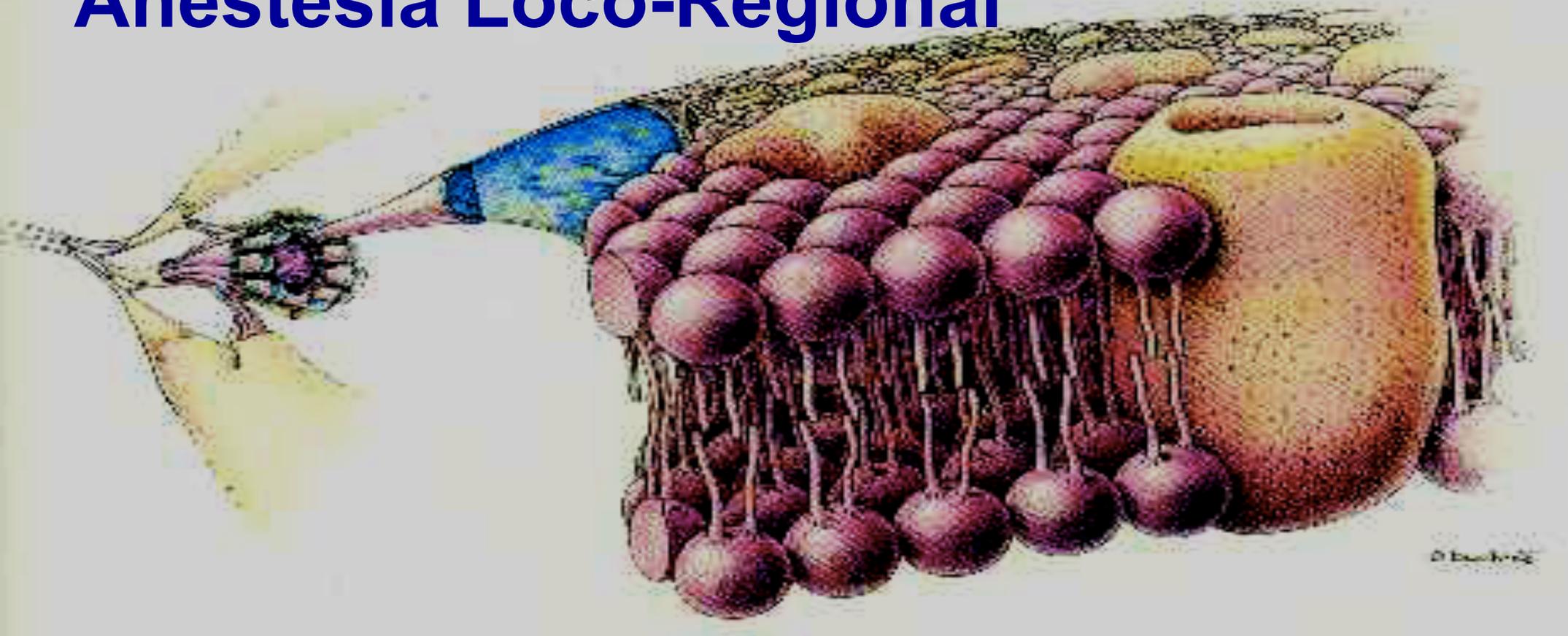


Anestésicos Locais

Anestesia Loco-Regional



2015

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Técnica Operatória e Cirurgia Experimental - UFES

TOCExp - UFES



Aula - RCP



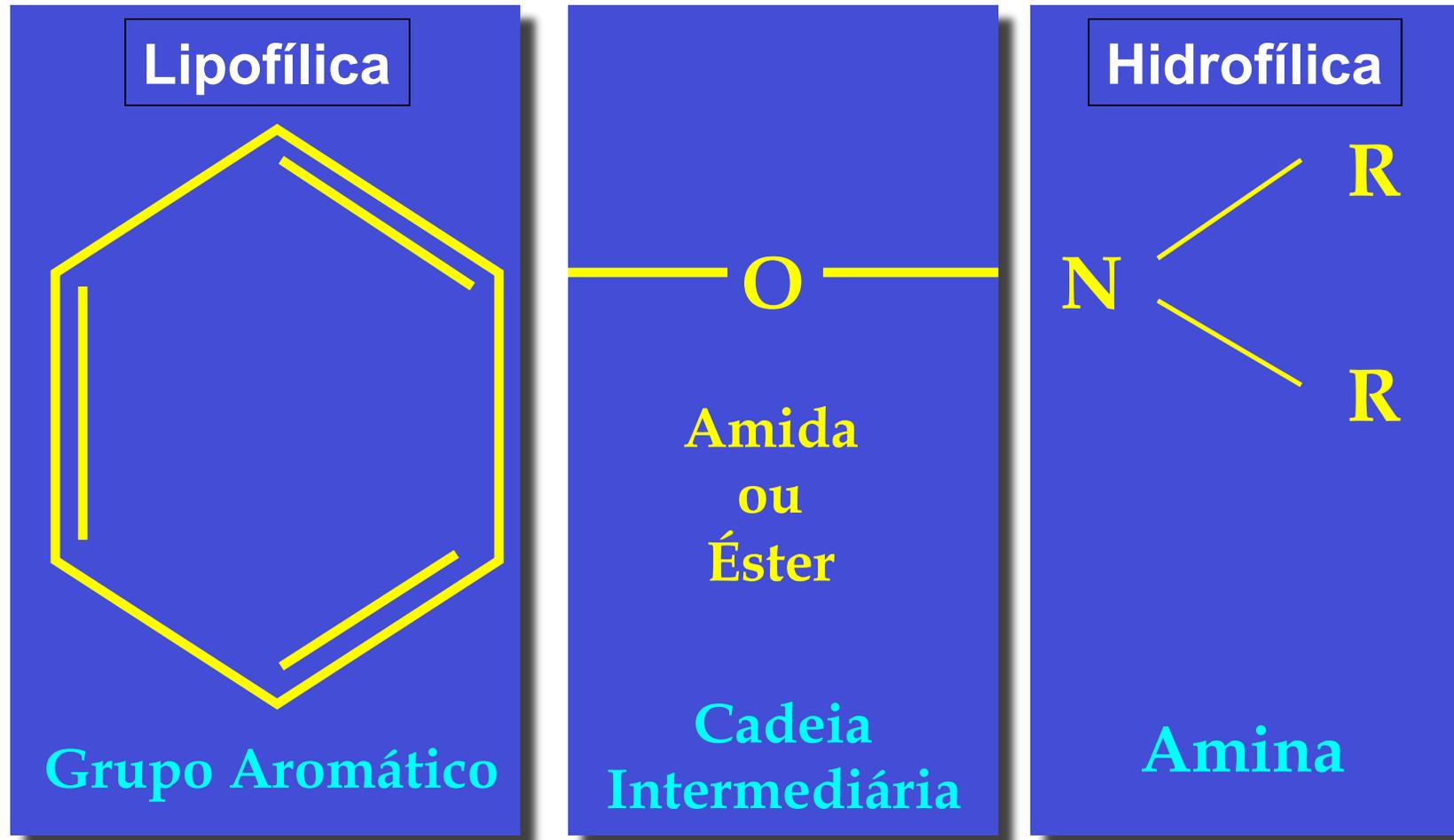
Aula - Anest. Locais



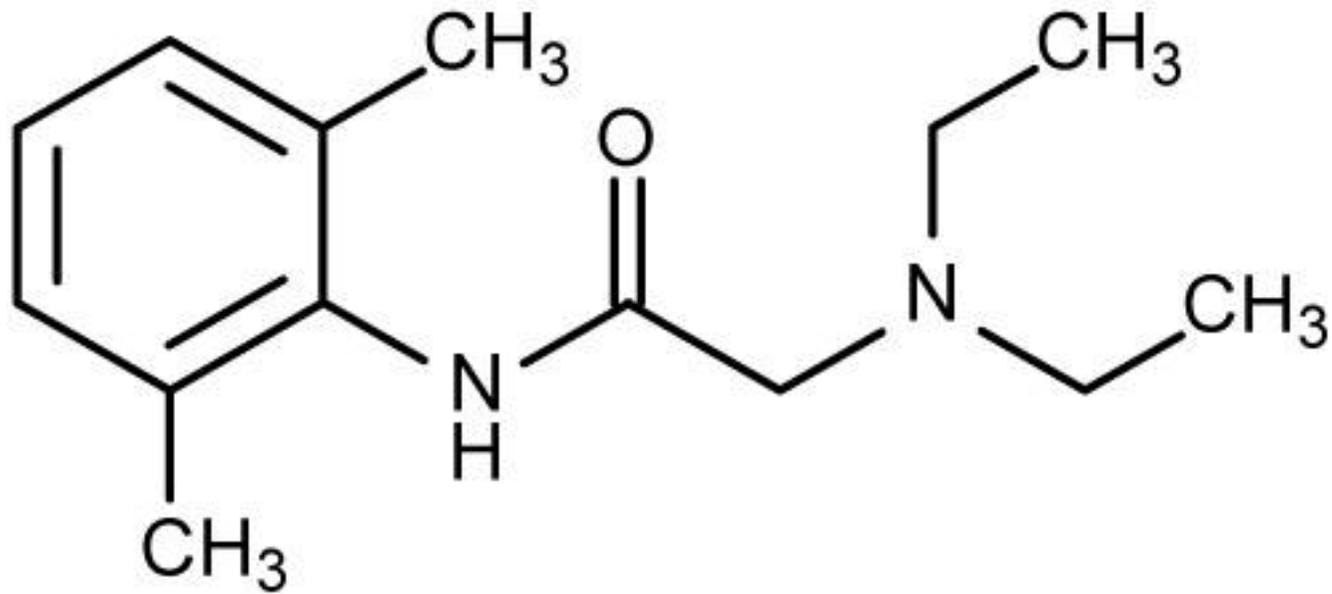
Objetivos

- ◆ Rever a farmacologia dos AL.
- ◆ Definir seu modo de ação.
- ◆ Definir o seu uso e cuidados.
- ◆ Definir a dose a ser empregada.
- ◆ Diagnosticar e tratar a intoxicação.
 - ◆ ???

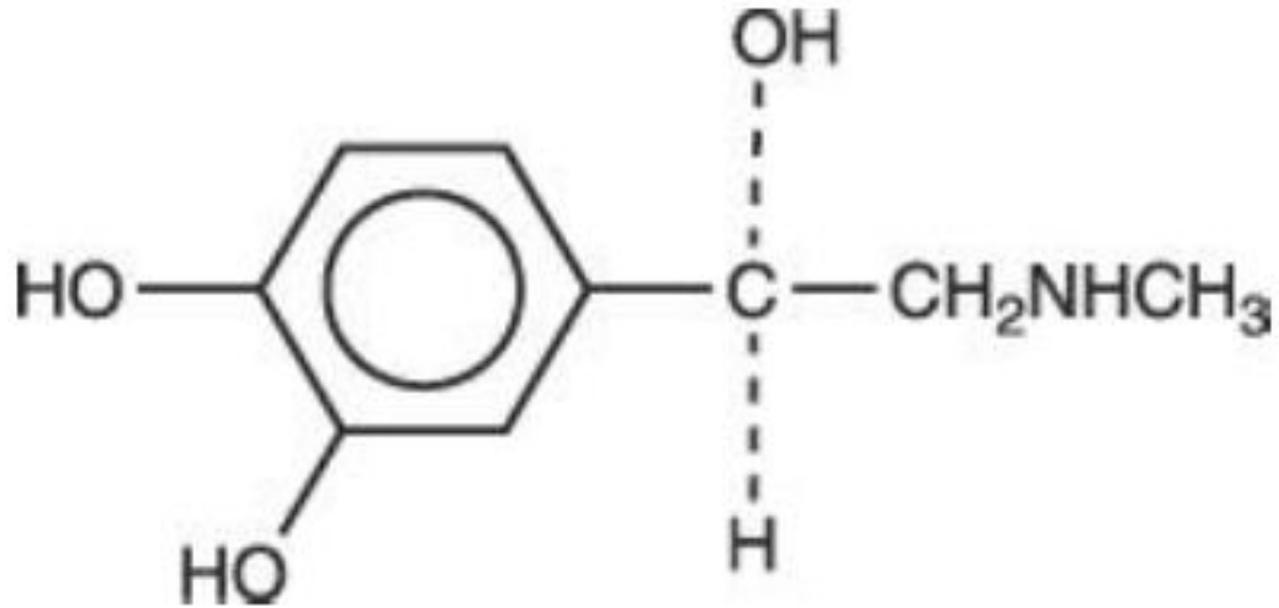
Estrutura Química dos Anestésicos Locais



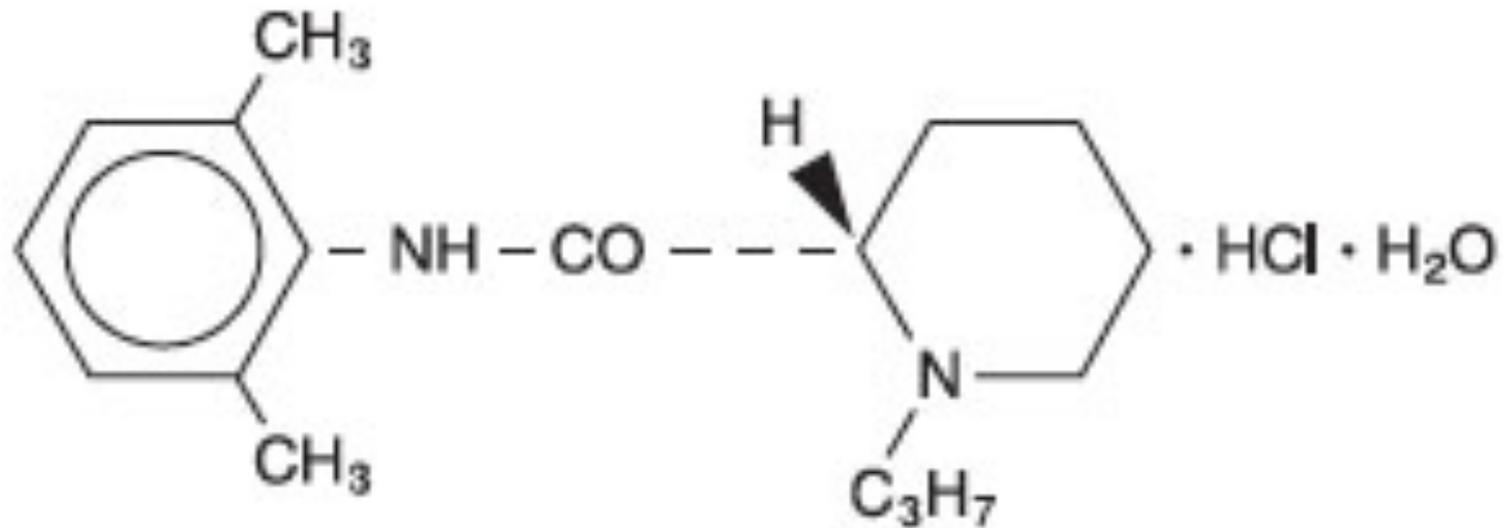
Lidocaína



Bupivacaína



Ropivacaína



Anestésicos Locais: Mais usados na prática clínica.

Lidocaína

%	mg/mL
1,0	10
2,0 (+)	20



Bupivacaína

%	mg/mL
0,25	2,5
0,5 (+)	5,0
0,75%	7,5



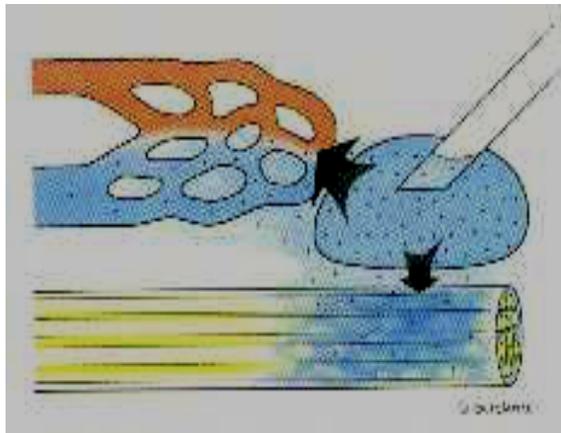
Ropivacaína

%	mg/mL
0,2	2
0,75	7,5
1,0	10



Adição de ADRENALINA

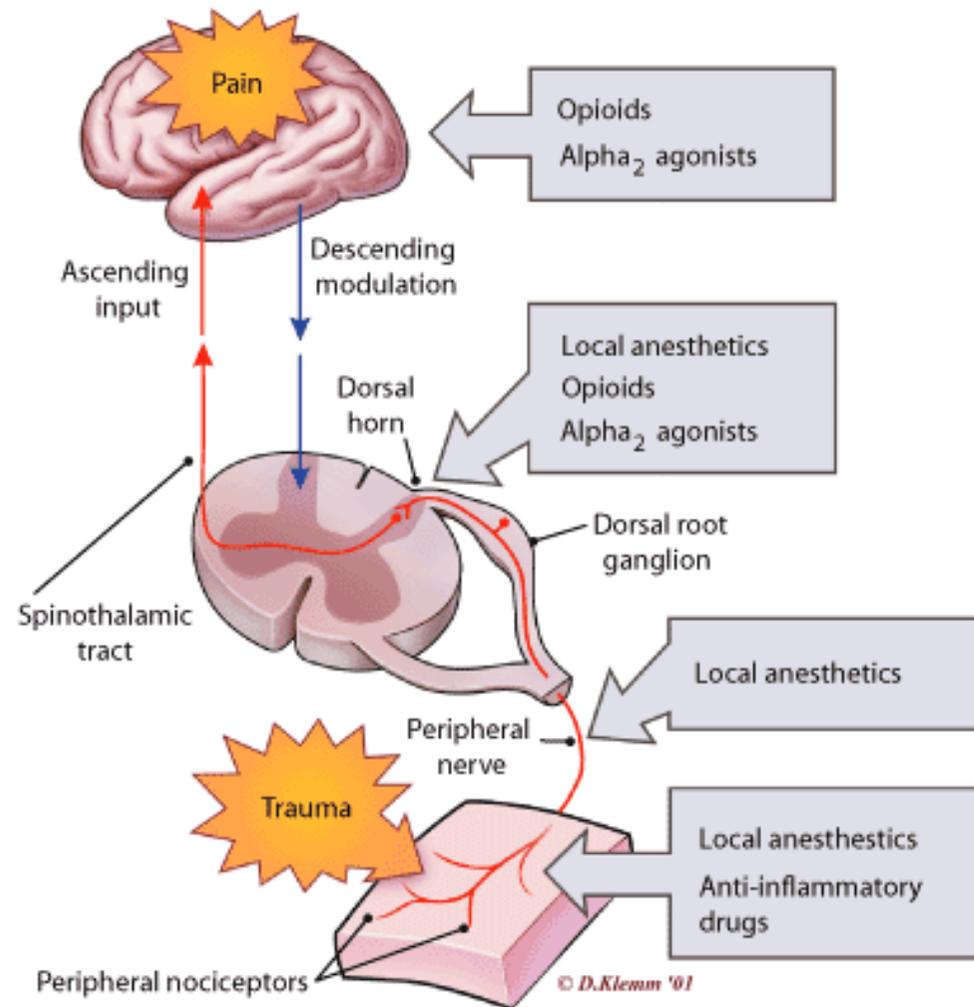
- ◆ Diminui a diferença das propriedades vasoativas
- ◆ Diminui a absorção / toxicidade
- ◆ Aumenta a duração do bloqueio
- ◆ Concentração = 1 : 200.000 - 5 $\mu\text{g/mL}$



