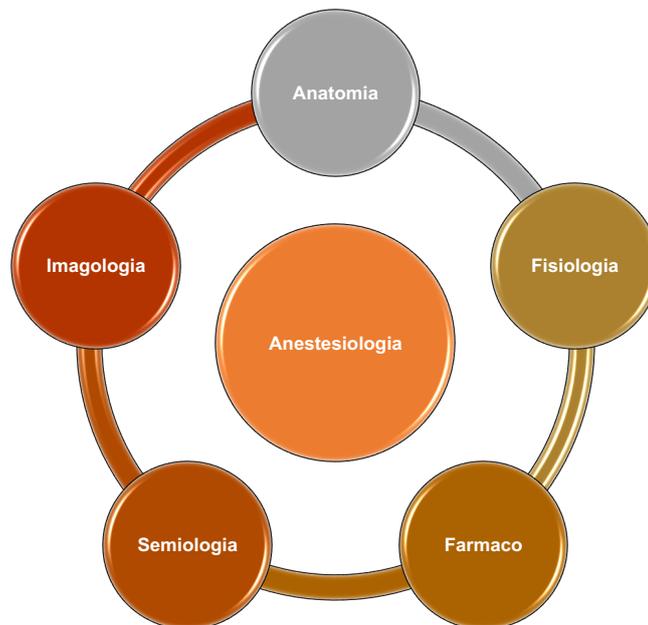


Bases anatômicas para Anestesiologia Veterinária

Silvia R Gaido Cortopassi
FMVZ/USP

1



2

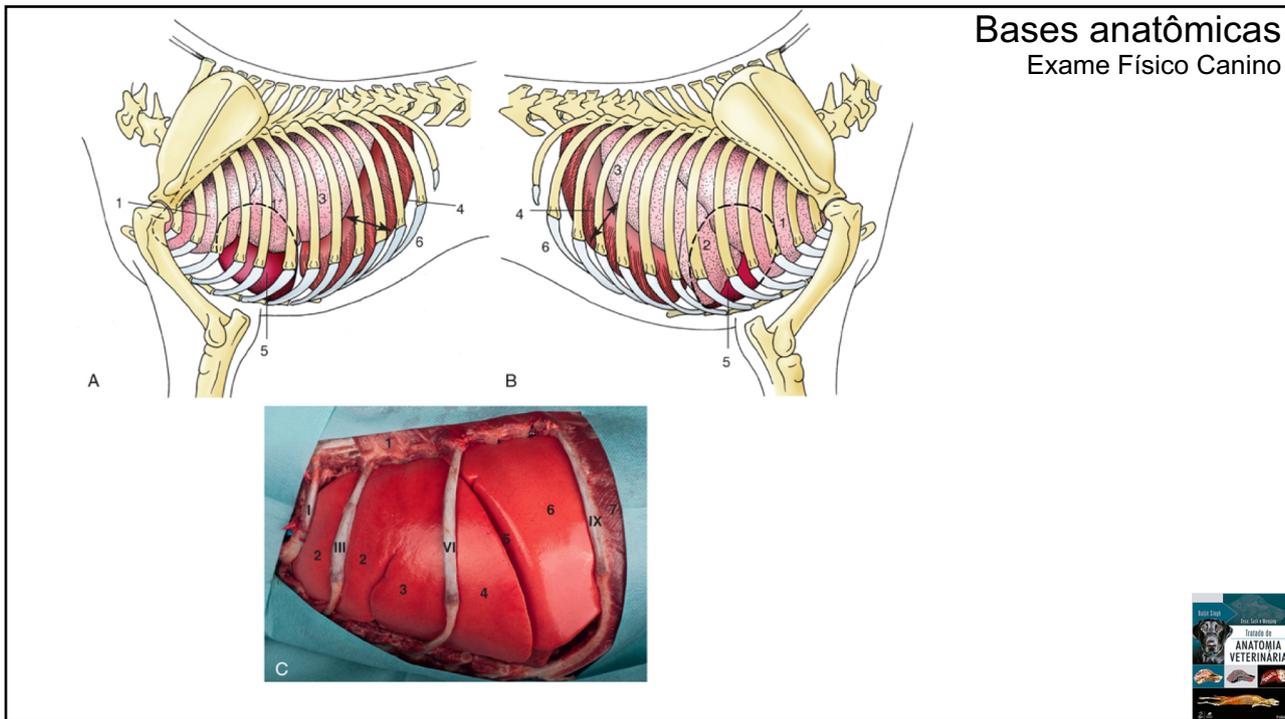
Bases anatômicas

- Exame físico
- Vias de administração
 - Acesso venoso
 - Acesso arterial
 - Via intraóssea
 - Via intramuscular
 - Intubação traqueal
 - Via peridural

