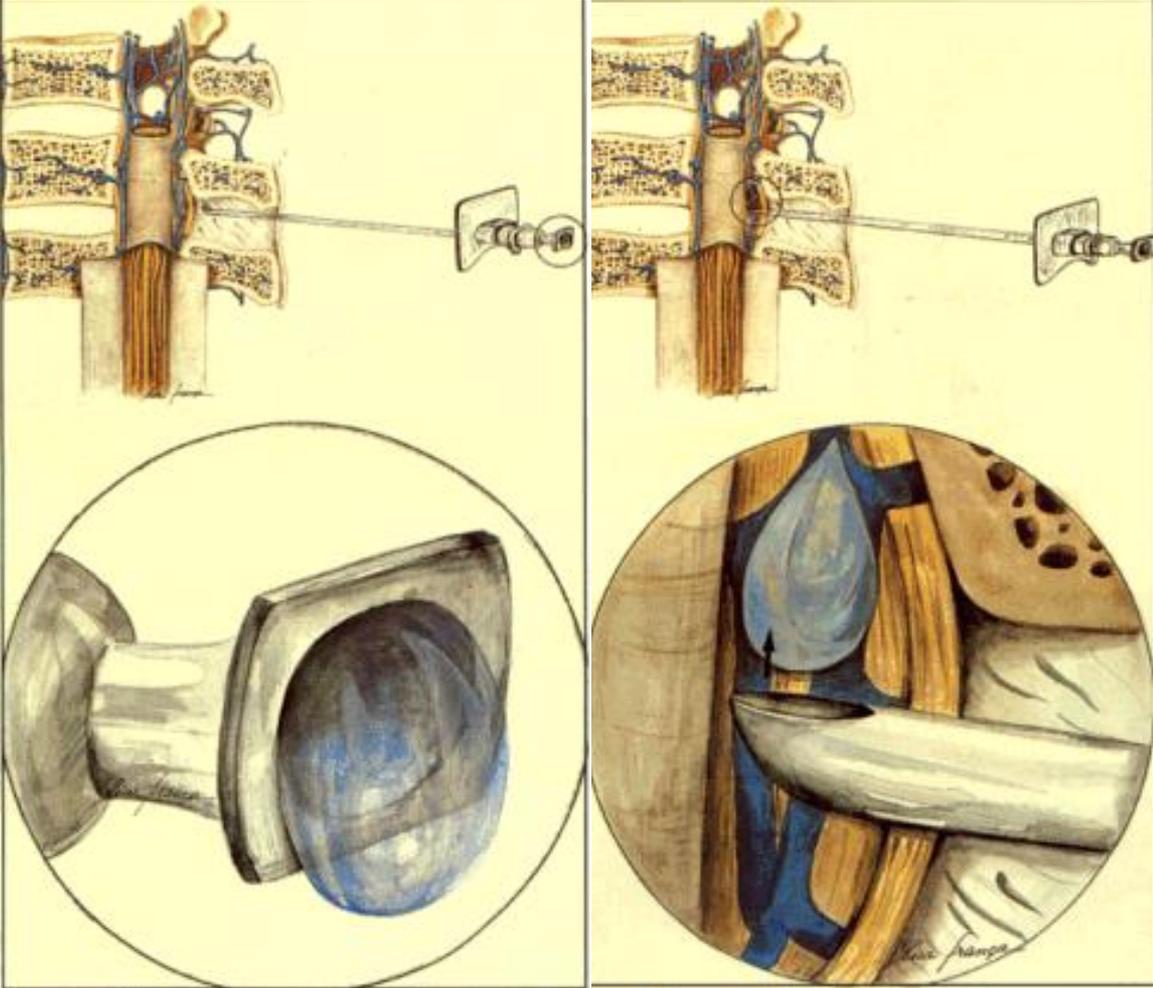


# Perda da Resistência





# GOTA PENDENTE DE GUTIERREZ



# Espaços

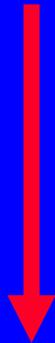
## Peridural



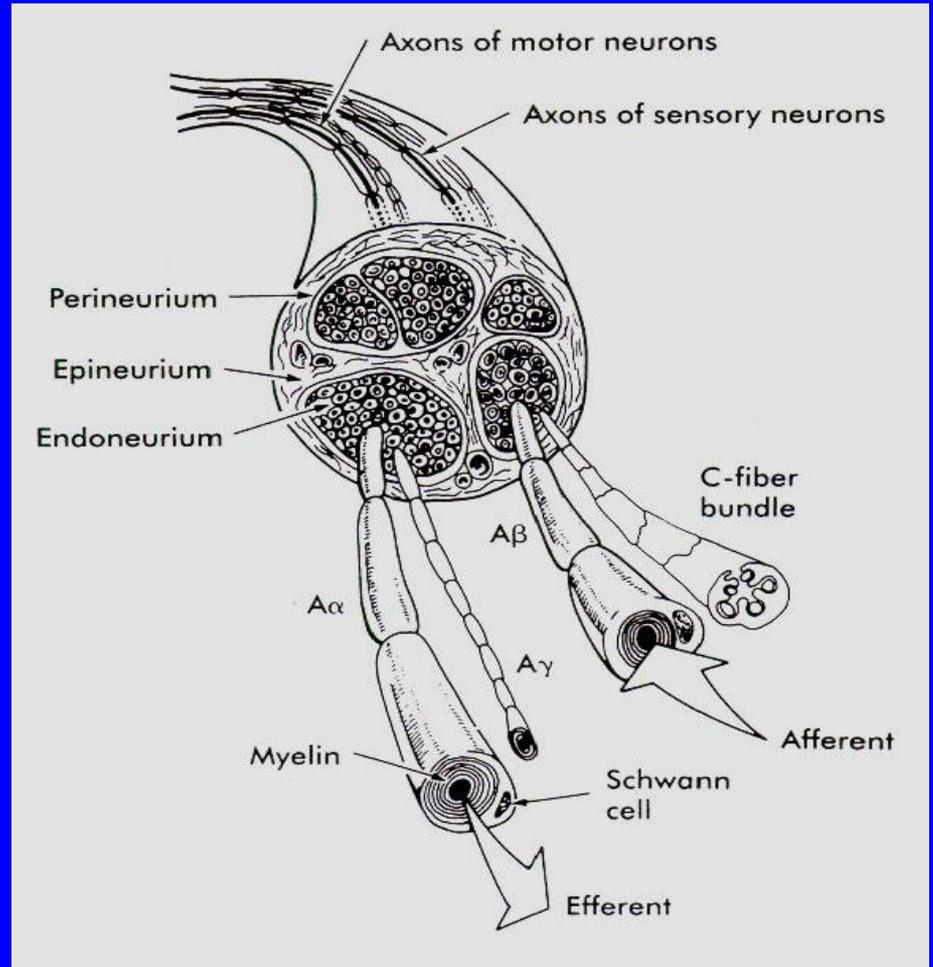
**VASOS**  
**GORDURAS**  
**NERVOS**

# Espaços

Peridural



**VASOS**  
**GORDURAS**  
**NERVOS**

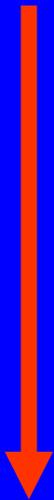


# CLASSIFICAÇÃO FIBRAS NERVOSAS

	A				B	C
SUBCLASSE	alfa	beta	gama	delta	----	----
MIELINA	sim	sim	sim	sim	sim	não
DIÂMETRO (mm)	15-20	8-15	4-8	3-4	4	1-2
VELOCIDADE (m/s)	80-120	30-70	30-70	10-15	10-15	1-2

# EVOLUÇÃO DO BLOQUEIO

## Fisiologia



**Fibras finas não mielinizadas**

**Fibras finas mielinizadas**

**Fibras grossas não mielinizadas**

**Fibras grossas mielinizadas**

## EVOLUÇÃO DO BLOQUEIO

### Fisiologia

↓  
Fibras finas não mielinizadas  
Fibras finas mielinizadas  
Fibras grossas não mielinizadas  
Fibras grossas mielinizadas

## CLASSIFICAÇÃO FIBRAS NERVOSAS

**A**

**B**

**C**

**SUBCLASSE**

alfa

beta

gama

delta

----

----

**MIELINA**

sim

sim

sim

sim

sim

não

**DIÂMETRO (mm)**

15-20

8-15

4-8

3-4

4

1-2

**VELOCIDADE (m/s)**

80-120

30-70

30-70

10-15

10-15

1-2

# EVOLUÇÃO DO BLOQUEIO

## Fisiologia

Fibras finas não mielinizadas  
Fibras finas mielinizadas  
Fibras grossas não mielinizadas  
Fibras grossas mielinizadas

**A**

**Alfa**



**Motoras, propriocepção**

**Beta**



**Motor, tato, pressão**

**Gama**



**Reflexos**

**Delta**



**Dor, temperatura**

**B**



**Fibras pré-ganglionares**

**C**



**Dor, temperatura**

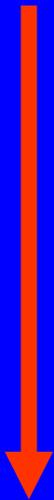
# Fibras nervosas

<b>A</b>	<b>Alfa</b>	→	<b>Motoras, propriocepção</b>
	<b>Beta</b>	→	<b>Motor, tato, pressão</b>
	<b>Gama</b>	→	<b>Reflexos</b>
	<b>Delta</b>	→	<b>Dor, temperatura</b>
<b>B</b>		→	<b>Fibras pré-ganglionares</b>
<b>C</b>		→	<b>Dor, temperatura</b>