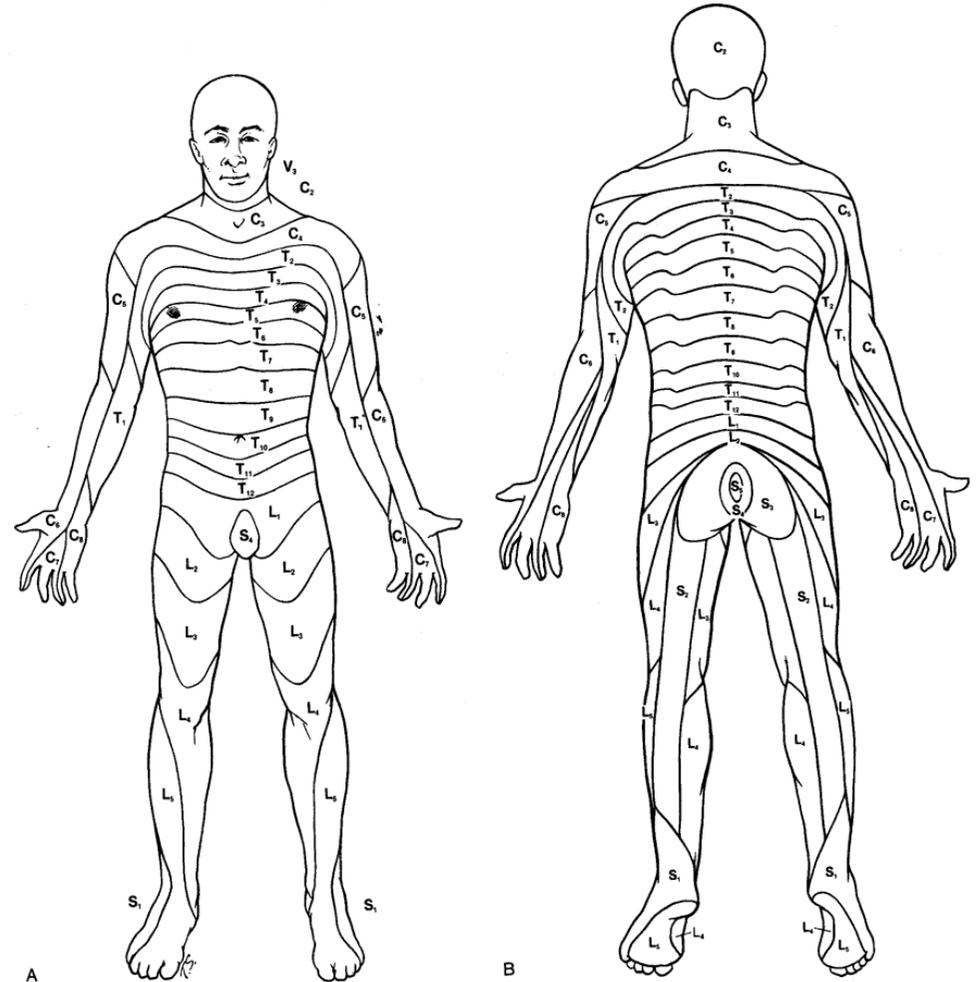
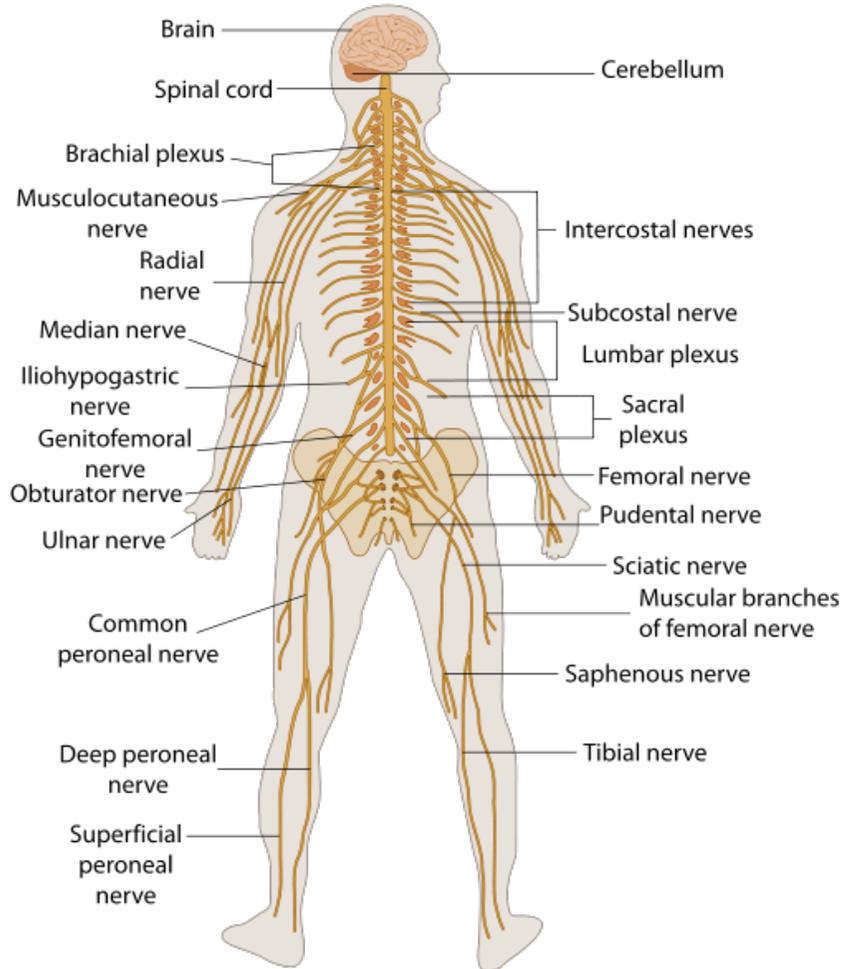
CUIDADO :

- Circulação de extremidades
- Cardiopatias graves
- Hipertensão
- Arritmias

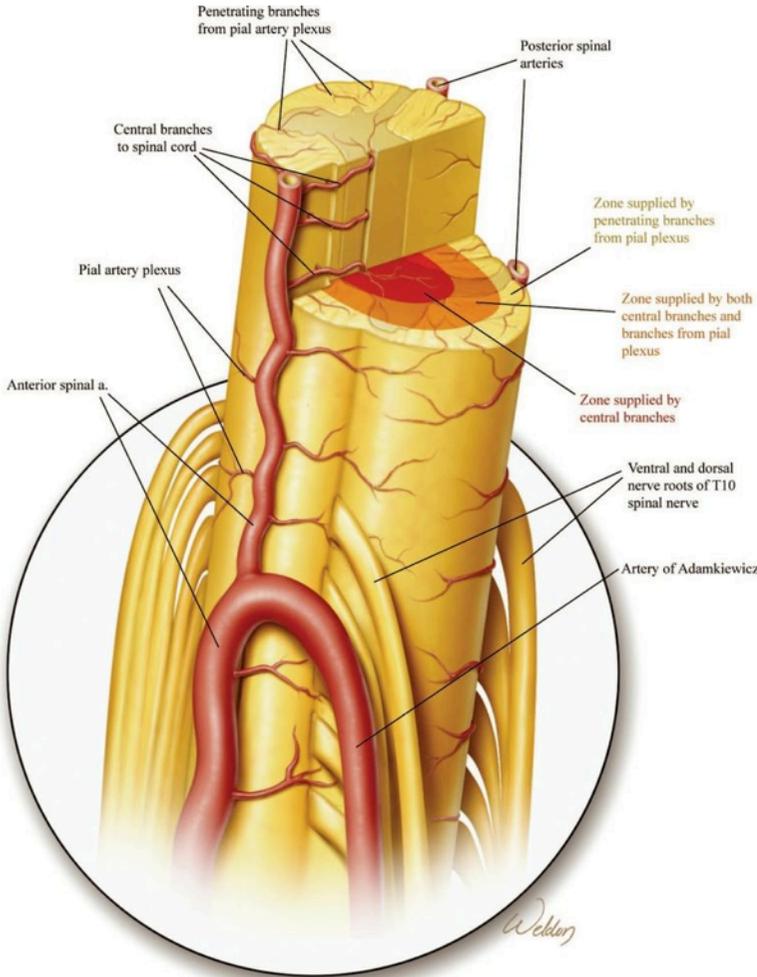
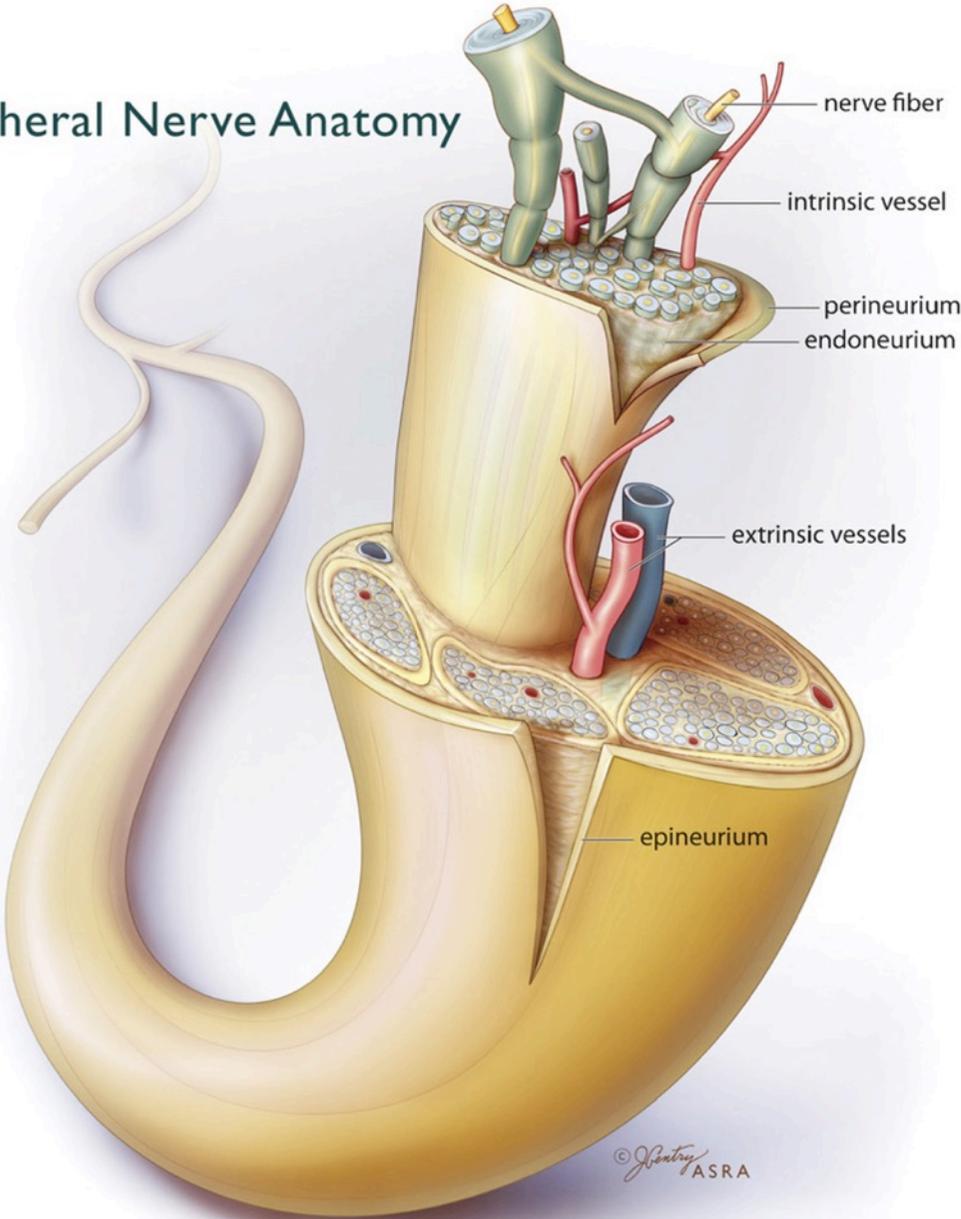
Vias da dor e intervenções que podem modular a atividade em cada ponto



Dermátomos

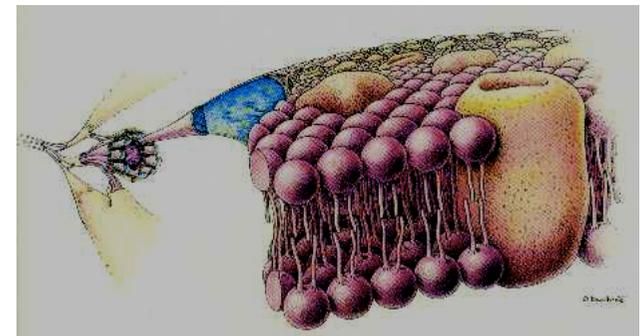
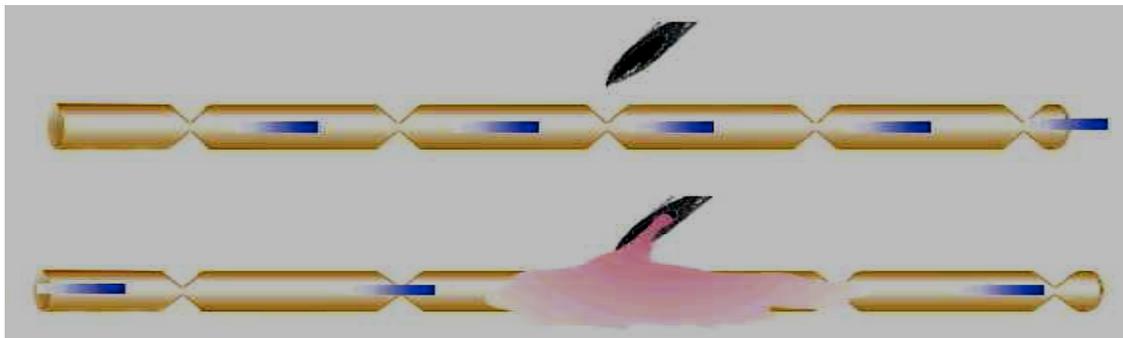


Peripheral Nerve Anatomy

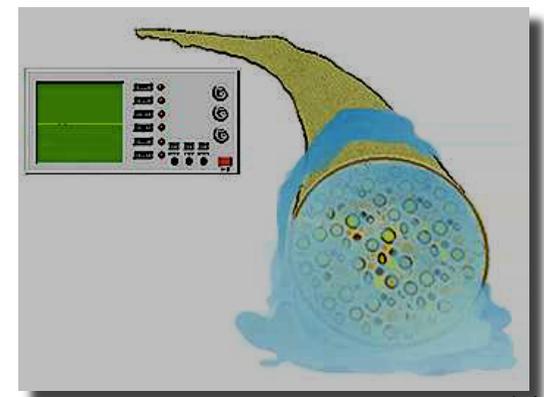
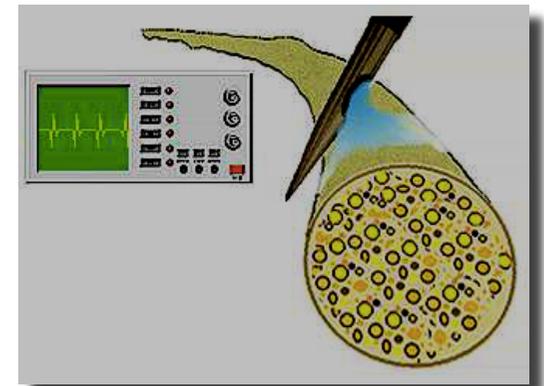
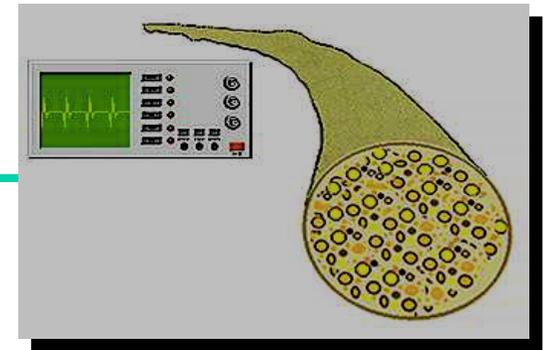
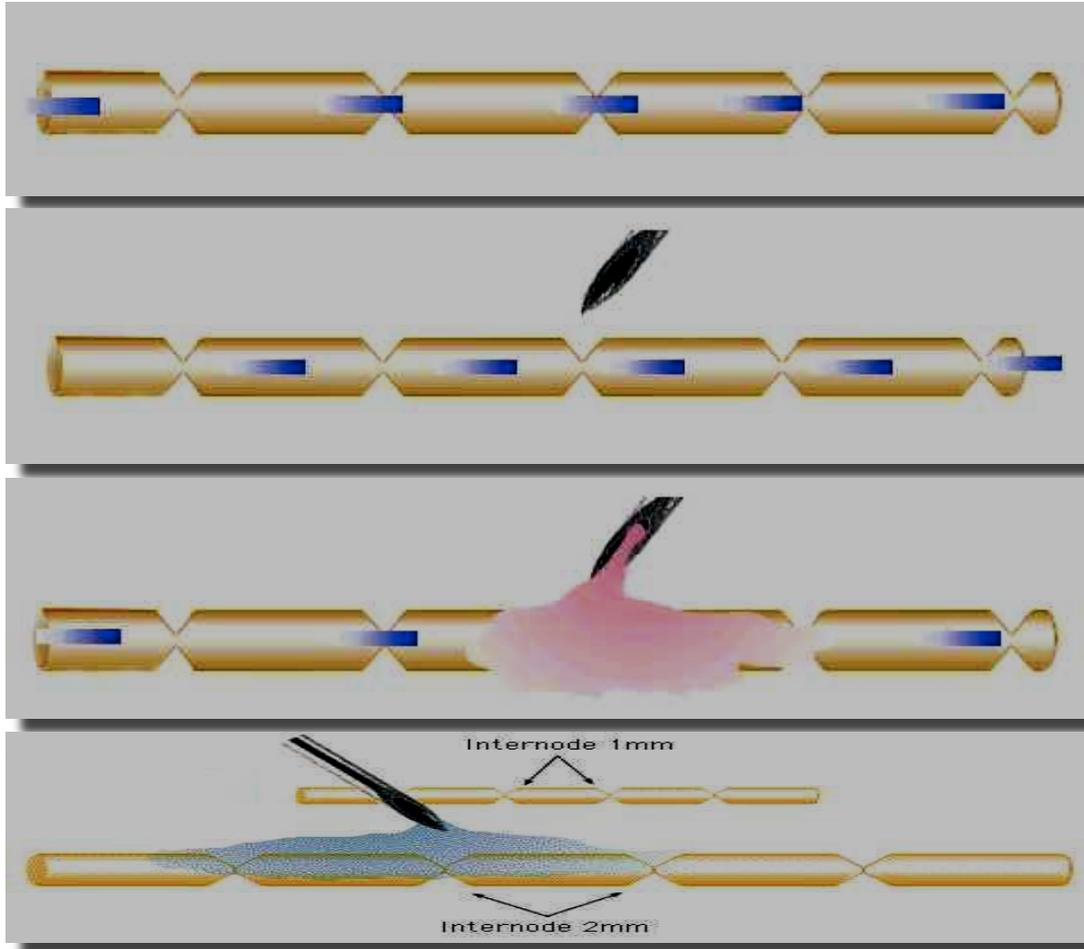