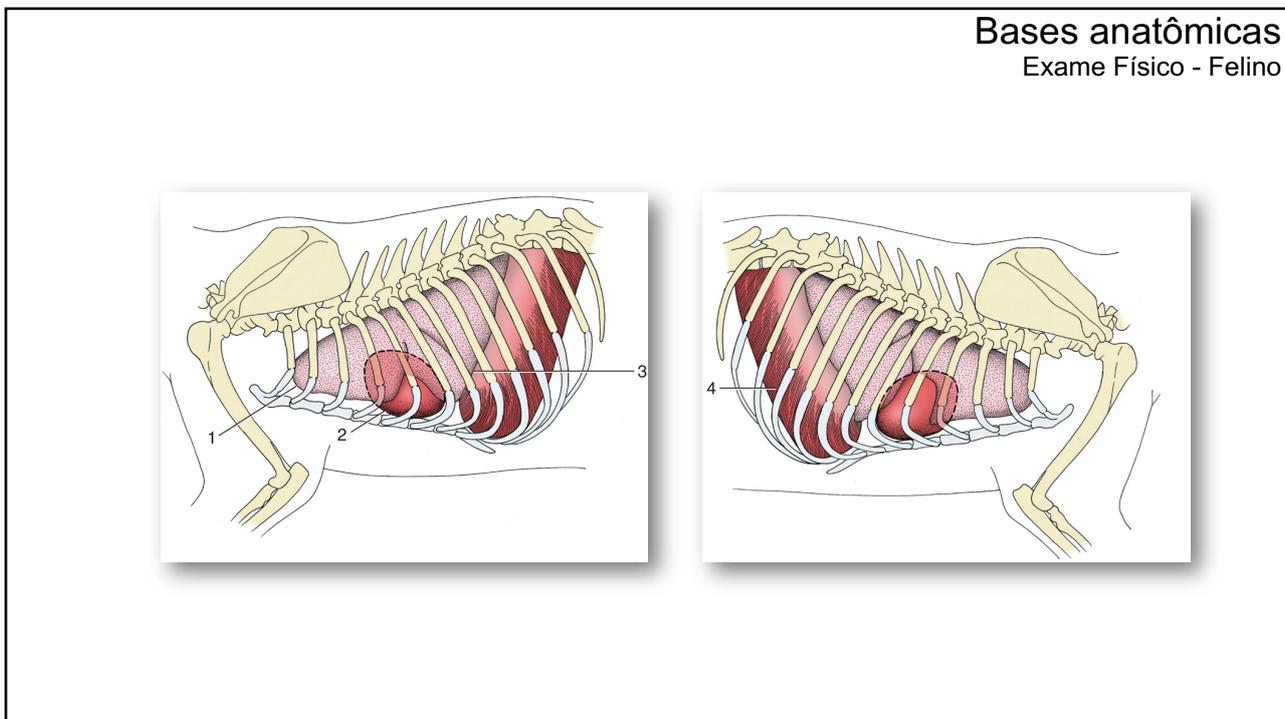
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Exame Físico