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# EVOLUÇÃO DO BLOQUEIO

## Fisiologia



**Fibras finas não mielinizadas**

**Fibras finas mielinizadas**

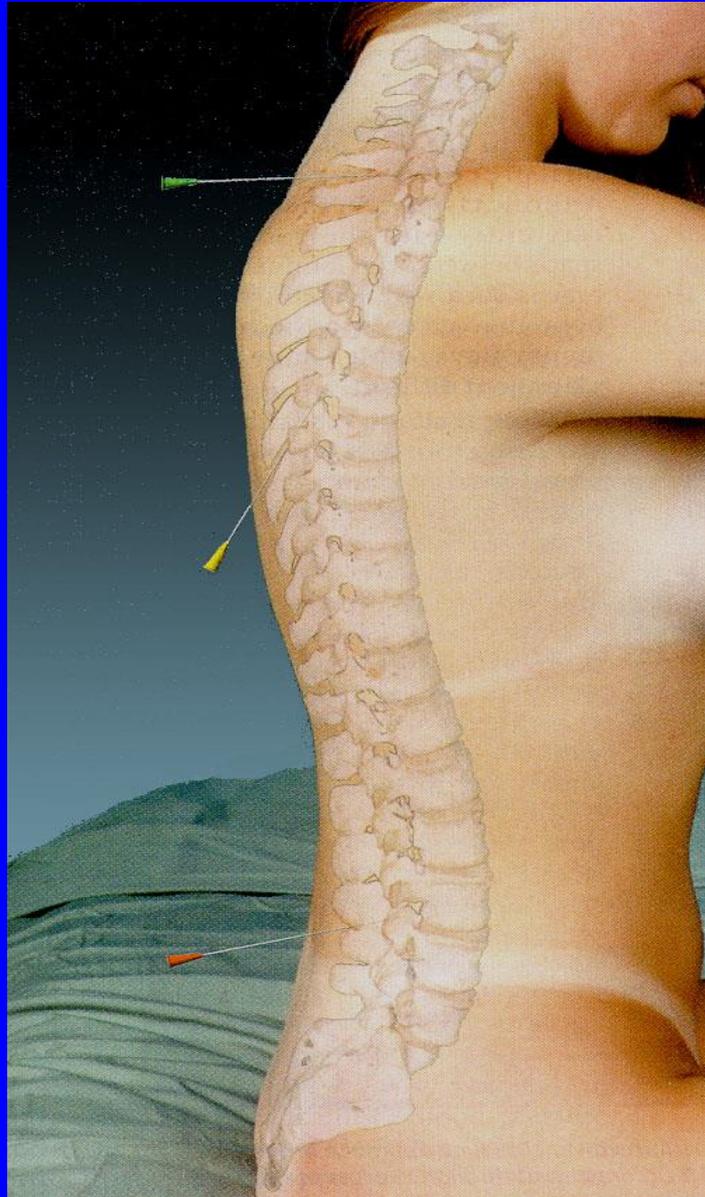
**Fibras grossas não mielinizadas**

**Fibras grossas mielinizadas**

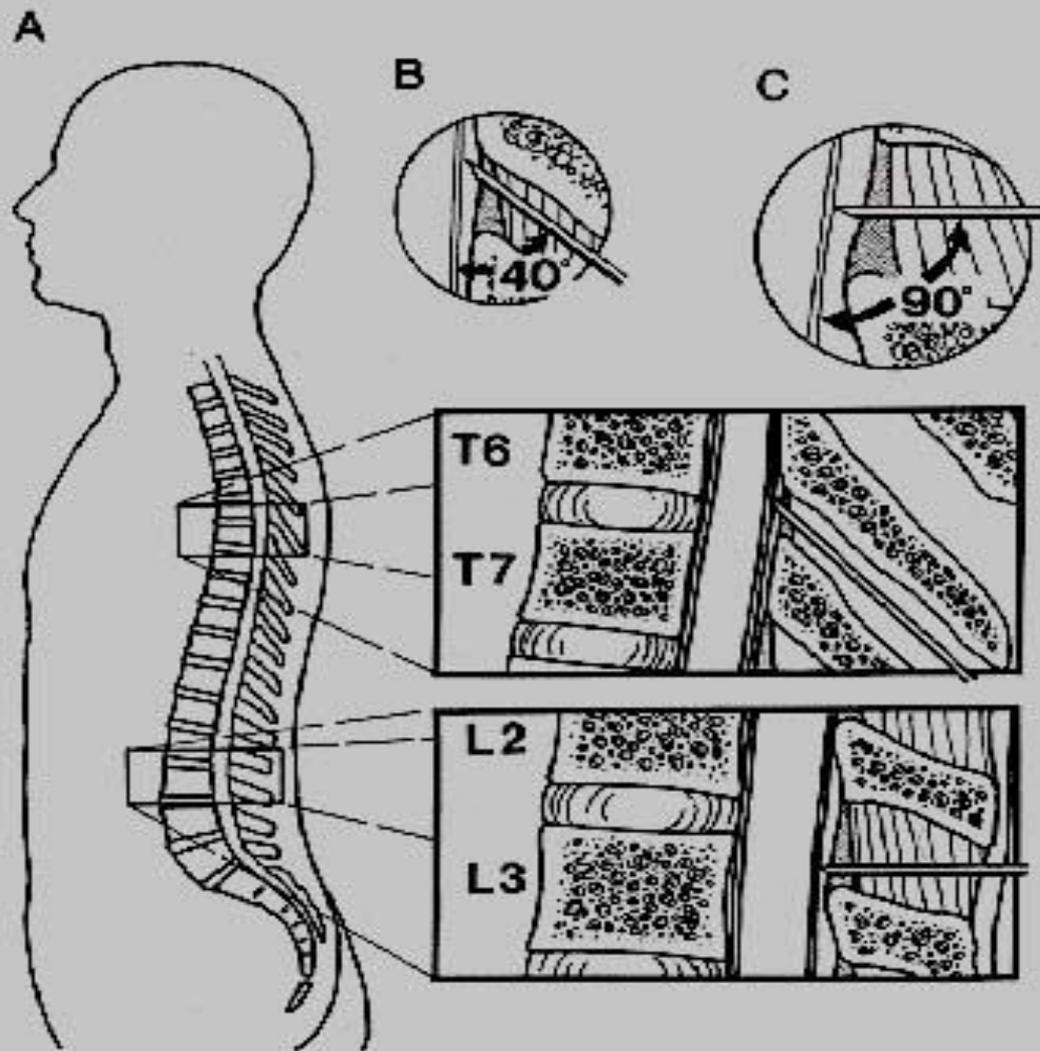
# PERIDURAL

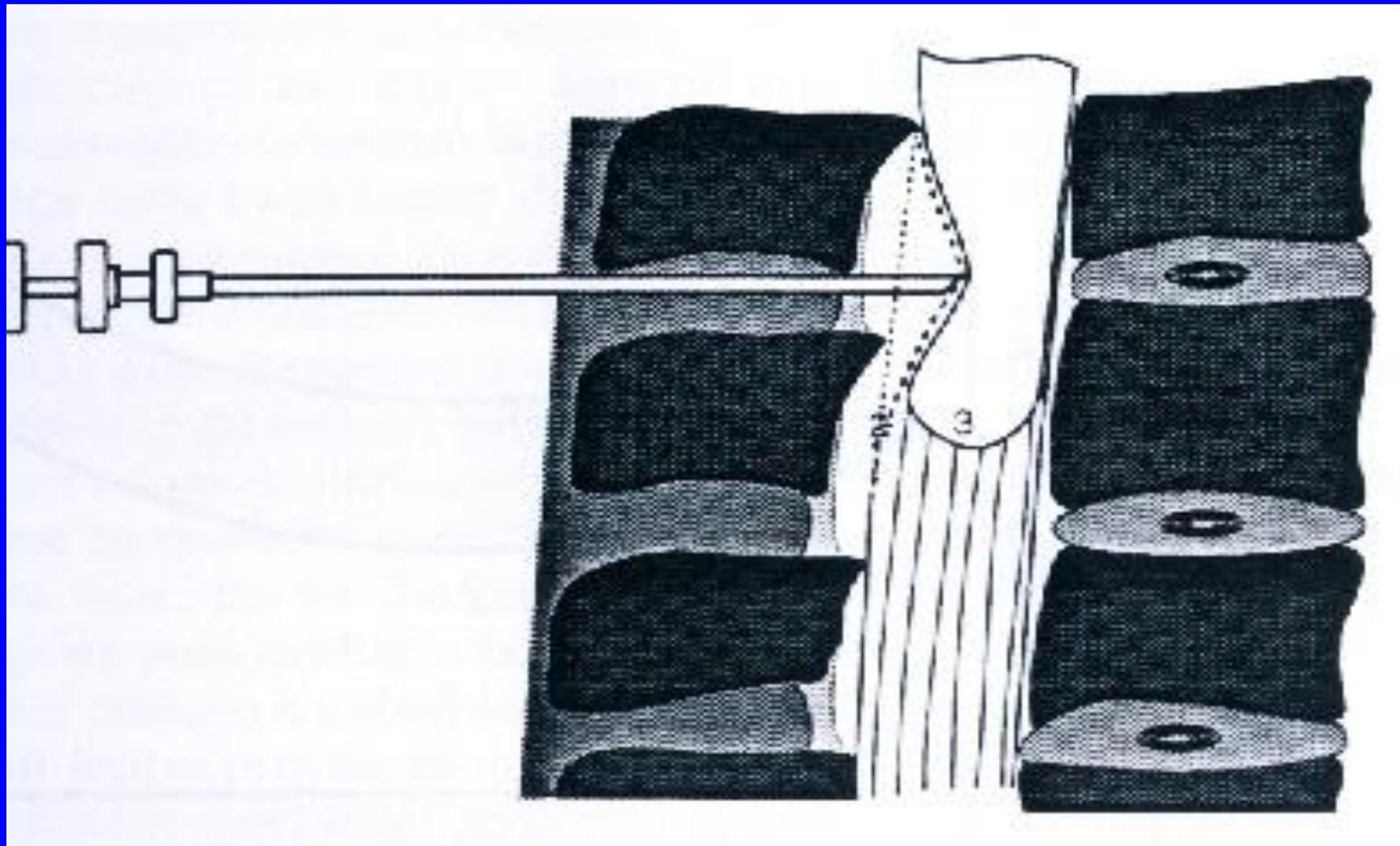
## Extensão do bloqueio

- **Volume**
- **Local da punção**