Anestésicos Locais

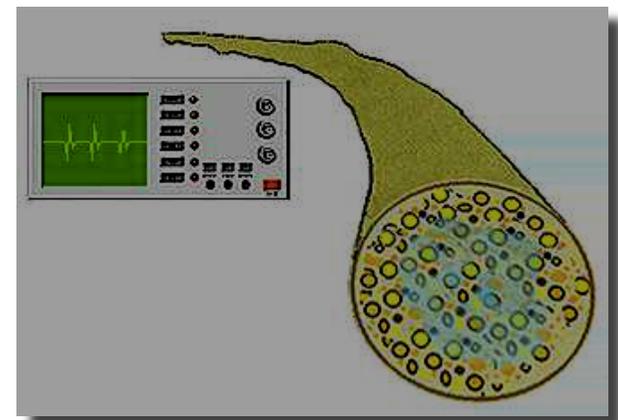
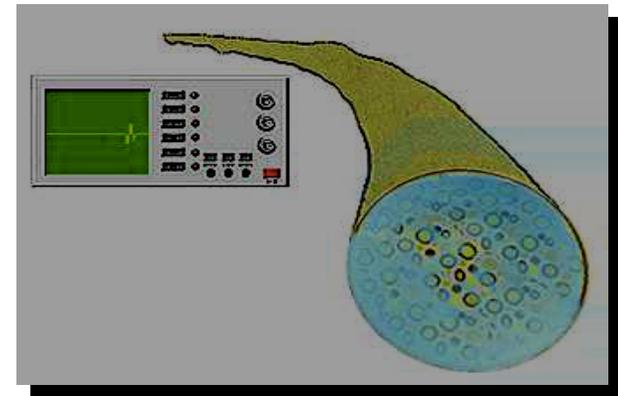
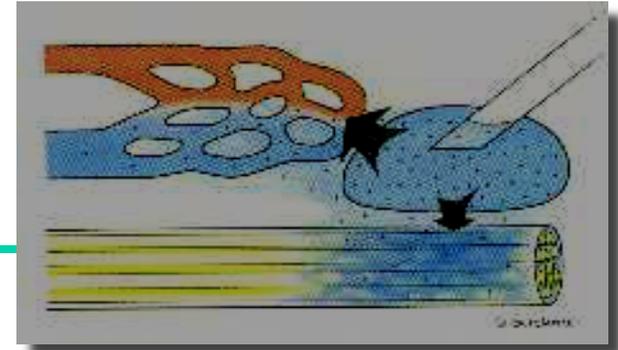
- ◆ Perda temporária da sensibilidade em uma área circunscrita.
- ◆ Depressão da excitabilidade das terminações nervosas ou a
- ◆ Inibição do processo de condução nos tecidos nervosos.



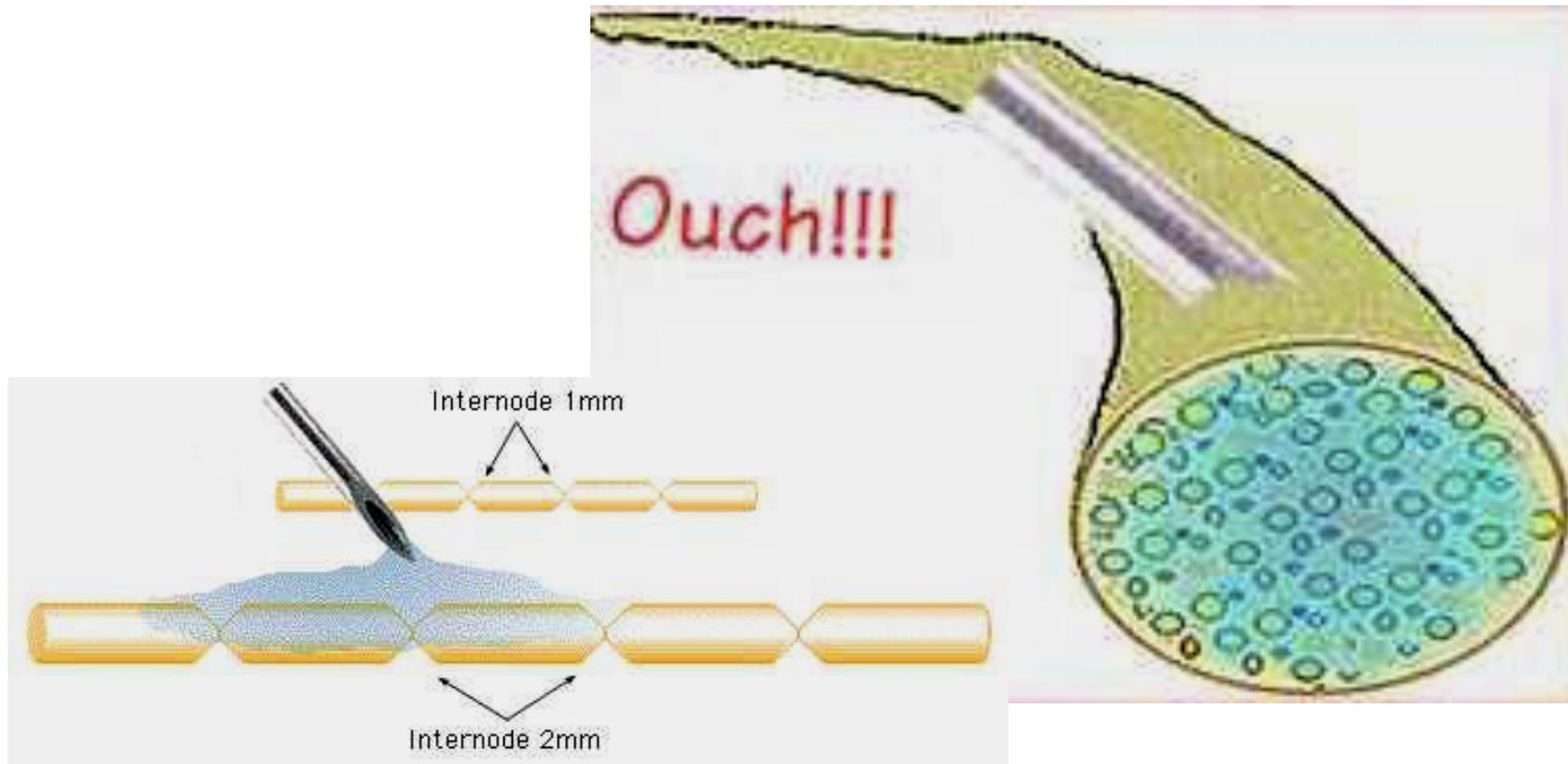
Instalação do Bloqueio



Regressão do Bloqueio

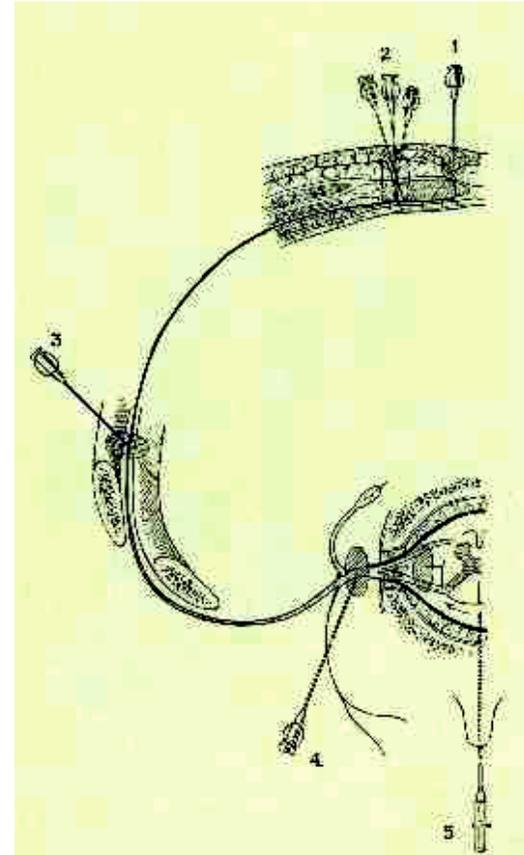


Injeção Intra Neural

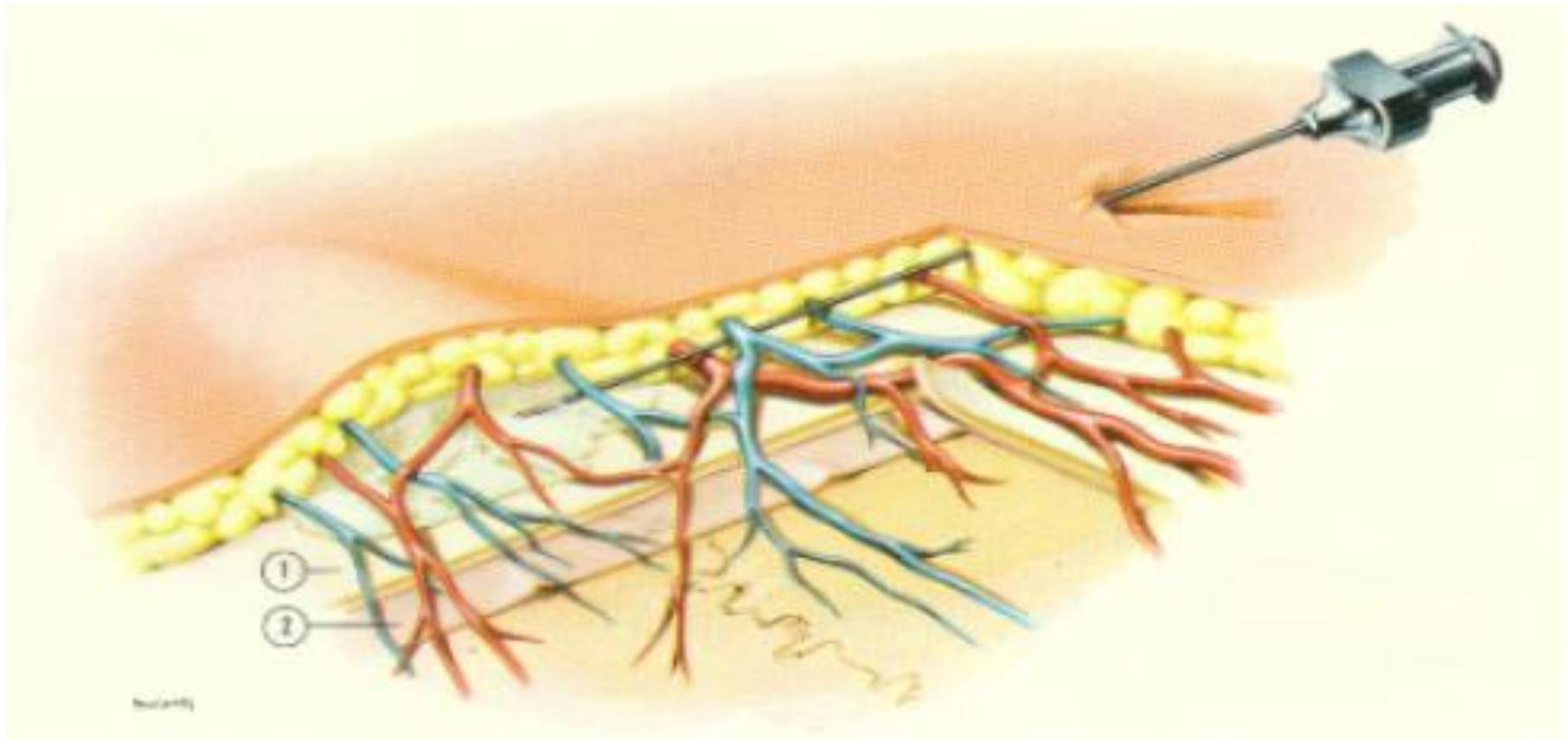


Locais para Bloqueio da Transmissão

- ◆ Infiltração Local
- ◆ Nervo Periférico
- ◆ Tronco de Nervos
- ◆ Plexo Nervoso
- ◆ Neuro Eixo
 - Epidural
 - Subaracnóide

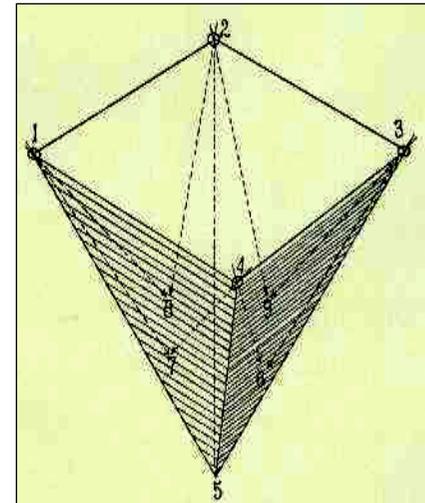
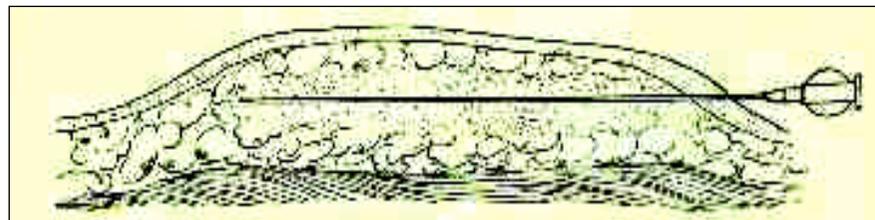
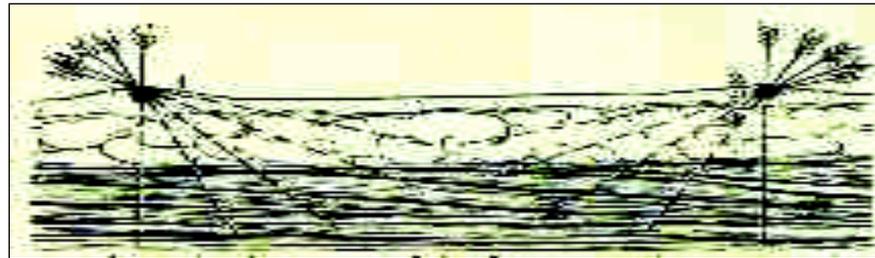
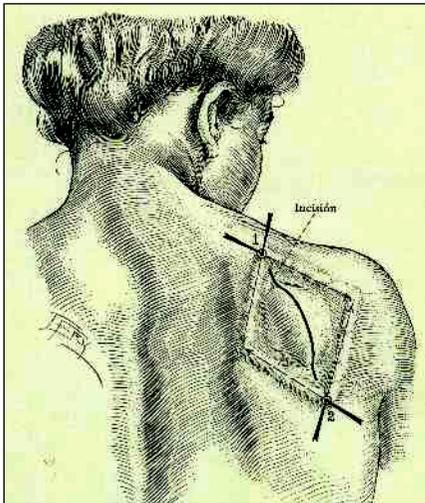
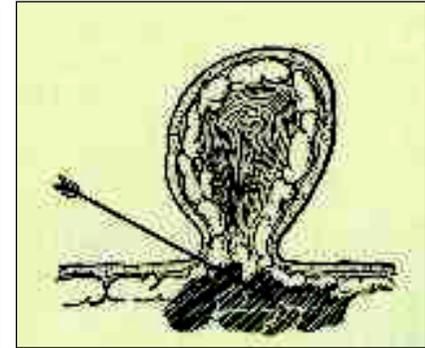