4



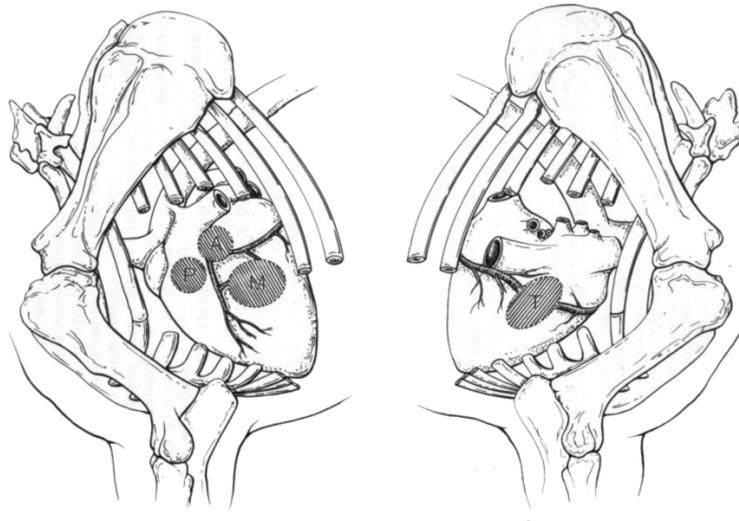
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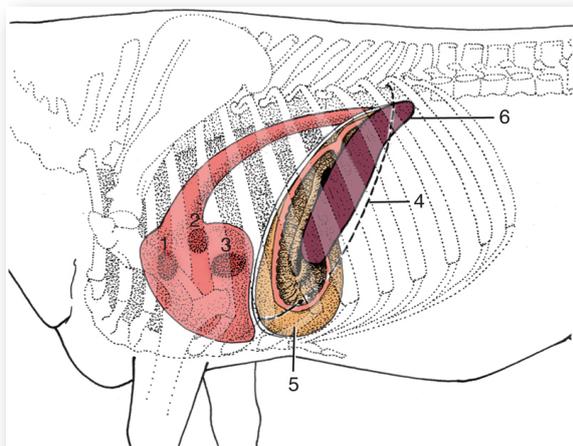
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Bases anatómicas

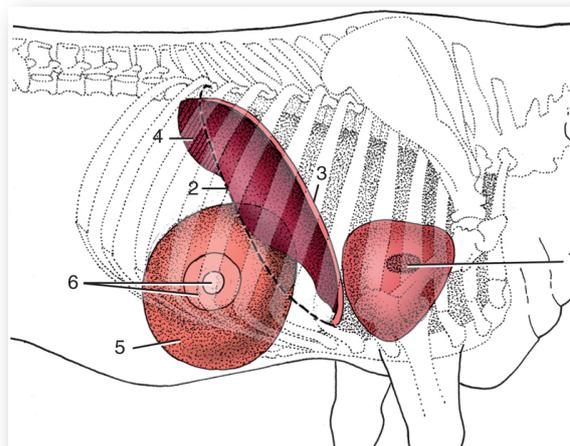
Exame Físico - Equino



7

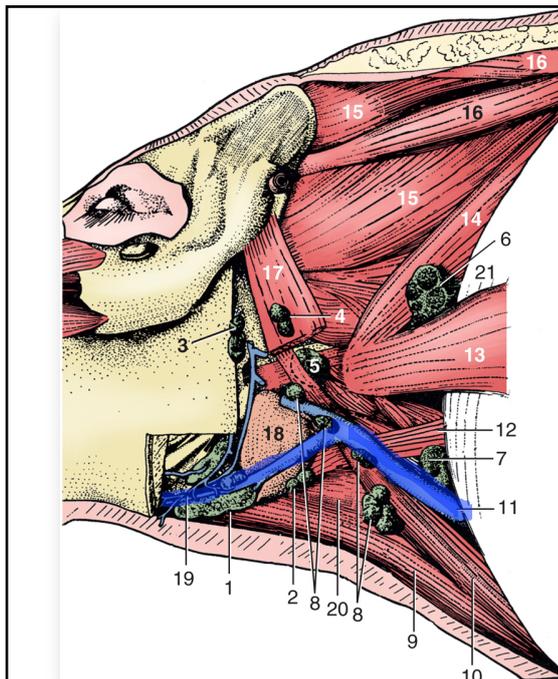


Projeção lateral esquerda de certos órgãos sobre a parede torácica bovina. 1, Valva pulmonar; 2, valva aórtica; 3, valva atrioventricular esquerda; 4, posição da margem basal do pulmão; 5, retículo, aberto (notar a posição do sulco reticular); 6, baço.



Projeção lateral direita de certos órgãos na parede torácica bovina. 1, Valva atrioventricular direita; 2, posição da margem basal do pulmão; 3, extensão cranial do diafragma e fígado; 4, campo de percussão hepática; 5, omaso; 6, campo para percussão e auscultação do omaso

8



- 1, Linfonodos mandibulares;
- 2, linfonodos mandibulares acessórios;
- 3, linfonodos parotídeos;
- 4, linfonodos retrofaríngeos laterais;
- 5, linfonodo retrofaríngeo medial;
- 6, 7 e 8, linfonodos cervicais superficiais dorsais, médios e ventrais, respectivamente;
- 9, esternoioide;
- 10, esternocéfálico;
- 11, veia jugular externa;
- 12, omoióide;
- 13, omotransversário;
- 14, serrátil ventral cervical;
- 15, esplênio;
- 16, romboides do pescoço e da cabeça;
- 17, cleidomastóideo;
- 18, glândula mandibular;
- 19, veia facial;
- 20, tireoióide;
- 21, subclávio.