- **velocidade de injeção**



**Qualquer nível**



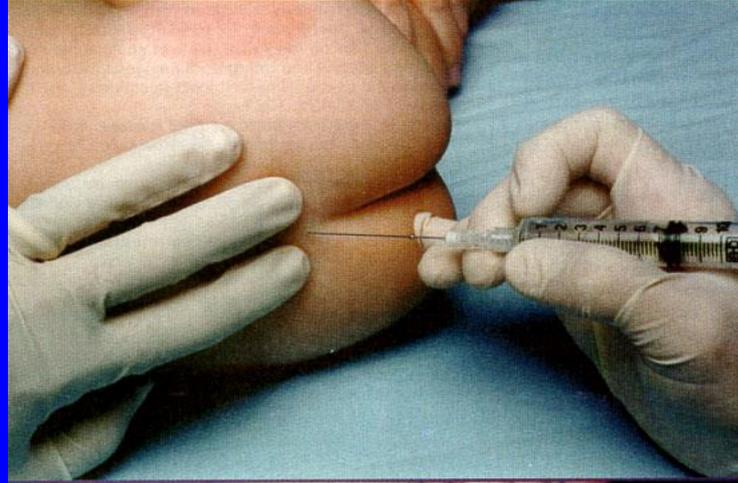


# Peridural

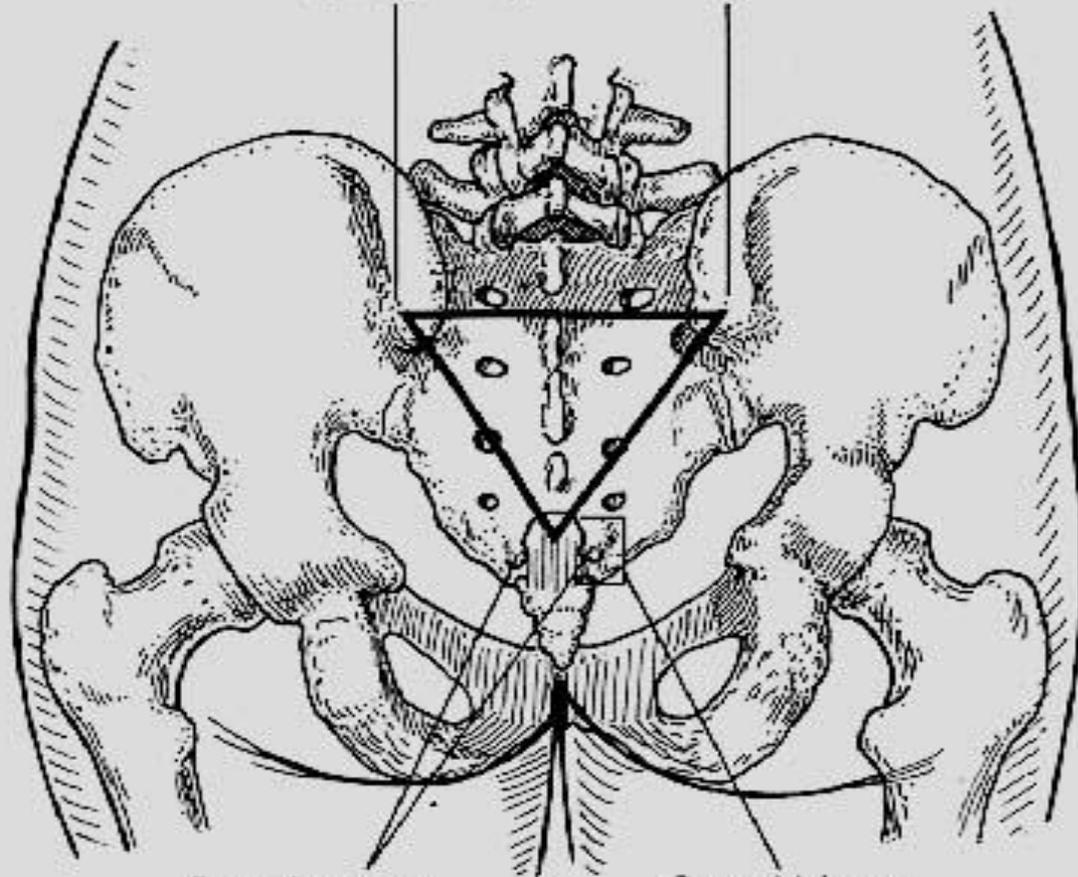
**Table 46-1.** Characteristics of Ligamentum Flavum at Different Vertebral Levels

Site	Skin to Ligament (cm)	Thickness of Ligament (mm)
Cervical	-	1.5 - 3.0
Thoracic	-	3.0 - 5.0
Lumbar	3.0 - 8.0 <sup>a</sup>	5.0 - 6.0 <sup>b</sup>
Caudal	Variable	2.0 - 6.0