Infiltração Local

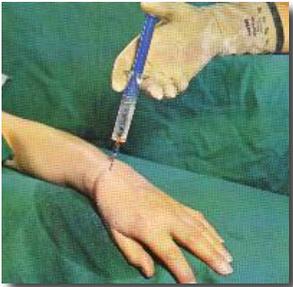
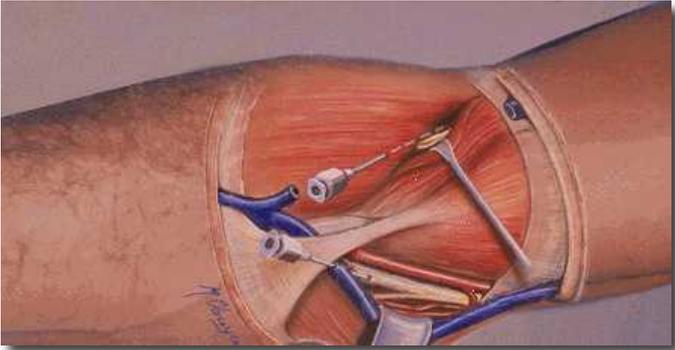
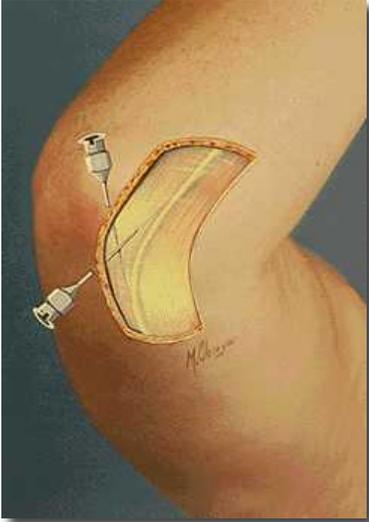
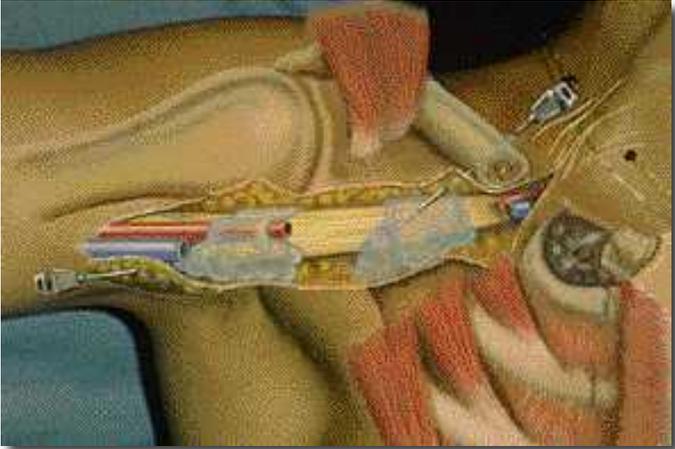


Infiltração - Bloqueio de Campo

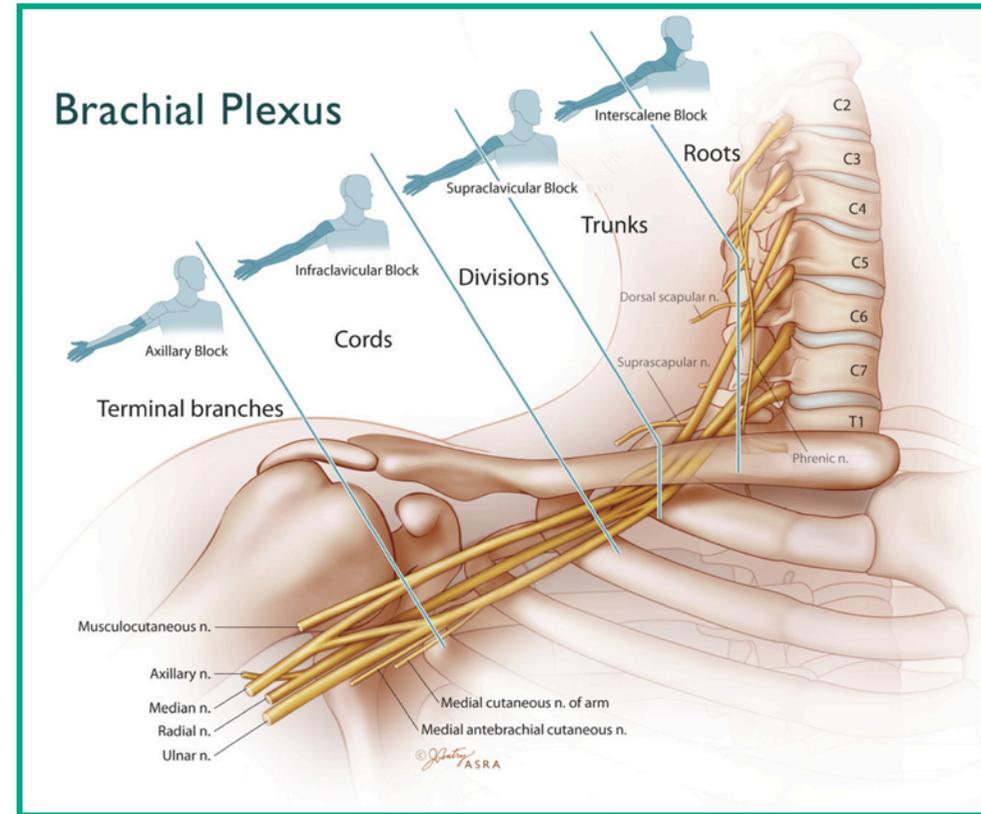
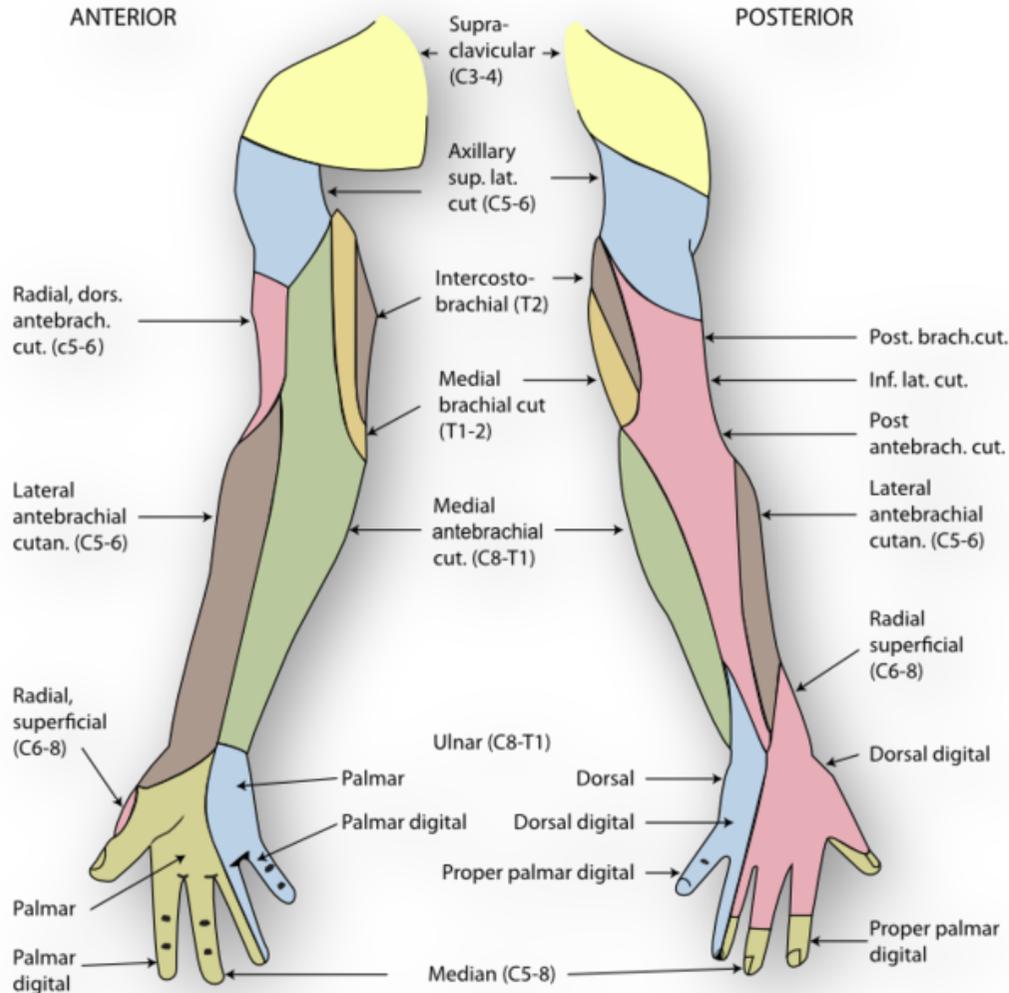
- ◆ Infiltração de solução de AL.
- ◆ Campo **X** Estruturas profundas.
- ◆ Considerar o uso de ADR.



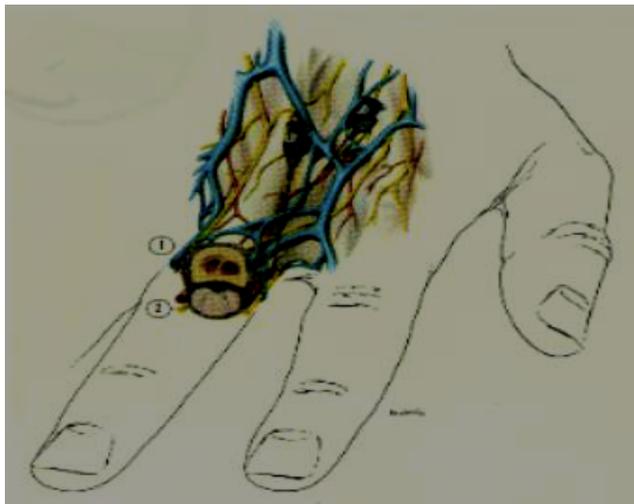
Membro Superior



Plexo Braquial



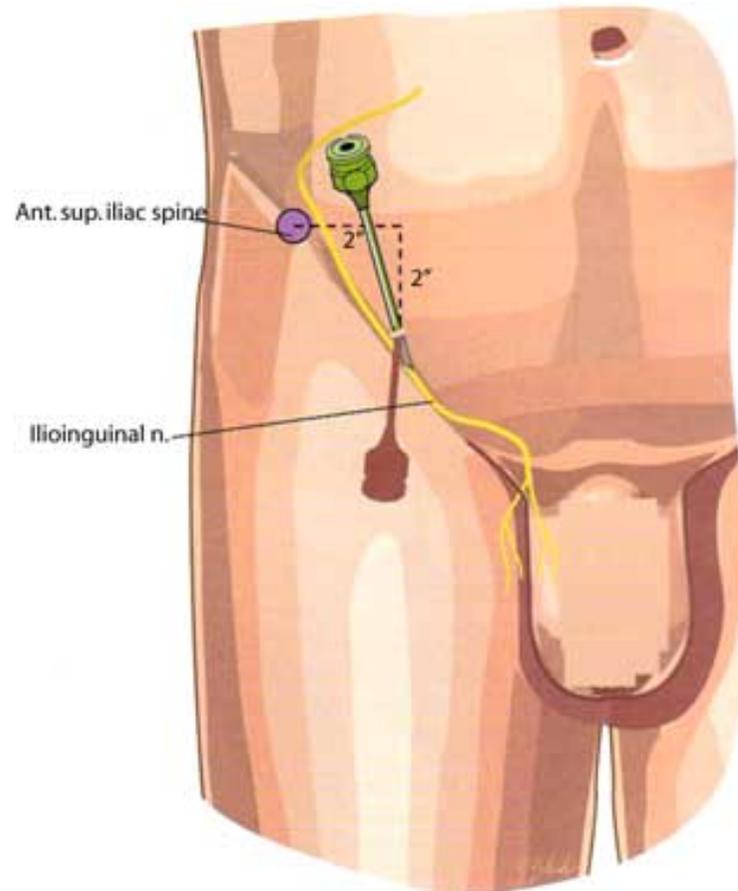
Bloqueio Interdigital e Peniano SEM VASOCONSTRICTOR



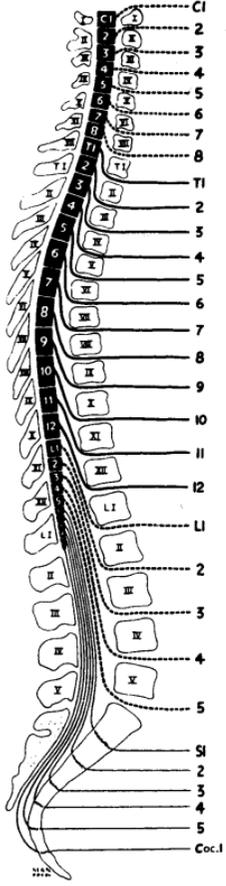
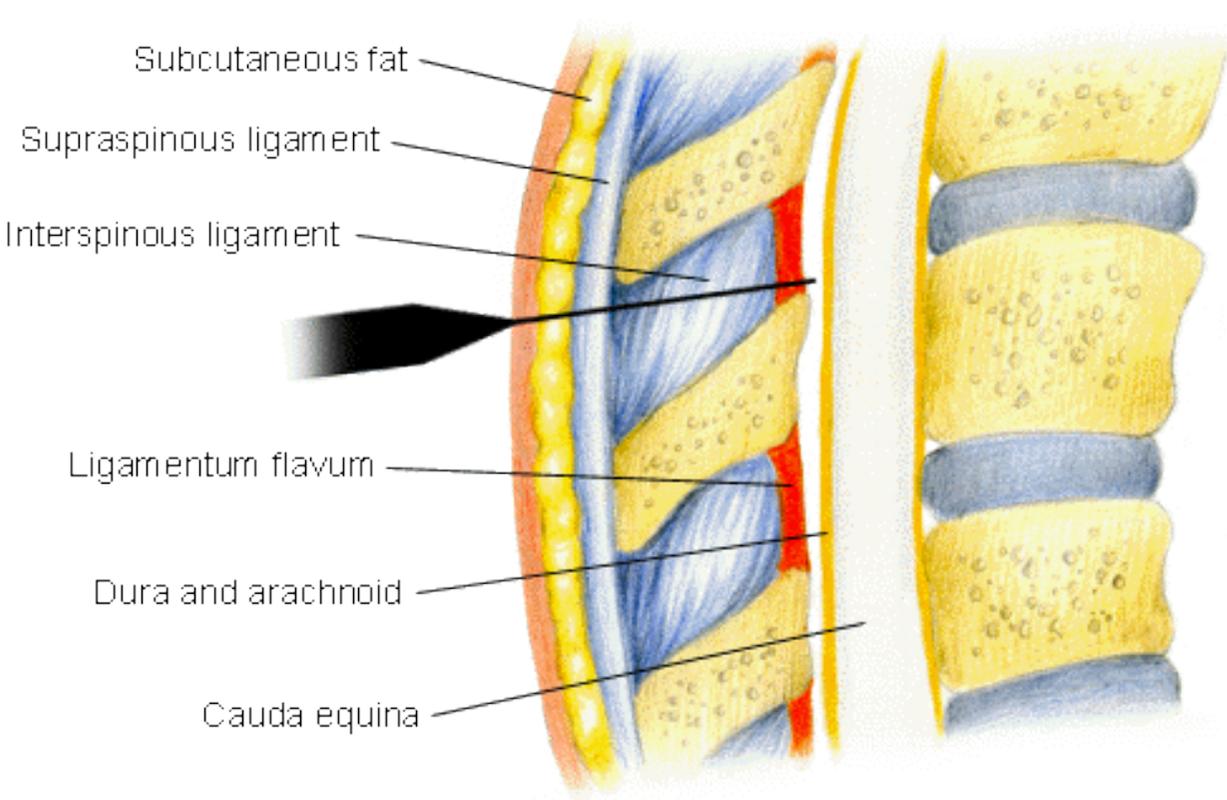
Nervos Intercostais