9

Vias de Administração

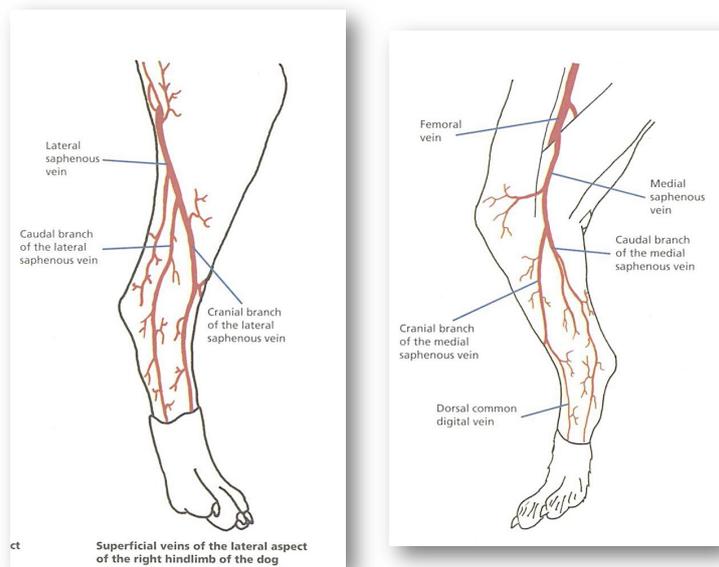
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Bases anatômicas Acesso venoso – Pequenos animais