# Nível Sacral

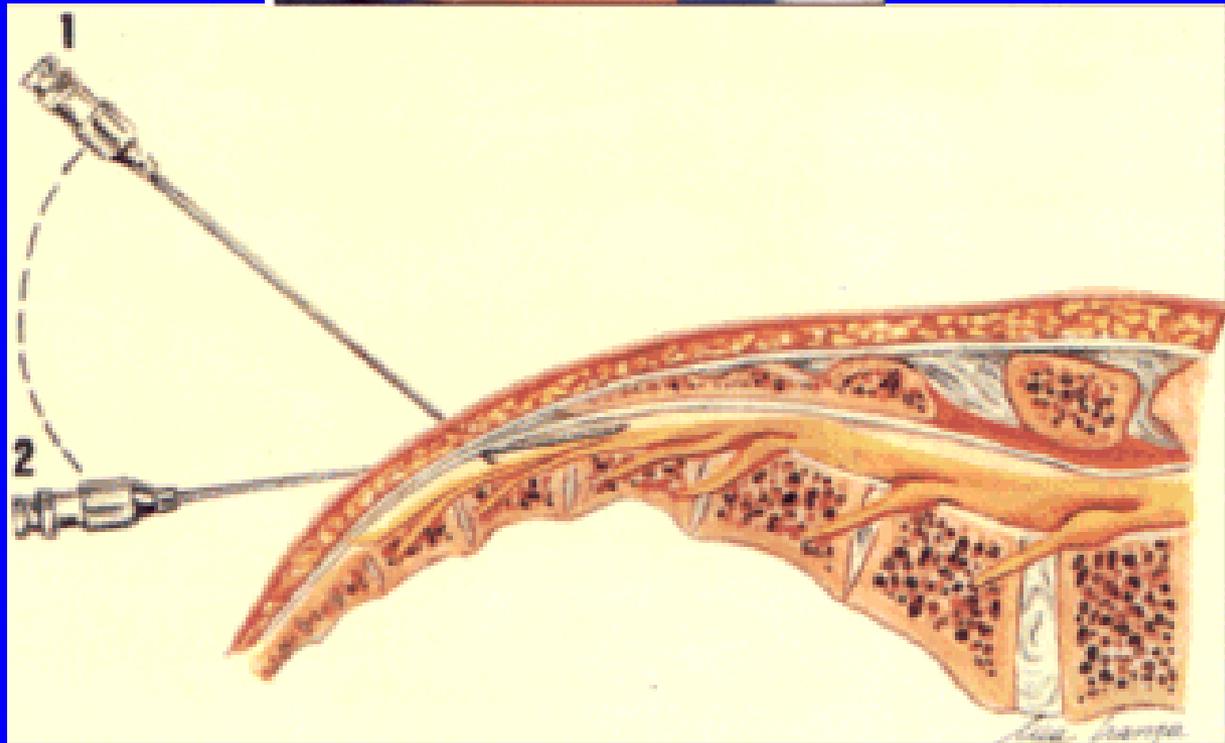
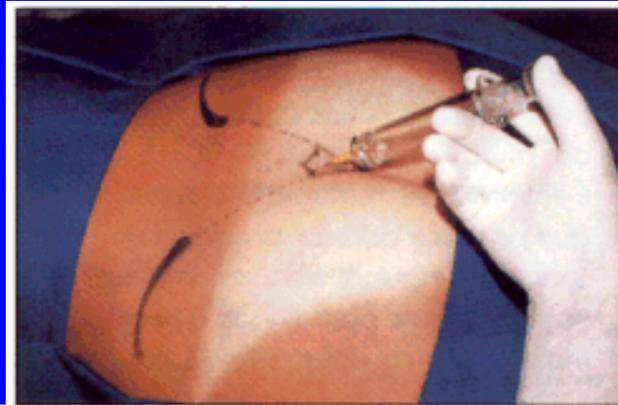