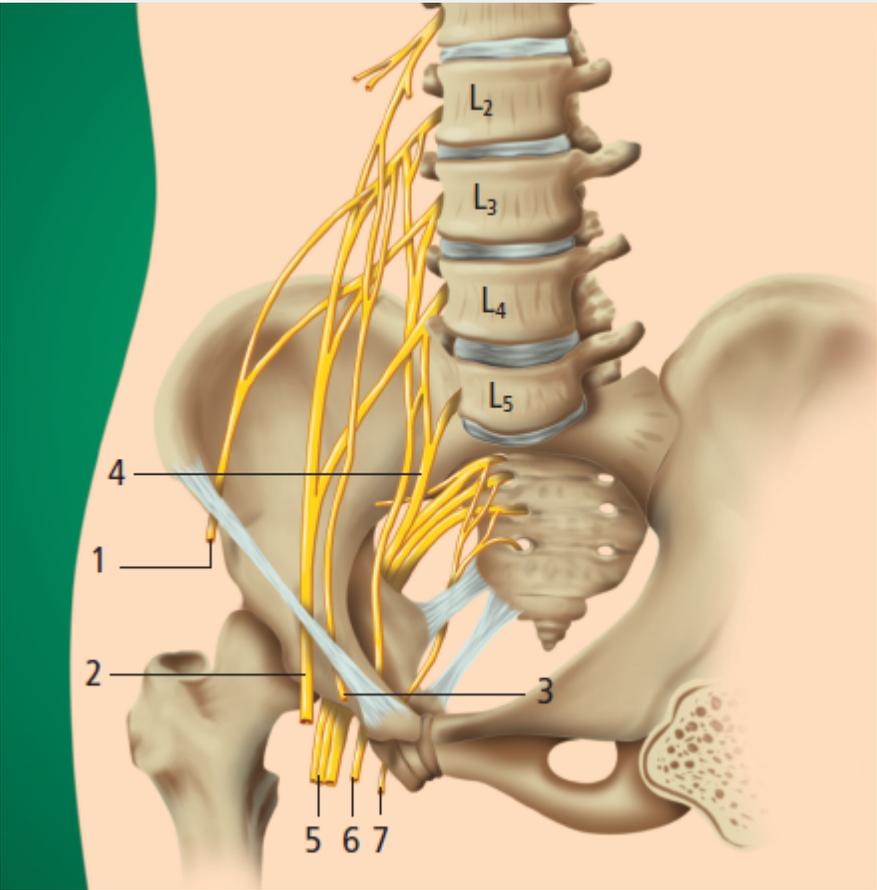
Ileinguinal - Ileo-hipogástrico



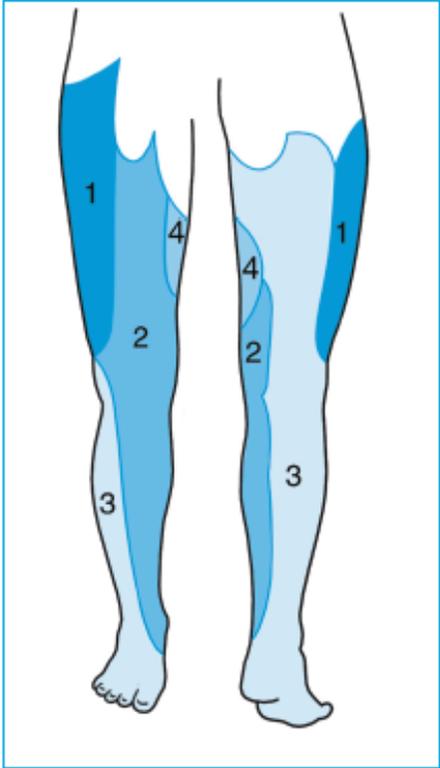
Bloqueo Epidural / Subaracnoideo



Plexo Lombo-Sacro



Sensory supply areas

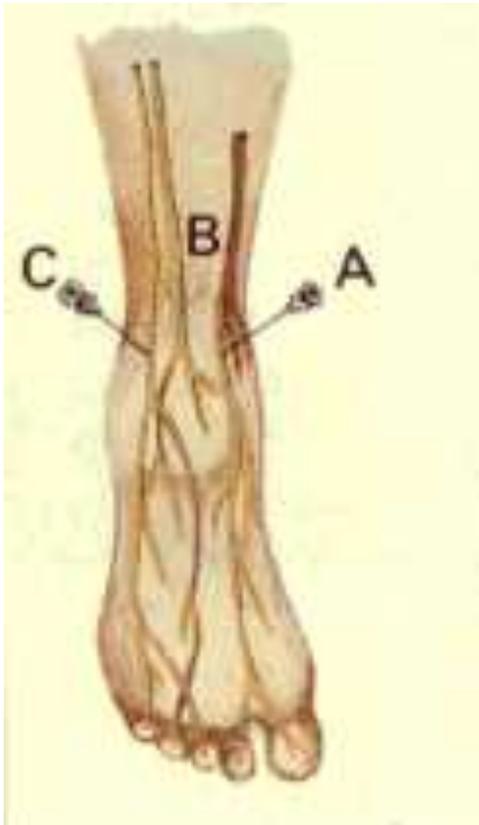


- 1 Lateral femoral cutaneous nerve
- 2 Femoral nerve
- 3 Sciatic nerve
- 4 (Obturator nerve)

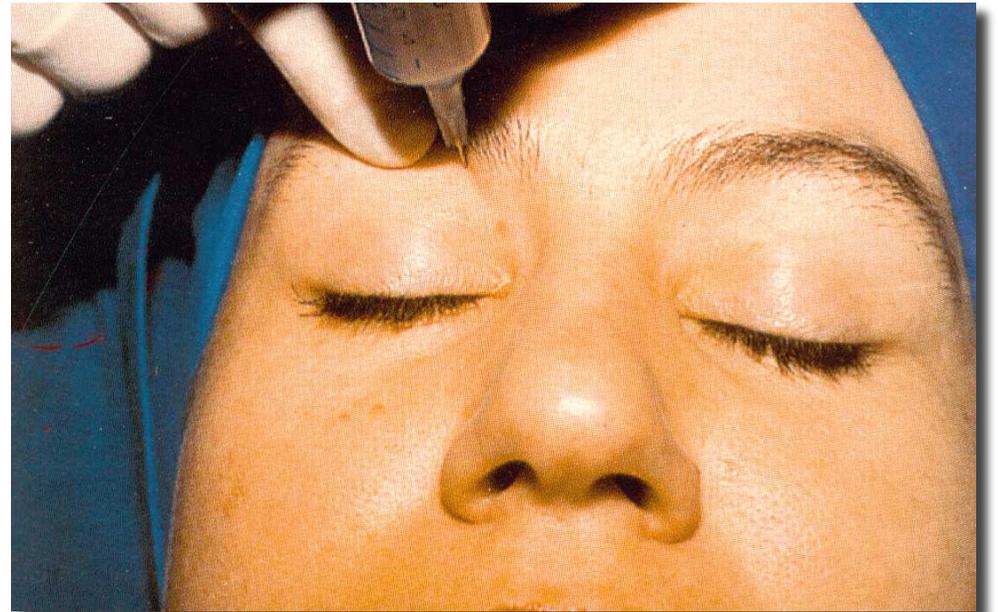
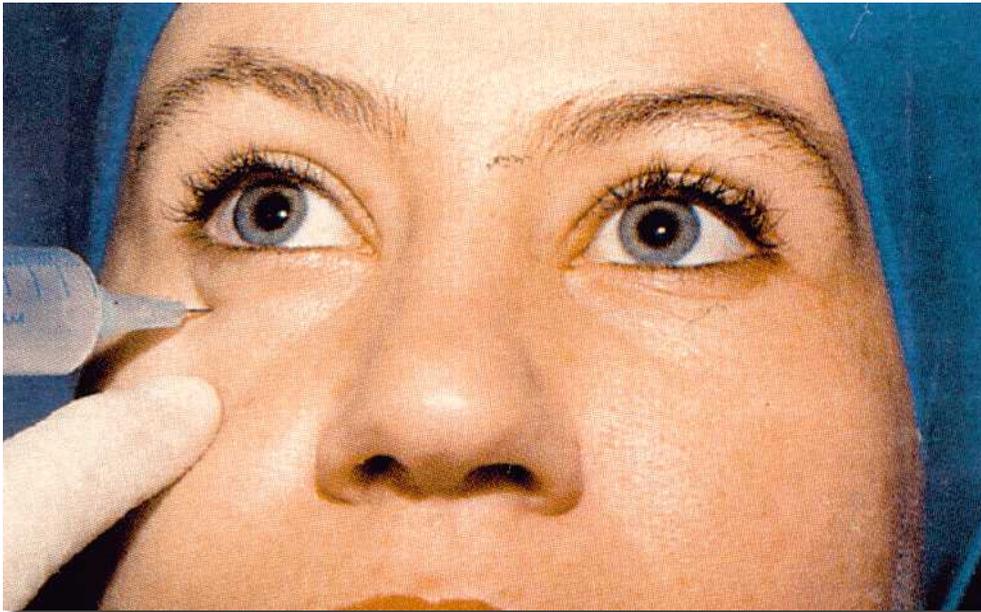
Fig. 5: Sensory supply areas of the lumbosacral plexus

Bloqueios do Membro Inferior

Nervos Tibial e Sural



Bloqueios em Oftalmologia



Avaliação do Paciente

- ◆ Condições Clínicas
- ◆ Tolerância ao Procedimento
 - Recusa do paciente
 - Extensão da lesão
 - Tempo cirúrgico
 - Posicionamento
- ◆ Dose TOTAL DO ANESTÉSICO LOCAL

Anestesia Local

Condições Mínimas de Segurança .

- ◆ Técnica asséptica.
- ◆ Linha venosa apropriada.
- ◆ Fármacos para a Reanimação.
- ◆ Material para a Reanimação.
- ◆ Barbitúricos, BDZ, BNM.



Anestesia Local

Condições Mínimas de Segurança ..

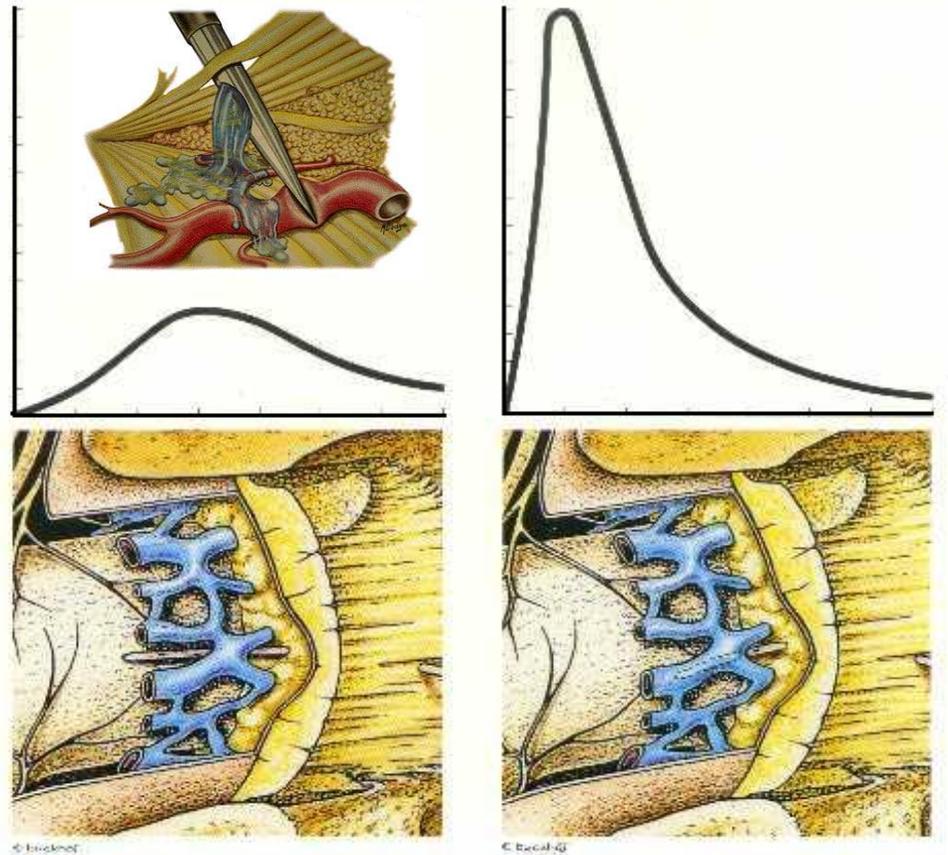
- ◆ **O MÉDICO deve conhecer:**
 - A Dose SEGURA
 - Os Sinais de TOXICIDADE
 - Os Procedimentos de REANIMAÇÃO



**OBSERVAR AS PRECAUÇÕES PARA
EVITAR A TOXICIDADE**

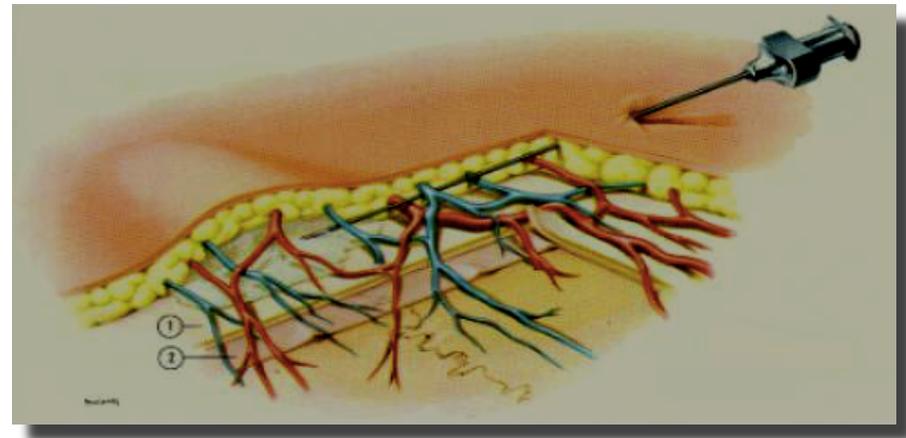
Absorção Sistêmica

- ◆ Dose total do AL
- ◆ Local da injeção
- ◆ Injeção intravascular
- ◆ Estado do paciente
 - acidose
 - hipóxia
 - hipercarbia
 - doença hepática

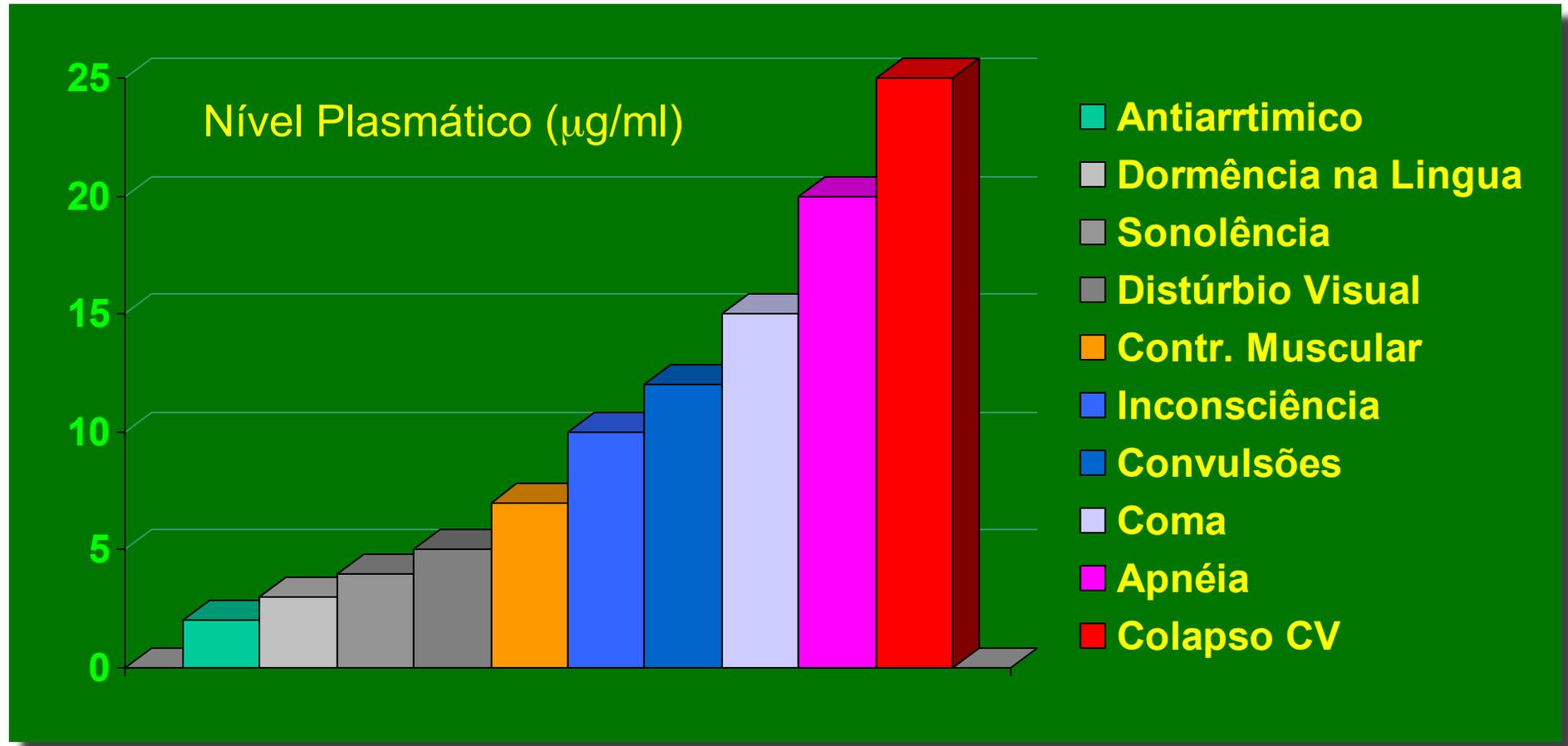


Toxicidade

- ◆ Injeção intravascular inadvertida.
- ◆ Administração de uma dose excessiva.
- ◆ Toxicidade tecidual direta da droga ou dos conservantes.
- ◆ Raramente:
reação anafilática



Toxicidade da Lidocaína



Dose Terapêutica Máxima

- ♦ Metade da dose (média) necessária para gerar os níveis plasmáticos que produzem as convulsões.