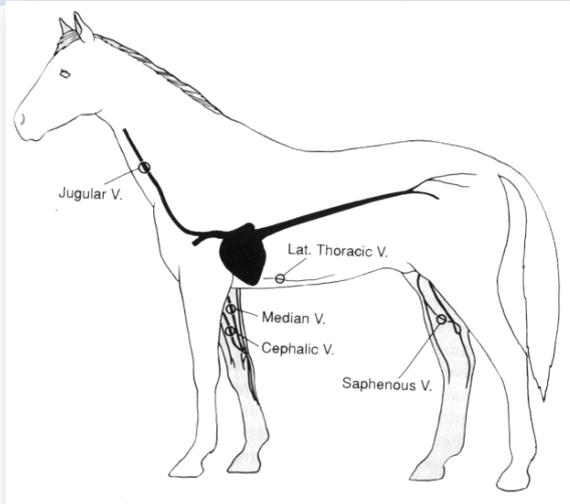
11

Bases anatômicas Acesso venoso – Pequenos animais



12

Bases anatômicas Acesso venoso

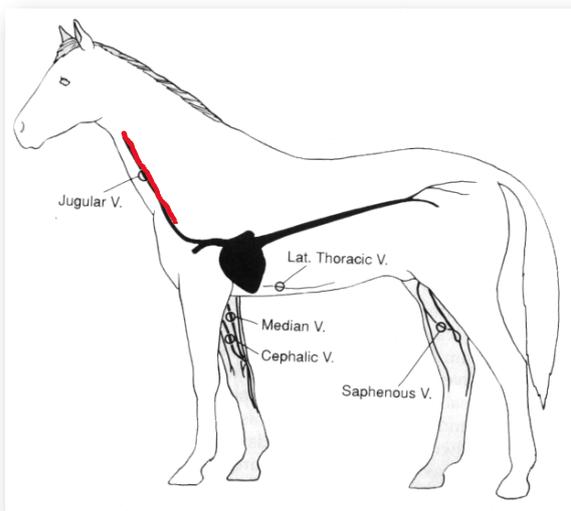


Equinos

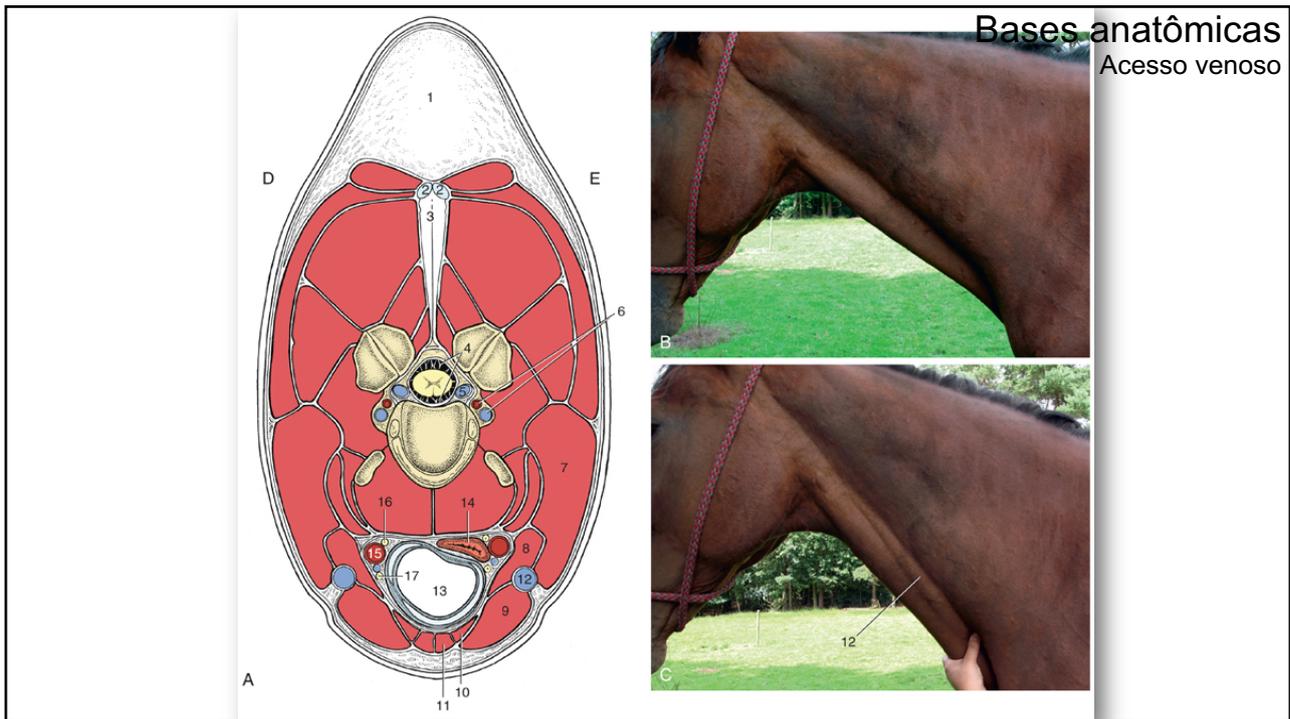
- v. jugular externa
- v. torácica superficial
- v. cefálica
- v. safena medial