Posterior superior iliac spines



Sacral cornua

Sacral hiatus



# Nível torácico ou cervical

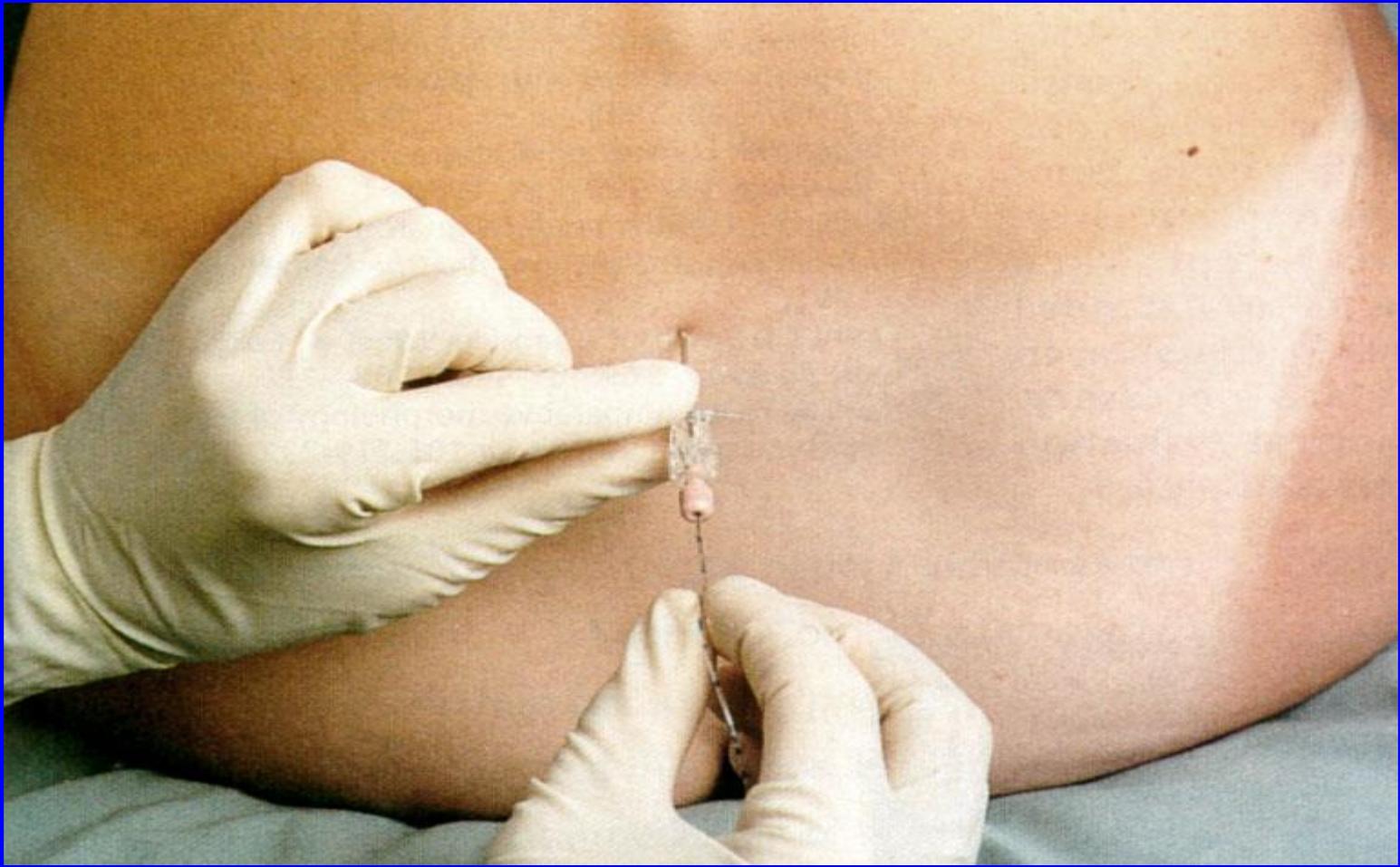


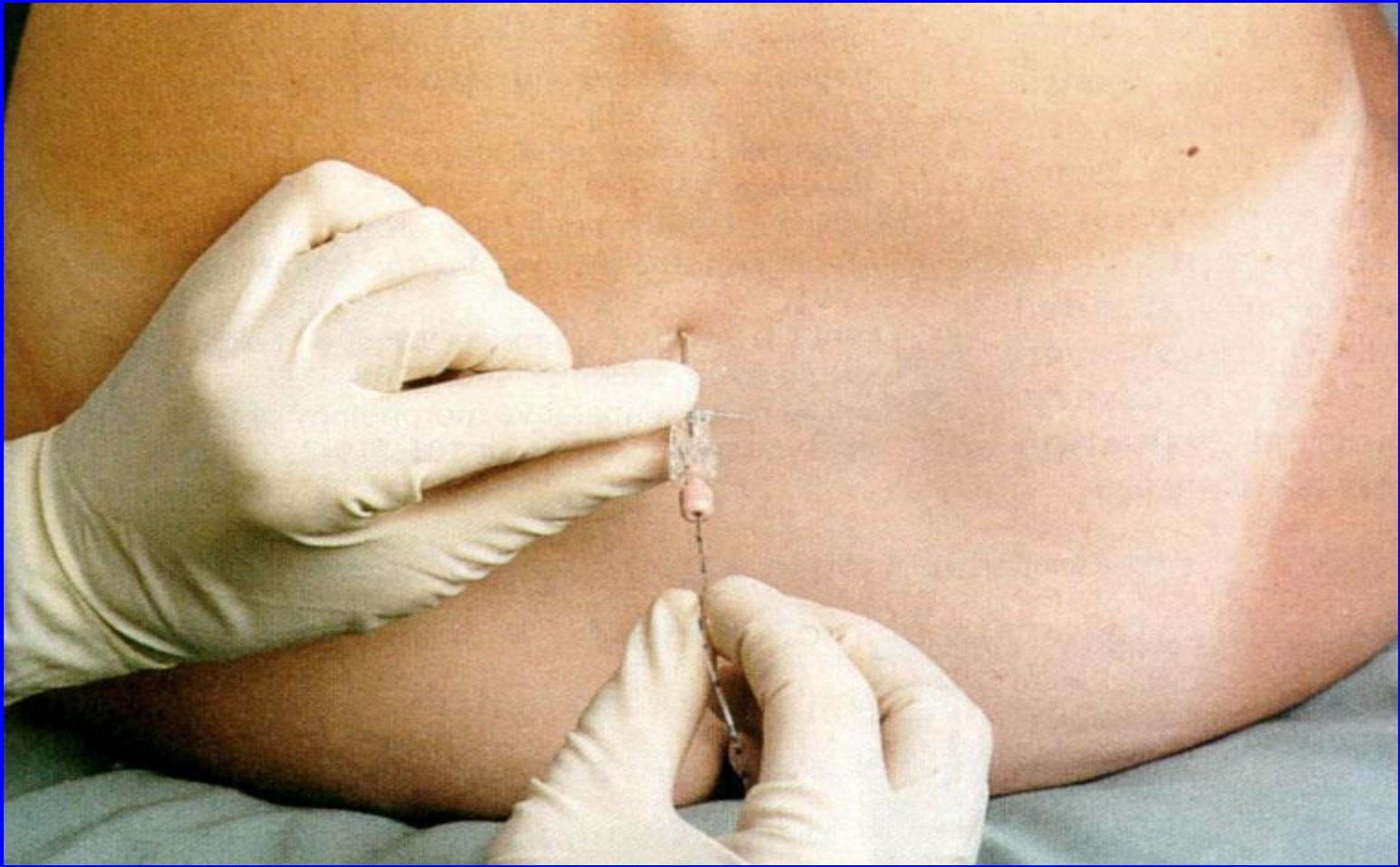
# Nível LOMBAR

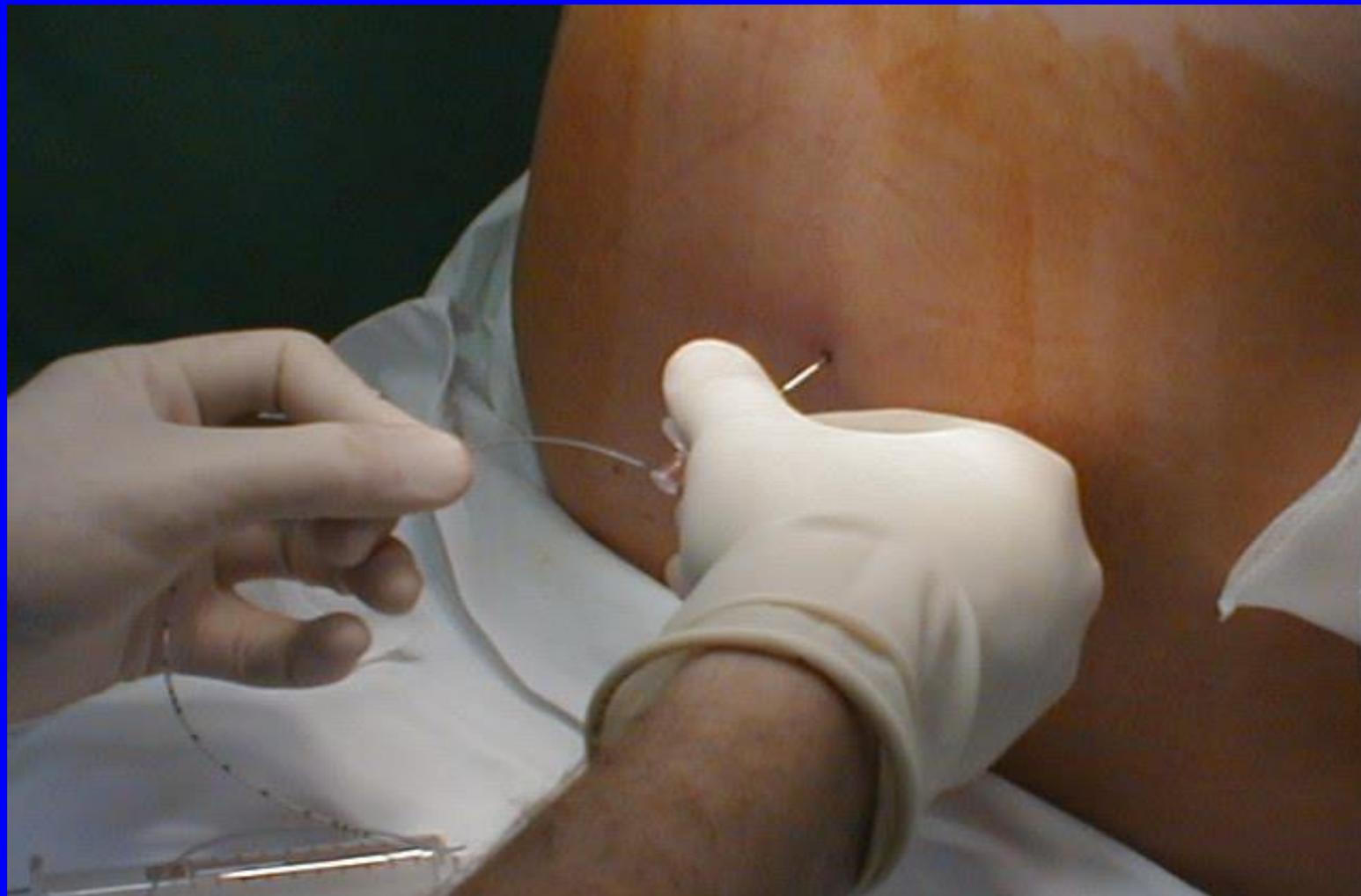