	Dose mg/kg	Duração (min.)
Lidocaína	5	50
Lidocaína + 1:200000	7	100
Bupivacaína	2	200

LIDOCAÍNA: Cálculo da Dose

5 mg/kg

c/ ADR 7 a 9 mg/kg

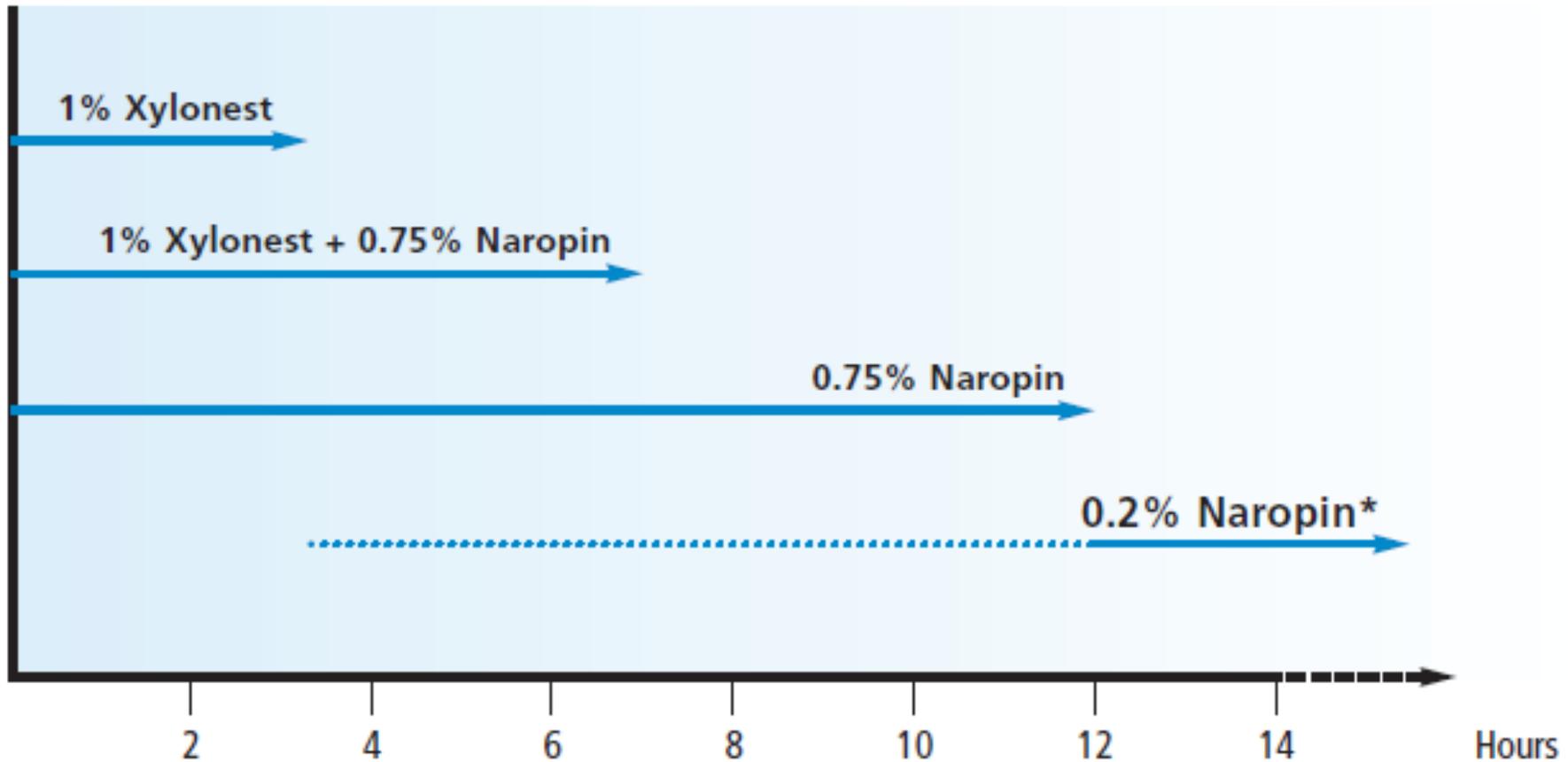
Pura: 5 mg/kg - com ADR: 7 - 9 mg/kg

Concentração	60 kg	ADR
0,5 % - 5 mg/ml	60 mL	84 mL
1,0 %- 10 mg/ml	30 mL	42 mL
2,0 %- 20 mg/ml	15 mL	21 mL

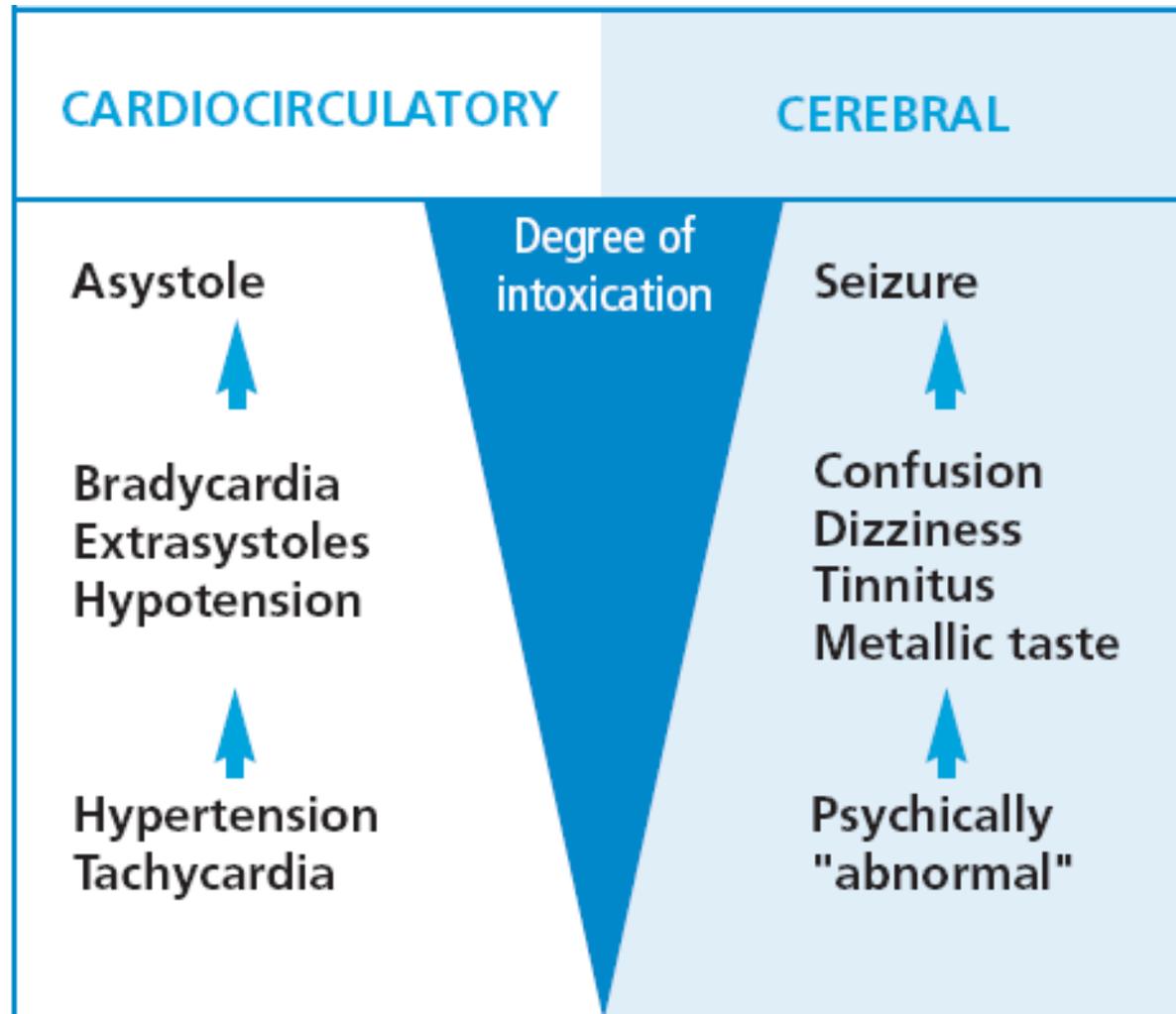
Diluição das Soluções

A	B	Vol.	ADR
1,0 %	- 0,5 %	1:1	1:400.000
2,0 %	- 0,5 %	1:3	1:800.000

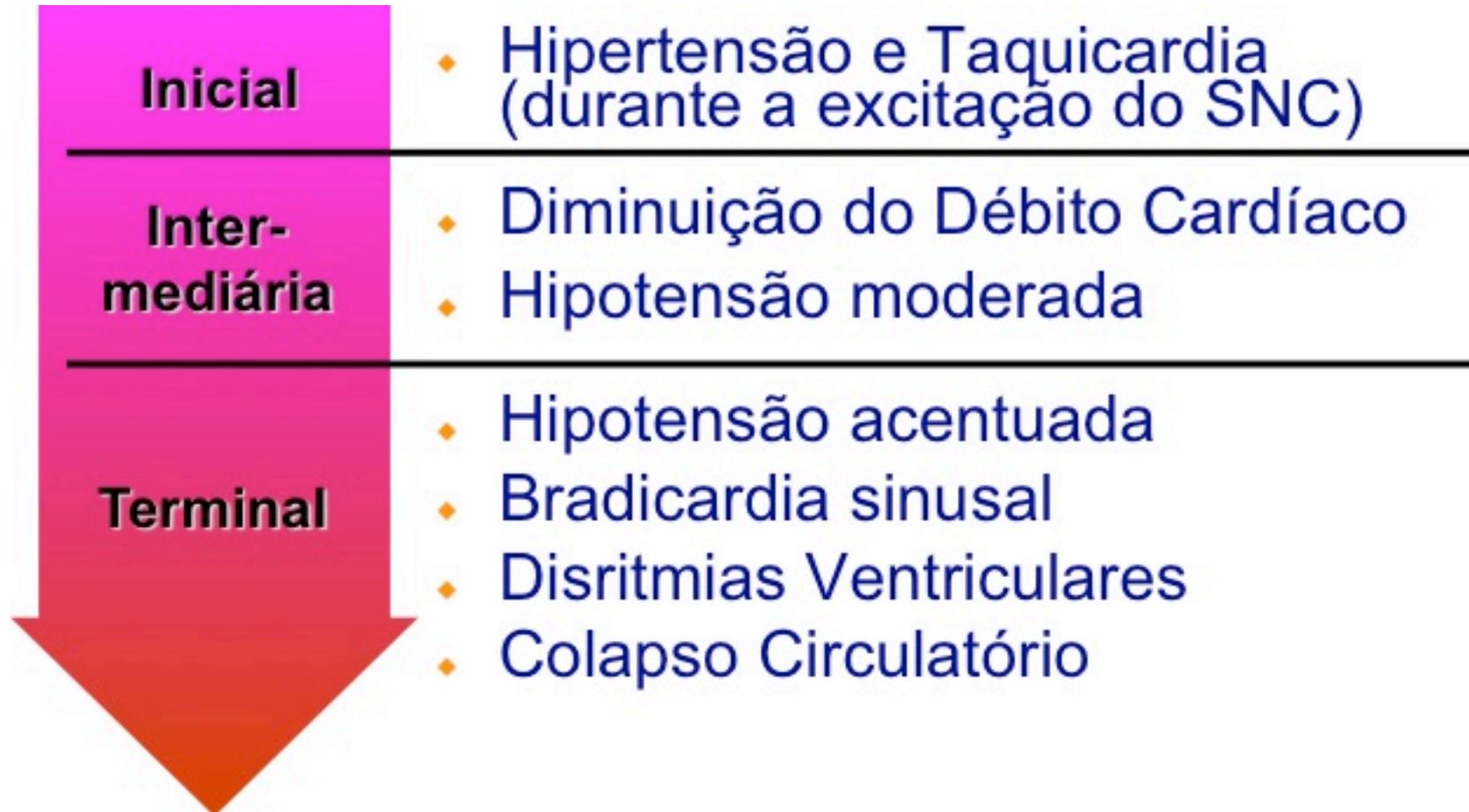
Mistura de Anestésicos Locais



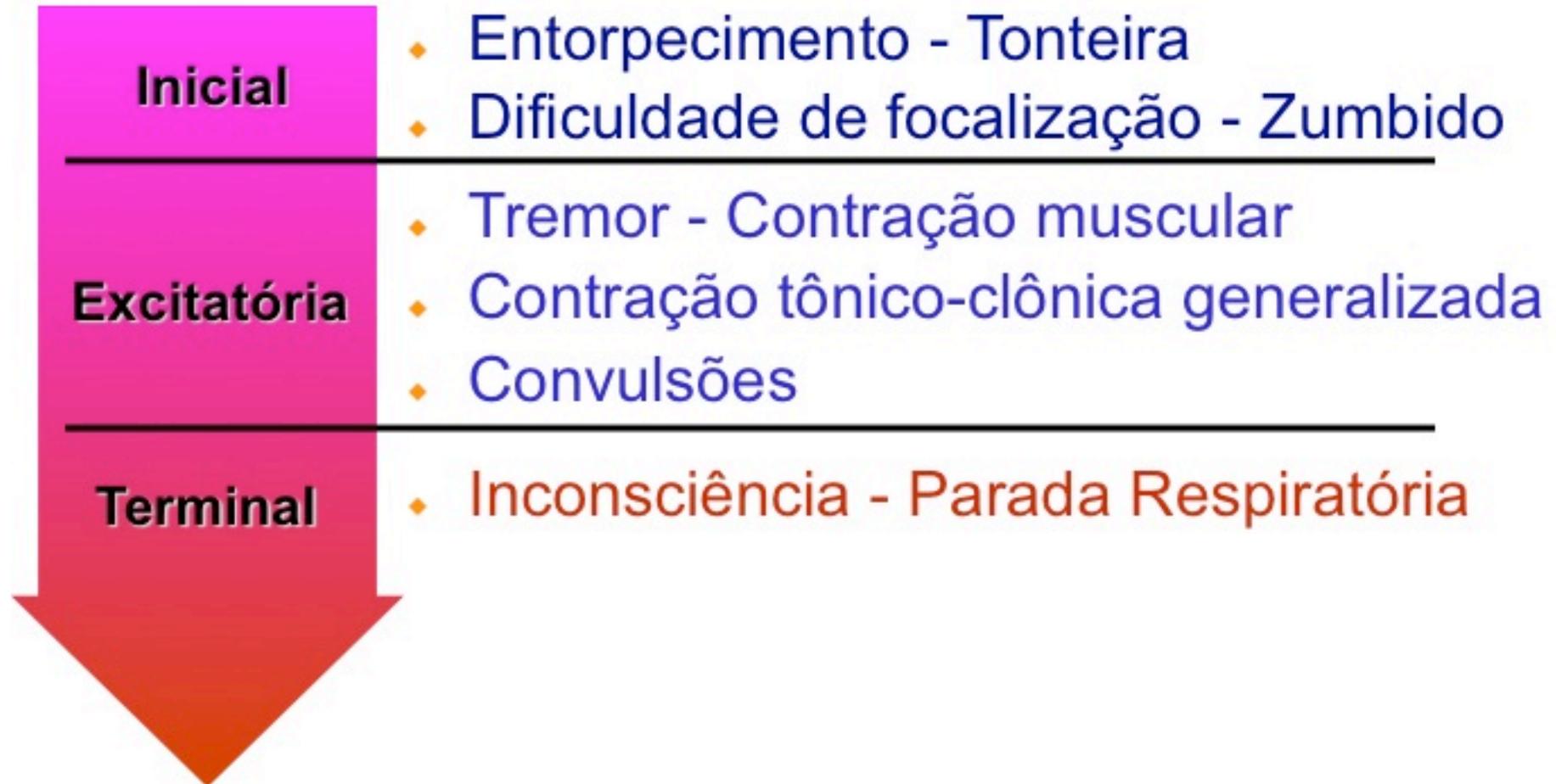
Anestésicos Locais: Intoxicação Sistêmica



Efeitos Tóxicos Sistema Cardiovascular



Efeitos Tóxicos Sistema Nervoso Central



Toxicidade dos Anestésicos Locais: Tratamento

HIPOTENSÃO

- ◆ Oxigênio 100%
- ◆ Hidratação
- ◆ Efedrina
- ◆ Adrenalina
- ◆ Atropina

**COLAPSO
CARDIOVASCULAR**

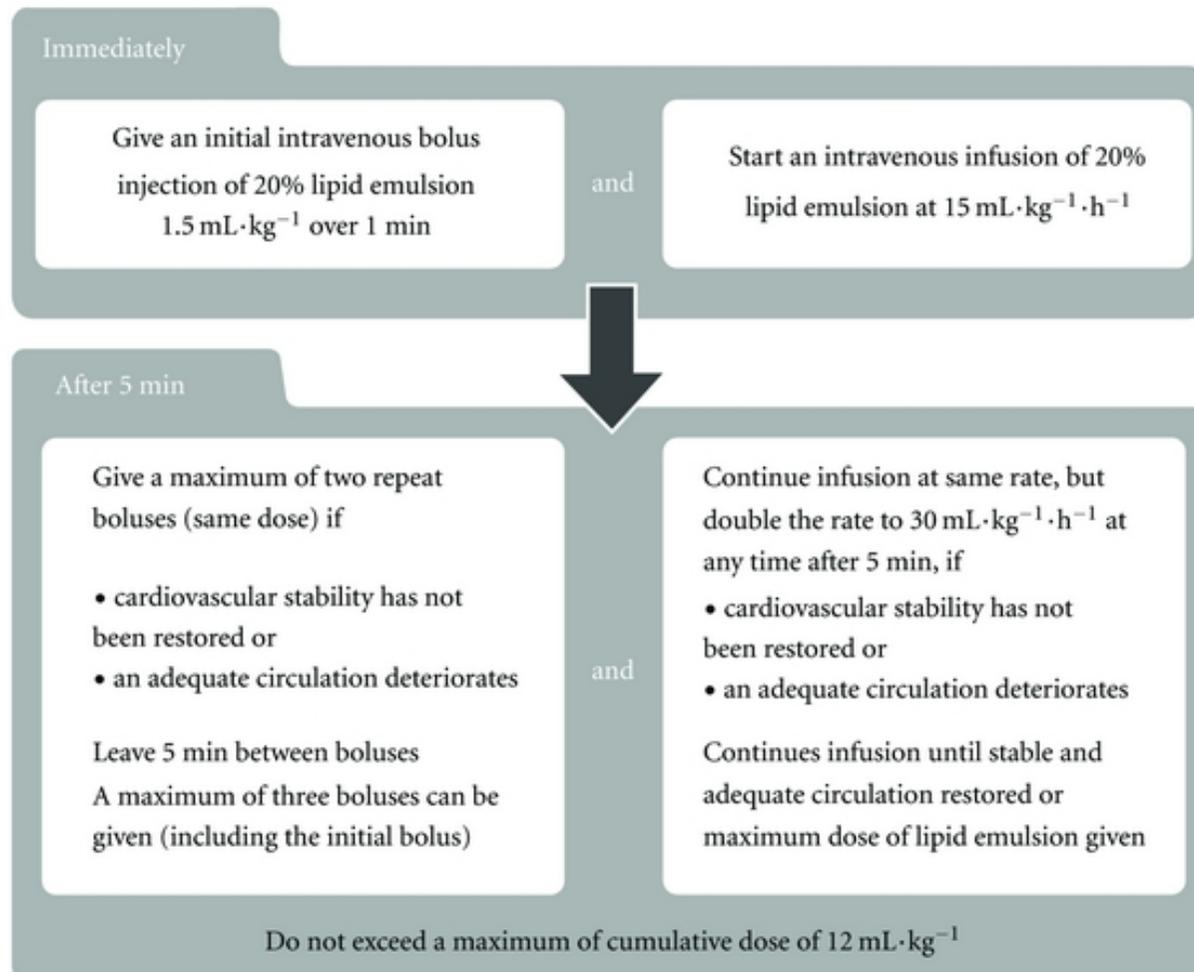
EXCITAÇÃO SNC

- ◆ Oxigênio 100%
- ◆ Manter a Via Aérea
- ◆ Diazepam 0,1 mg/kg
- ◆ Thiopental 2 mg/kg
- ◆ Succinilcolina 1mg/kg

CONVULSÃO

Intubar - RCPC se PA < 50 mmHg - Adrenalina

Toxicidade dos Anestésicos Locais: Tratamento



BLOQUEIOS: Contra Indicações

- ◆ Recusa do(a) paciente
- ◆ Infecção no local da punção
- ◆ Alterações da coagulação
- ◆ Alterações anatômicas acentuadas *

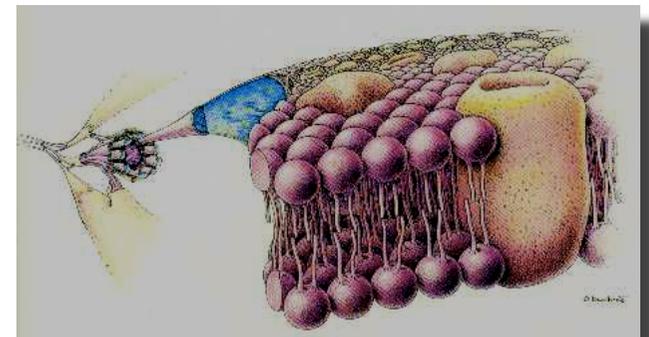
Muito Obrigado

Como Funcionam ?

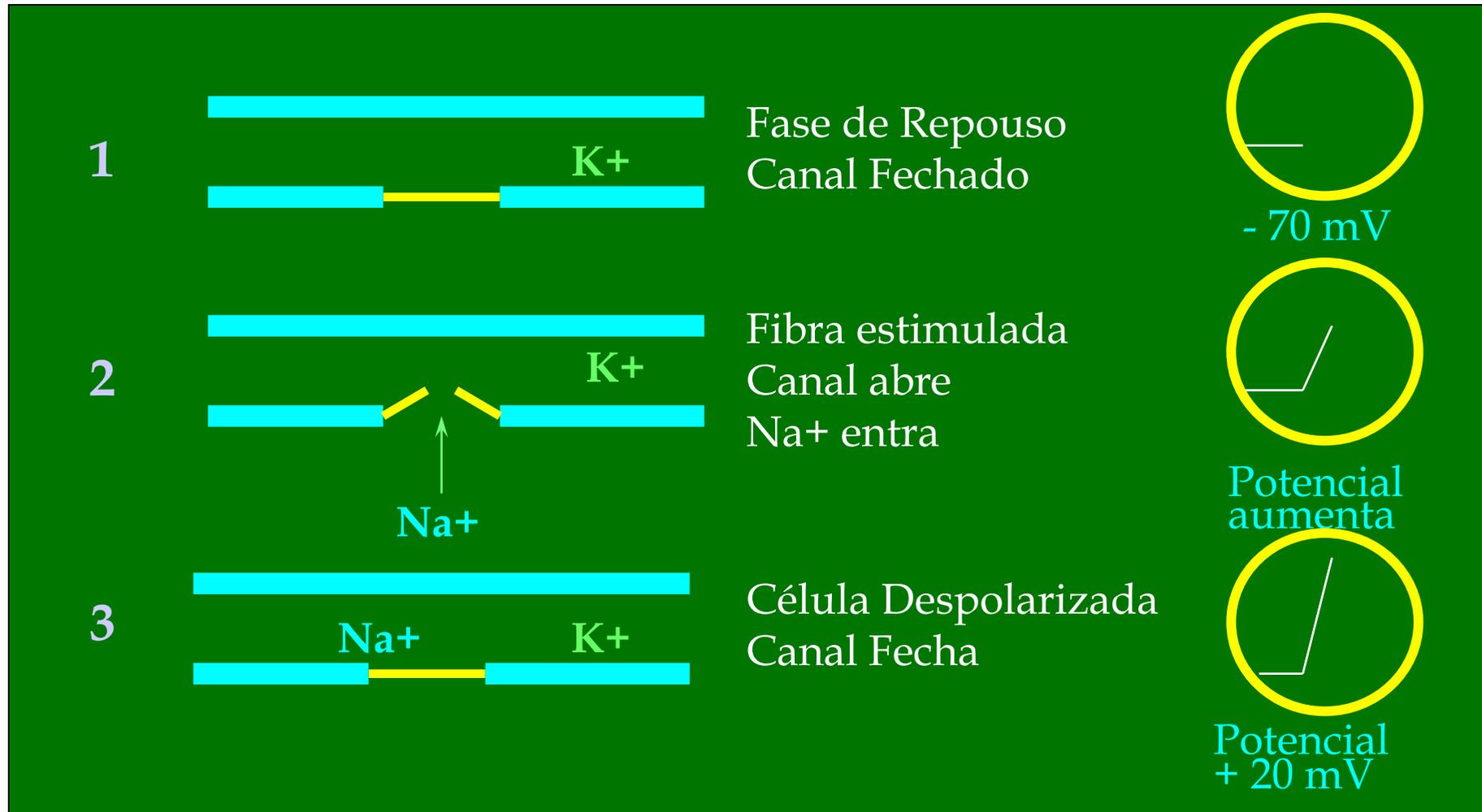
- ◆ Alteram Função da Membrana Axonal
também
- ◆ Afetam Outras Membranas Excitáveis
e
- ◆ Previnem Despolarização

Podem produzir toxicidade:

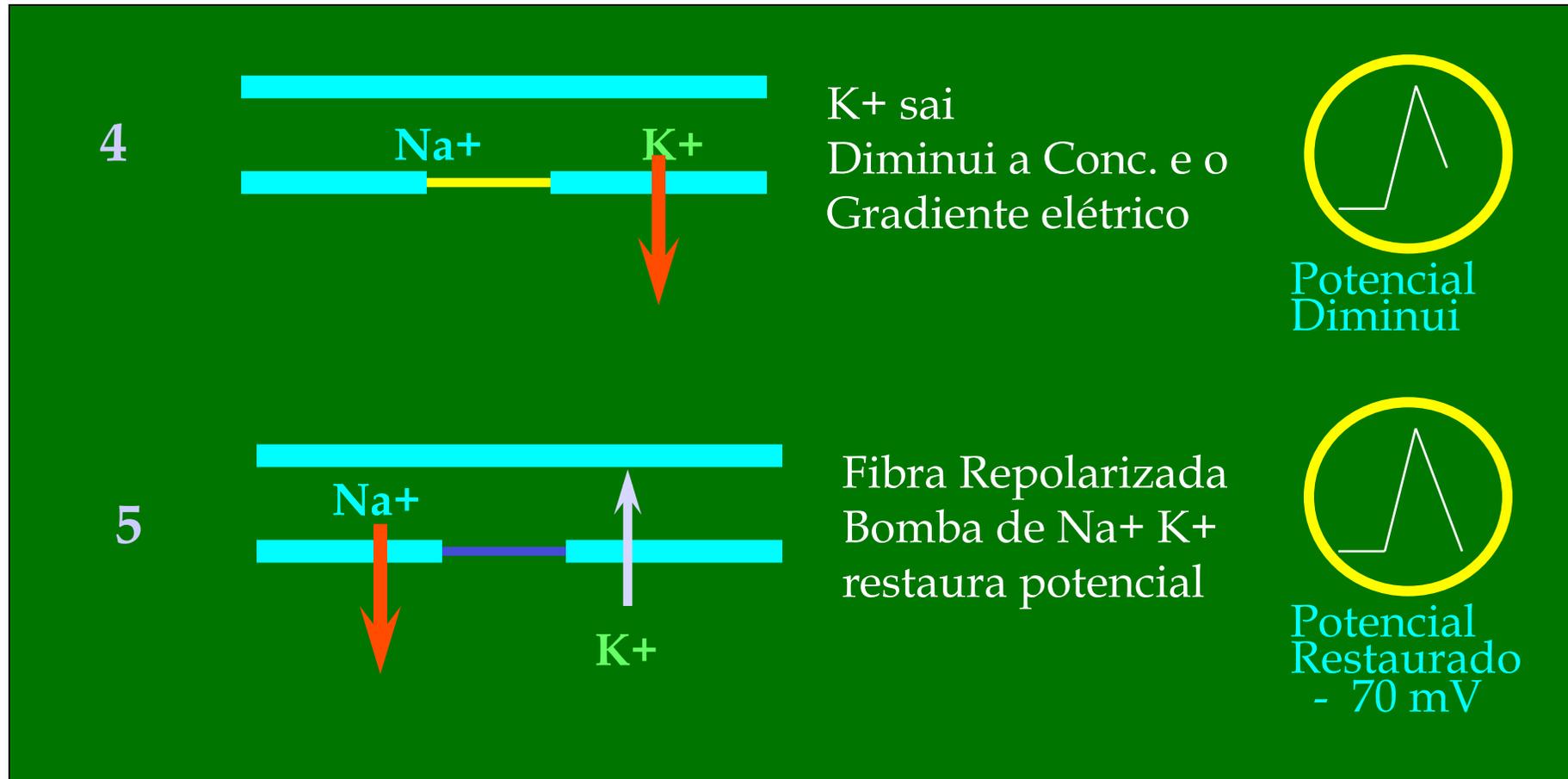
- Sistema Nervoso Central
- Sistema Cardiovascular



Transmissão do Impulso Nervoso .



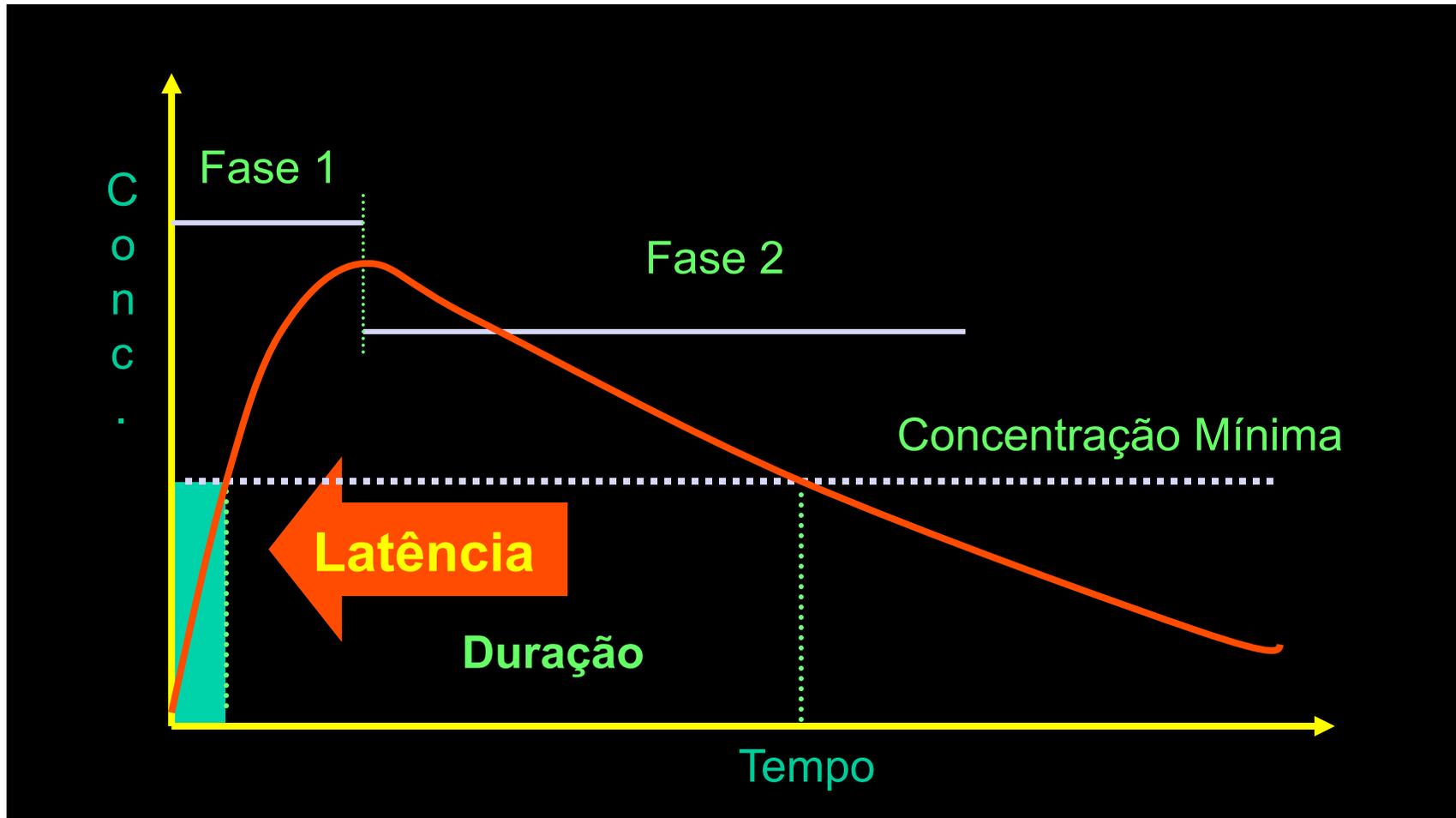
Transmissão do Impulso Nervoso ..



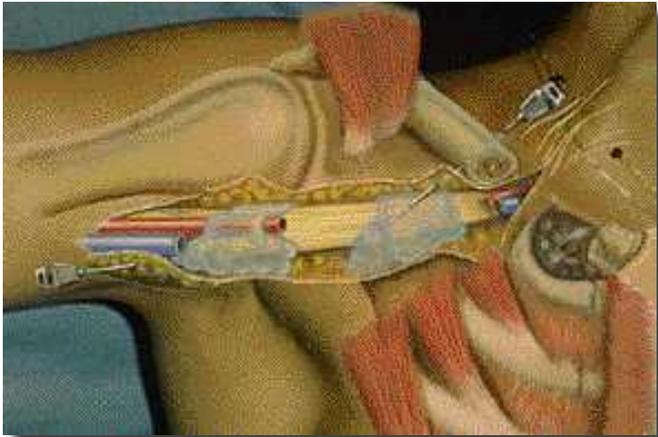
Seqüência de Eventos do Bloqueio de Condução .

- ◆ Difusão da forma básica através da bainha e da fibra nervosa
- ◆ Re-equilíbrio entre a forma básica e a catiônica no axoplasma
- ◆ Penetração do cátion e ligação ao sítio receptor no canal de sódio
- ◆ Bloqueio do canal de sódio

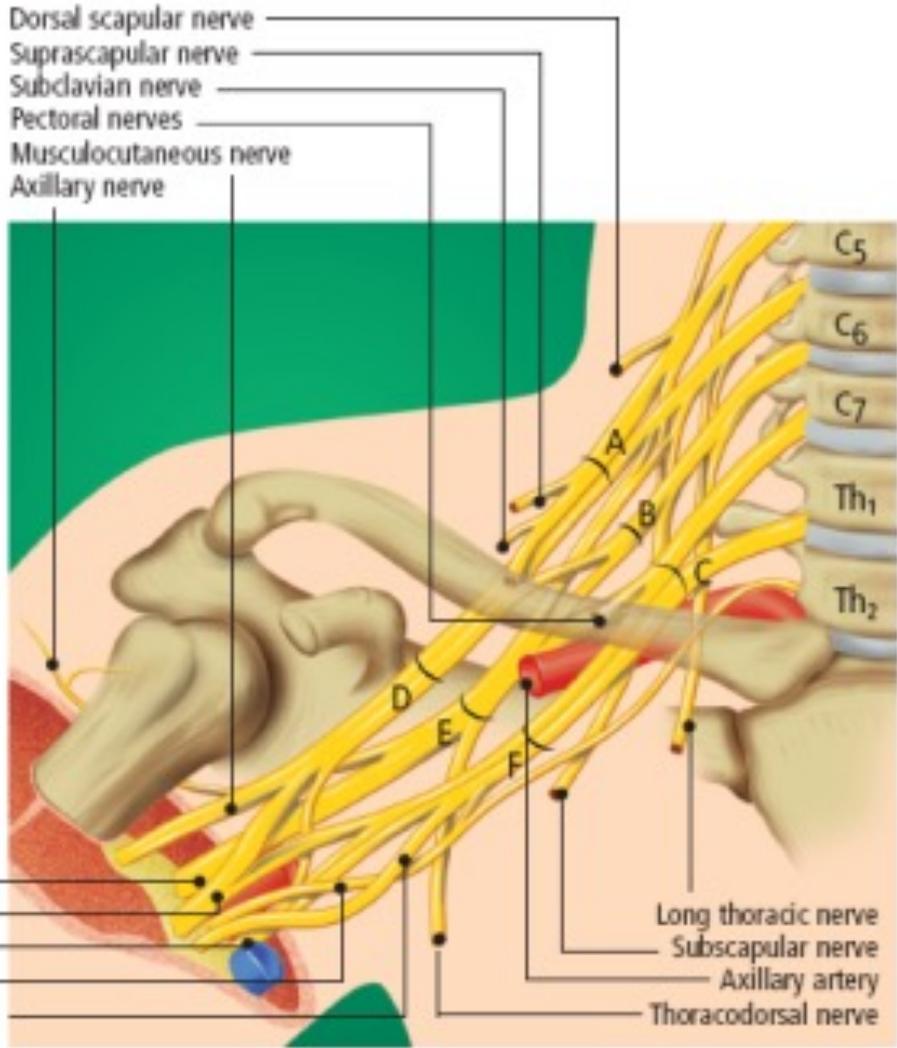
Latência - Duração - Potência



Plexo Braquial



- Radial nerve
- Median nerve
- Ulnar nerve
- Medial cutaneous nerve of the arm
- Medial cutaneous nerve of the forearm