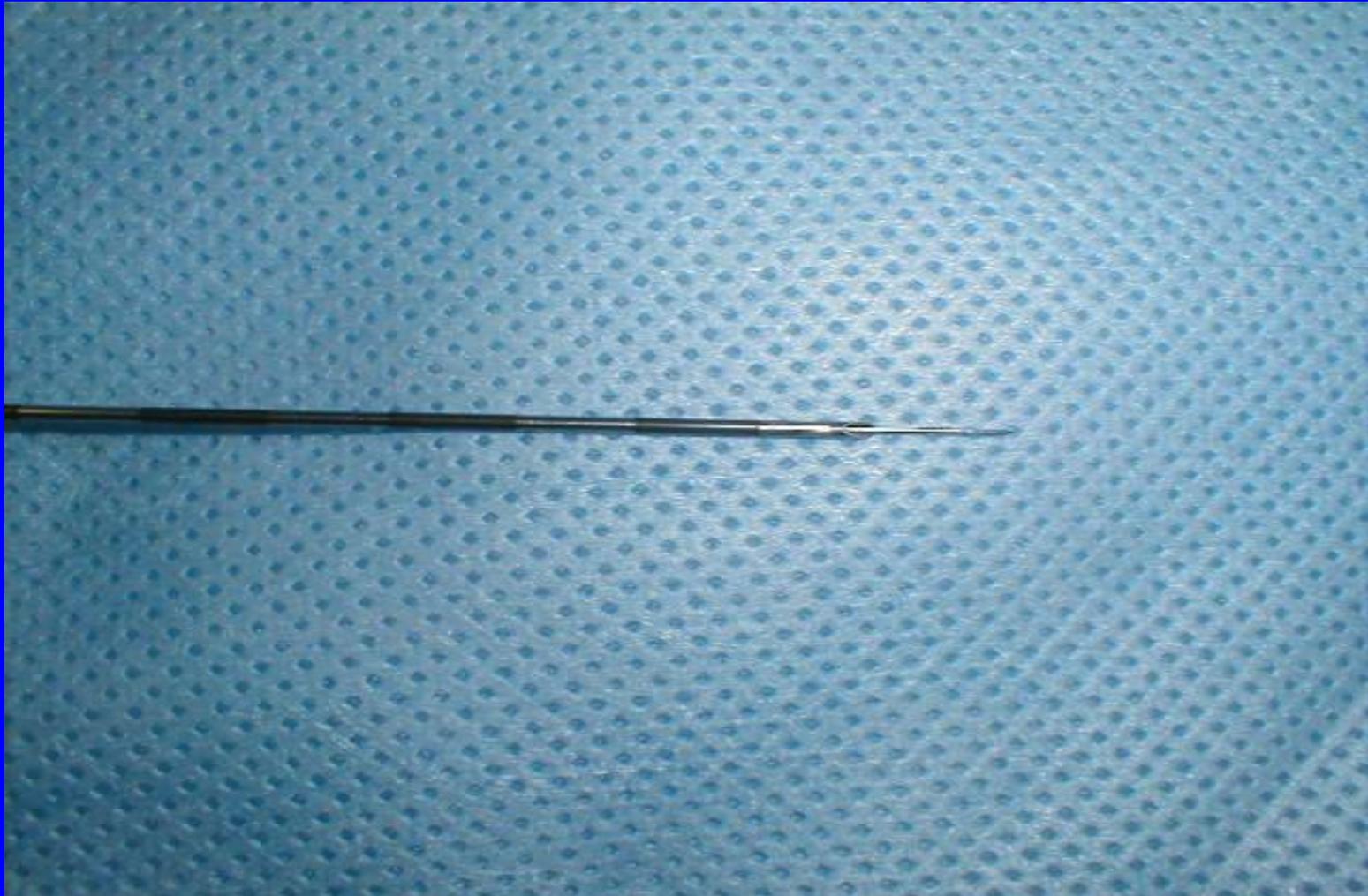
# ESCOLHA DO ANESTÉSICO

 Lidocaína

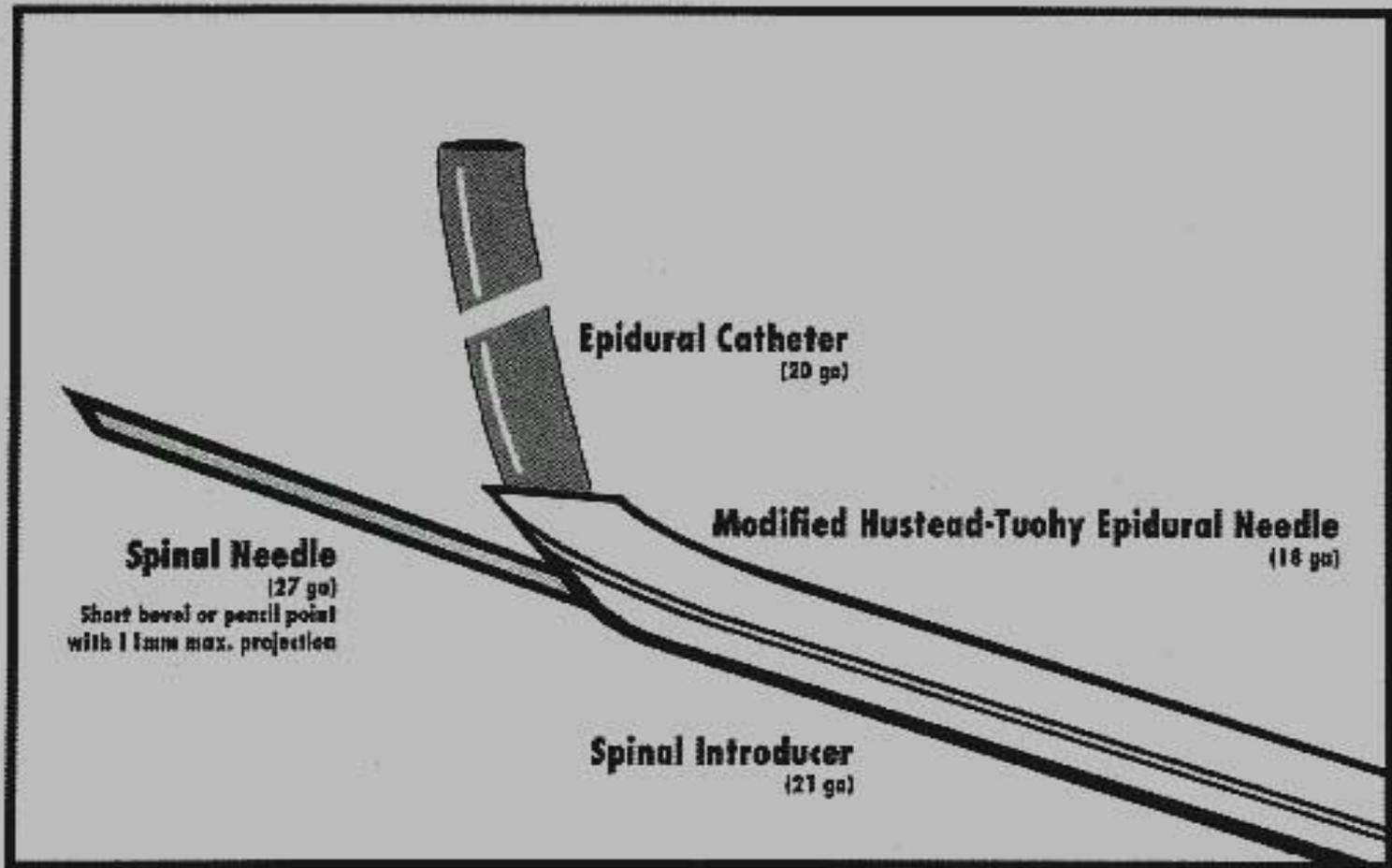
 Bupivacaína

 Ropivacaína

# Raqui- Peri Combinadas







**Epidural Catheter**  
(20 ga)

**Modified Husted-Tuohy Epidural Needle**  
(18 ga)