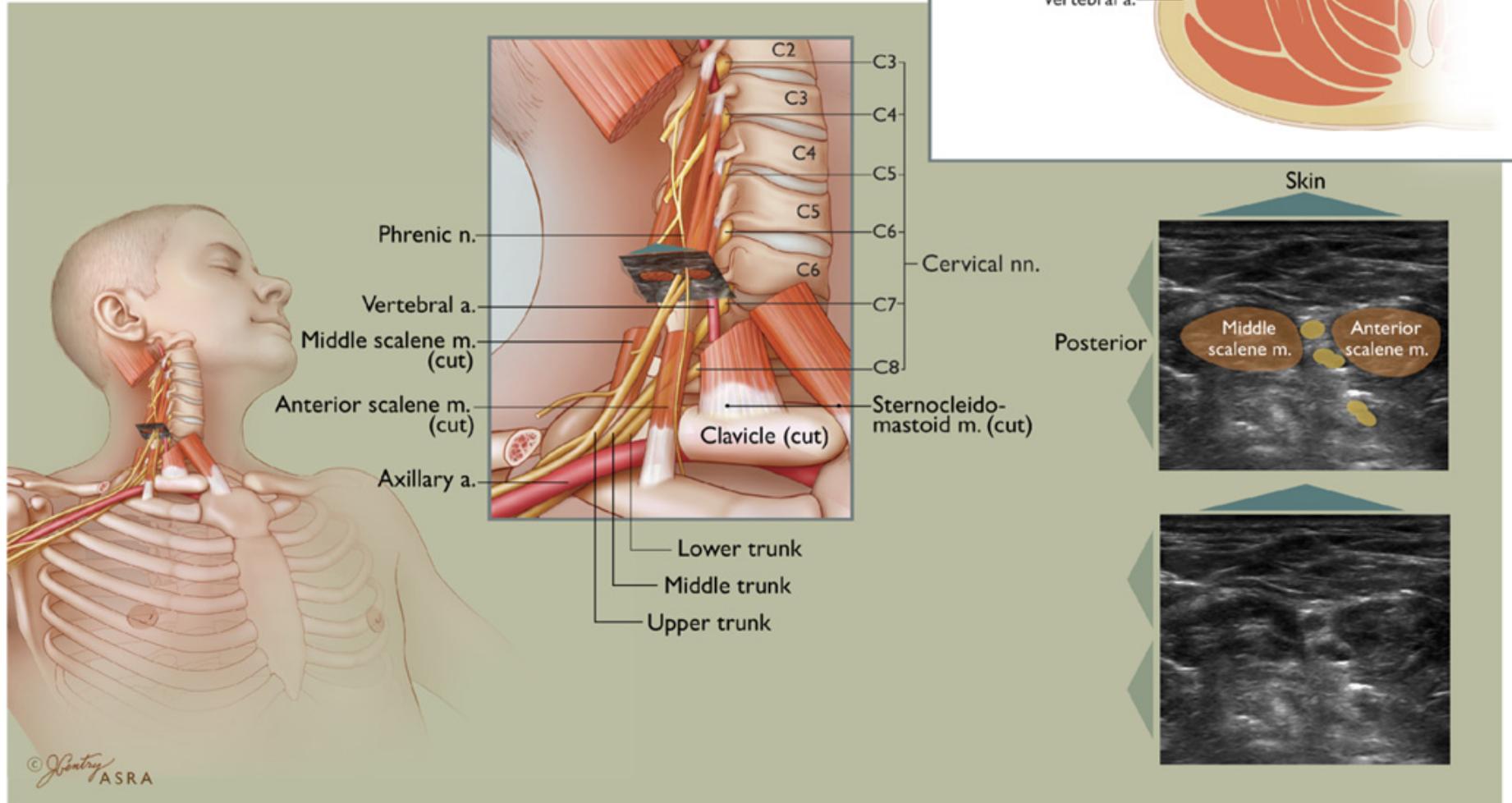
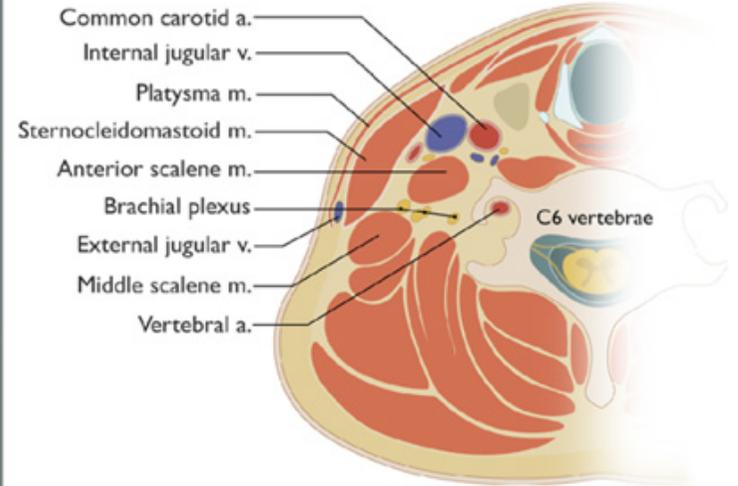


- A Upper trunk
- B Middle trunk
- C Lower trunk
- D Lateral cord
- E Posterior cord
- F Medial cord

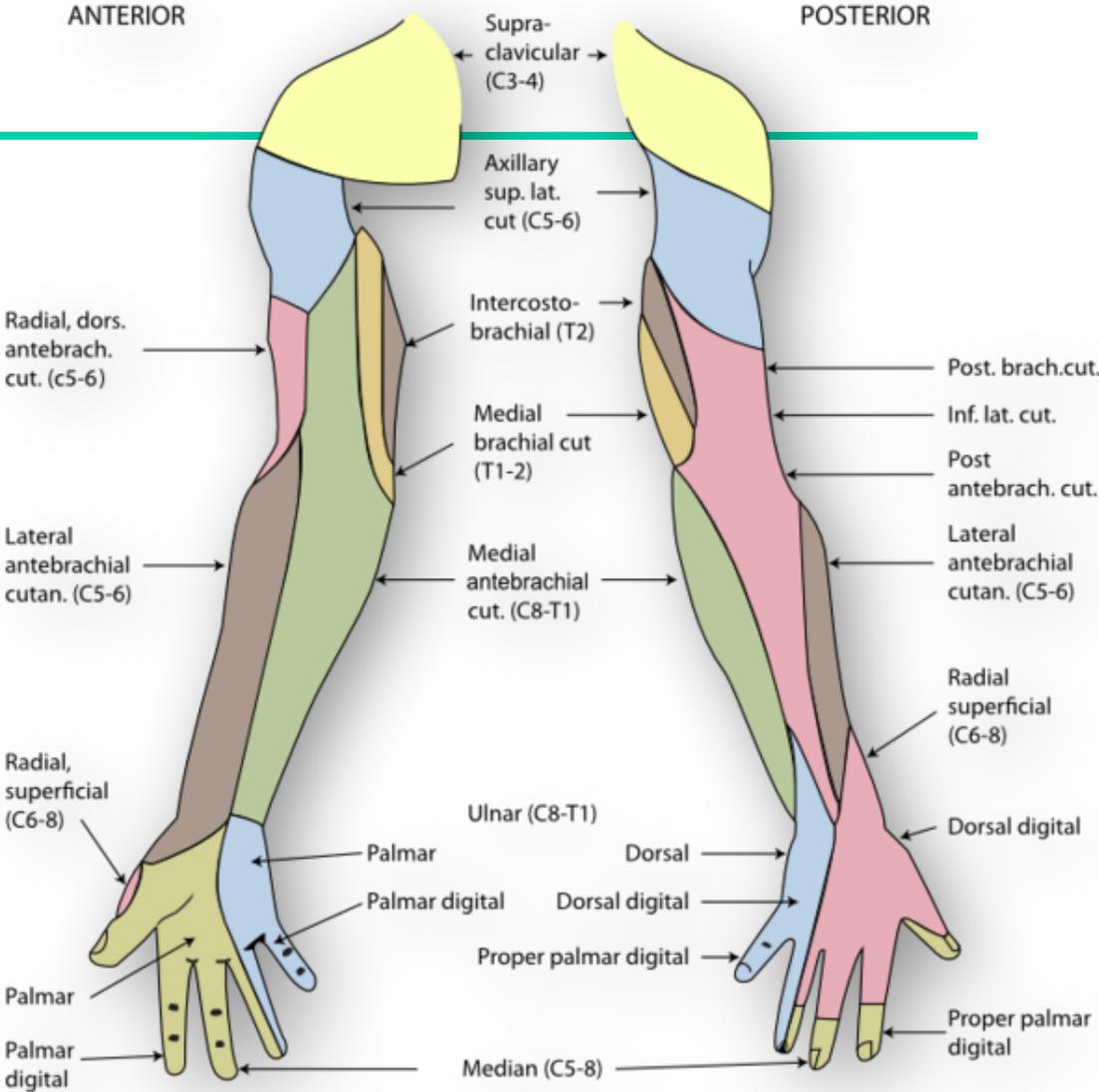
Fig. 1: Anatomy of the brachial plexus



Interscalene Block



Membro Superior



Sensory supply areas

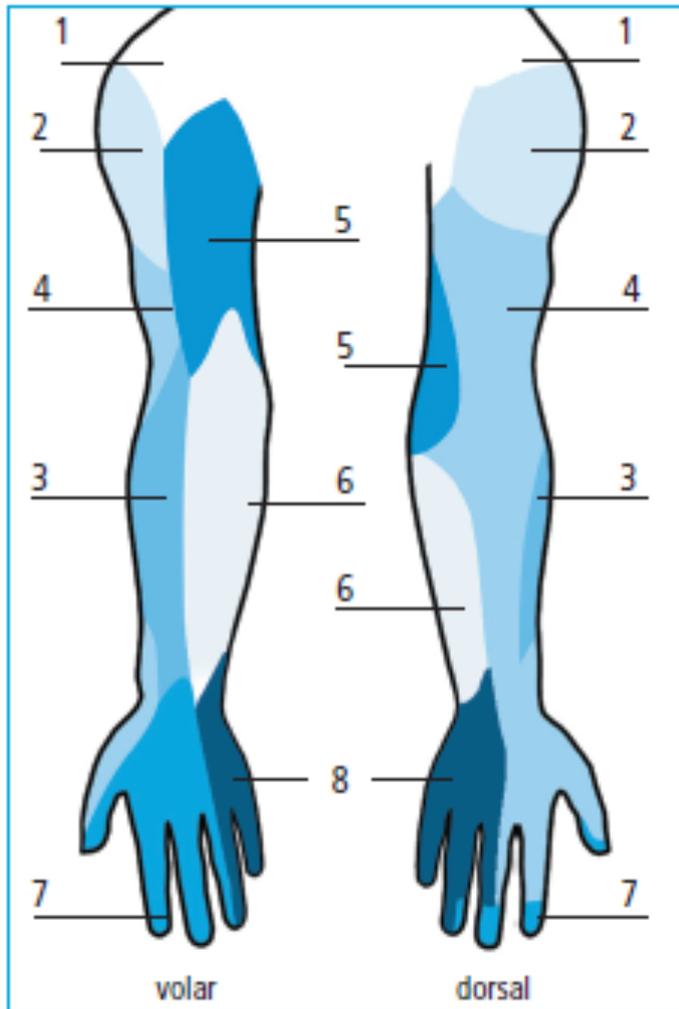


Fig. 2: Sensory supply areas of the brachial plexus

Anatomical landmarks

Superior thyroid notch, sternocleidomastoid muscle (posterior scalene gap)

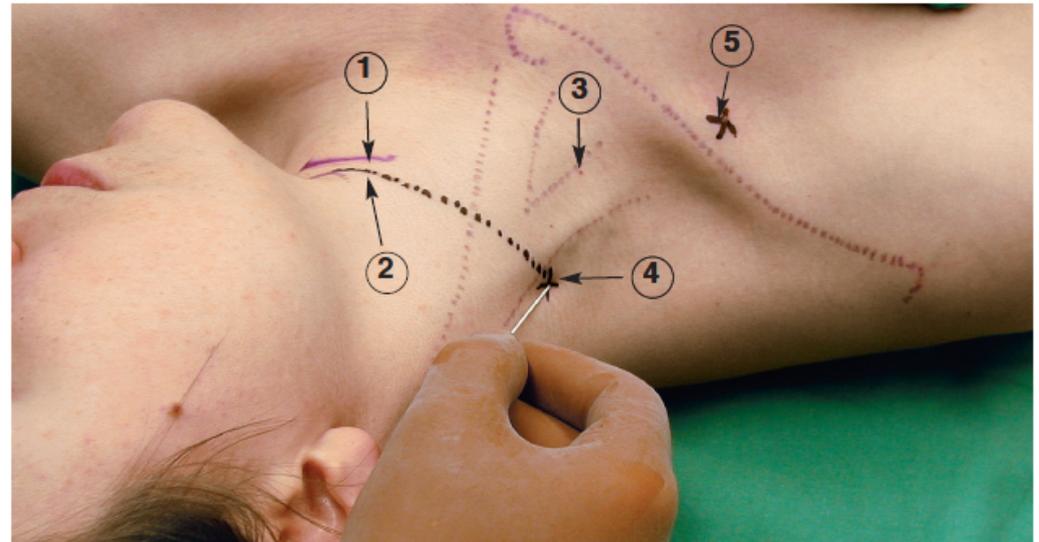
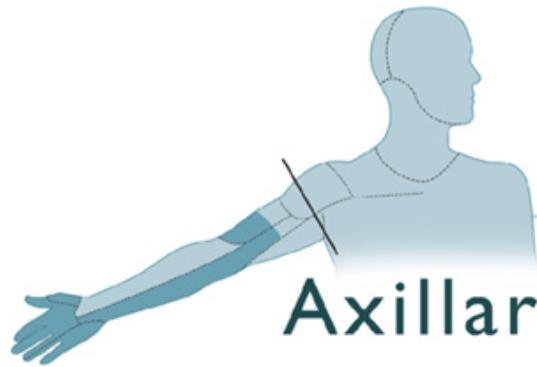


Fig. 11: Interscalene nerve block: Modification according to G. Meier

- | | |
|-------------------------------|--|
| 1. Cricoid | 4. Puncture site for anterior access |
| 2. Superior thyroid notch | 5. Vertical, infraclavicular puncture site |
| 3. Sternocleidomastoid muscle | |

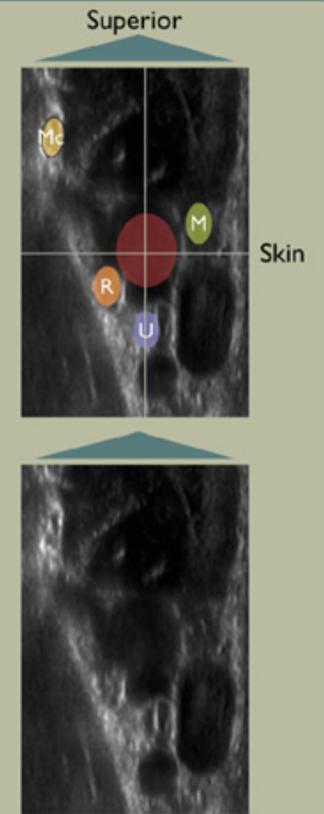
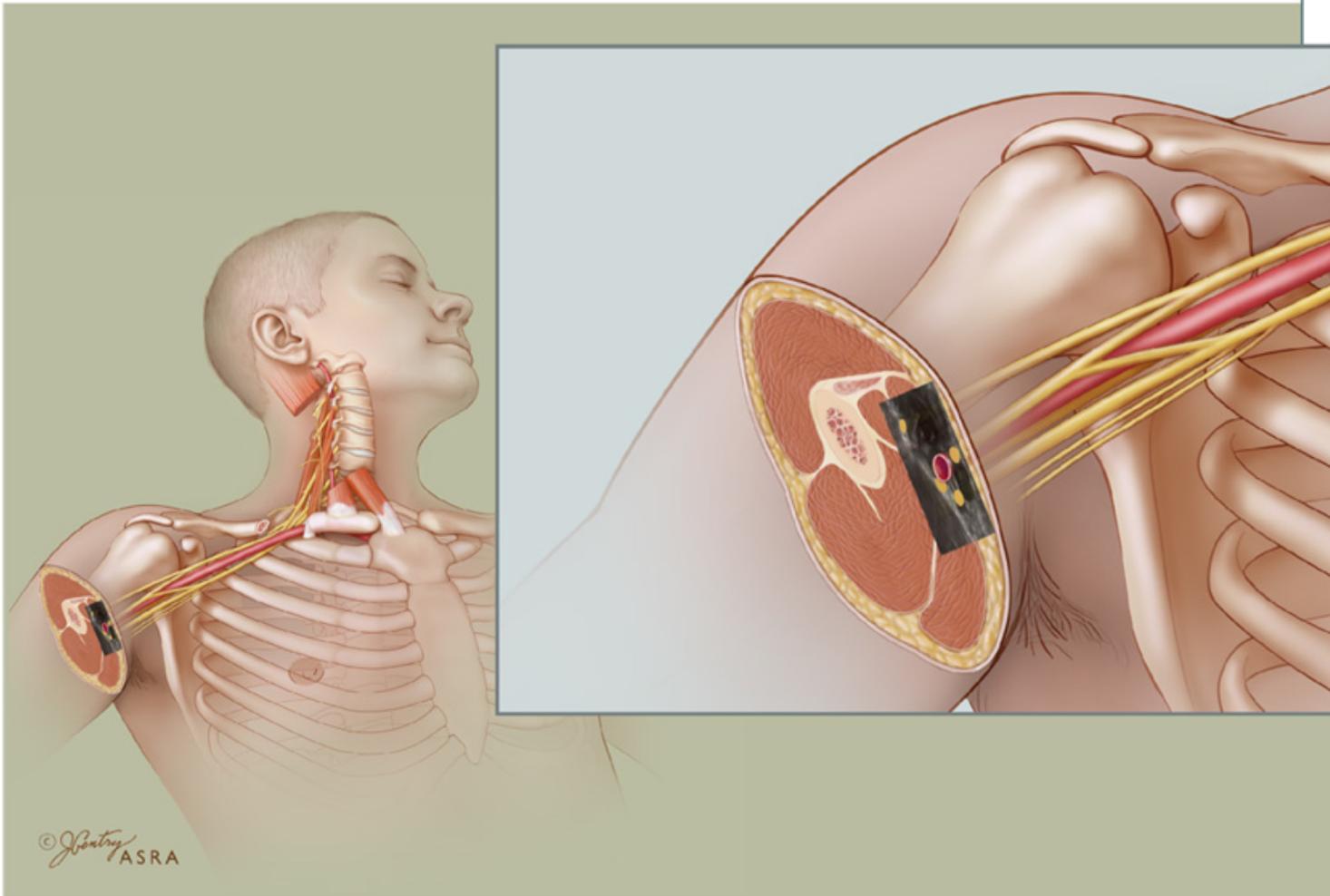
- 1 Supraclavicular nerves (from the superficial cervical plexus)
- 2 Axillary nerve
- 3 Musculocutaneous nerve
- 4 Radial nerve
- 5 Medial cutaneous nerve of the arm
- 6 Medial cutaneous nerve of the forearm
- 7 Median nerve
- 8 Ulnar nerve



Axillary Block



Variations



Membro Inferior