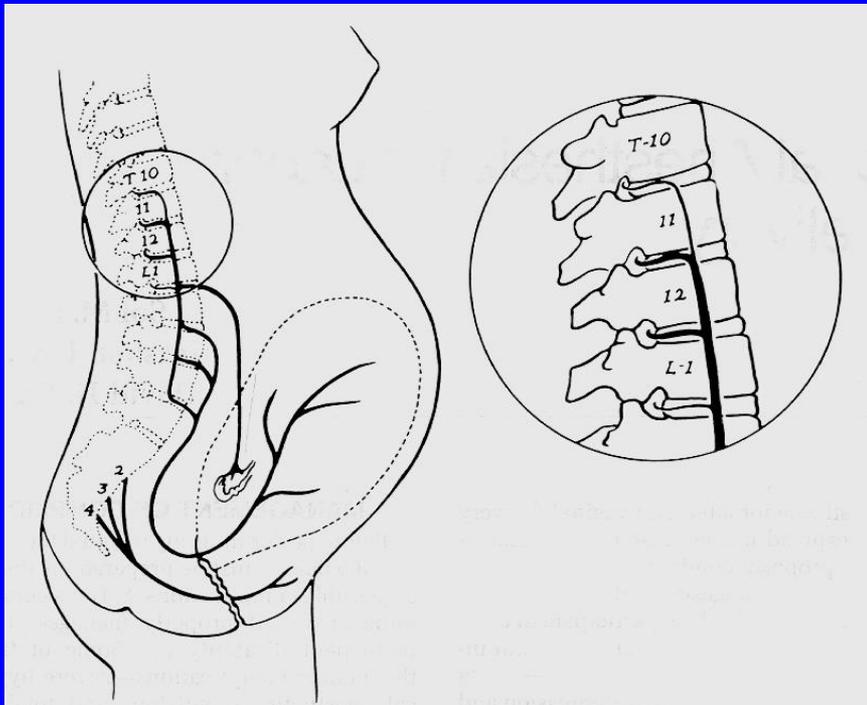
**Spinal Needle**  
(27 ga)  
Short bevel or pencil point  
with 1 mm max. projection

**Spinal Introducer**  
(21 ga)

# UTILIZAÇÃO CLÍNICA

# ANALGESIA DE PARTO

## Inervação Sensitiva



- T10
- T11
- T12
- L1
- S2
- S3
- S4

# ANALGESIA DE PARTO

## Inervação Motora

- T10
- T11
- T12
- L1

**PAREDE ABDOMINAL  
MEMBROS INFERIORES**

# **OUTRAS DROGAS NO ESPAÇO ESPINHAL**

# OUTRAS DROGAS

- 🍅 OPIÓIDES
- 🍅 CLONIDINA
- 🍅 QUETAMINA
- 🍅 NEOSTIGMINA