13

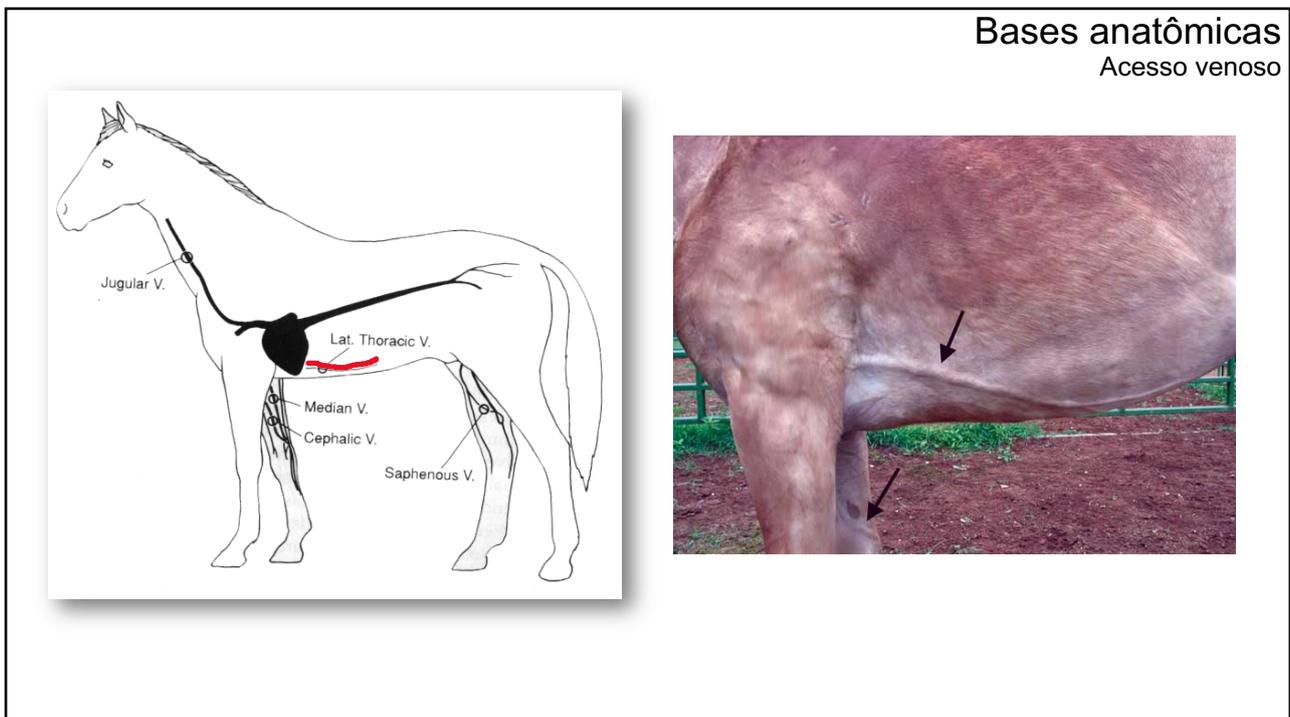
Bases anatômicas Acesso venoso - Equino



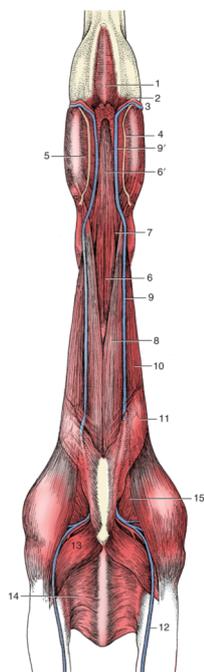
14



15



16



Vista ventral do pescoço e espaço intermandibular.

1, M. miloióideo;
 2, linfonodos mandibulares;
 3, **artéria e veia faciais**;
 4, ducto parotídeo;
 5, pterigóideo medial;
 6, esternoióideo e esternotireóideo; 6', esternoióideo e omoióideo combinados;
 7, omoióideo;
 8, esternocefálico;
 9, **veia jugular externa**;
 9', veia linguofacial;
 10, braquiocefálico;
 11, platisma;
 12, **veia cefálica**;



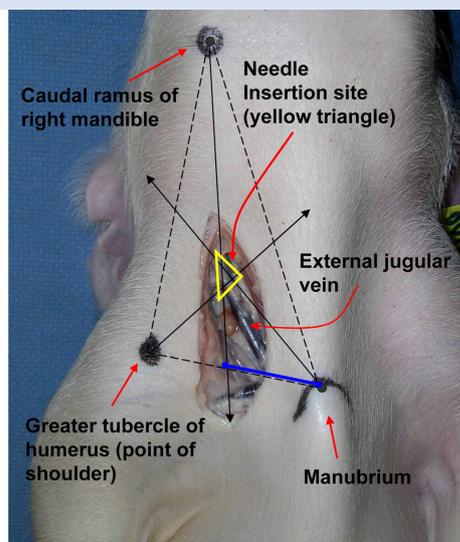
17



Bases anatômicas
 Acesso venoso - suíno

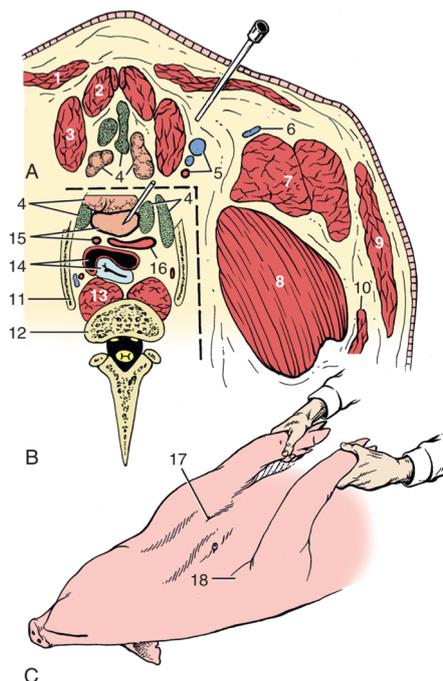
18

Bases anatômicas Acesso venoso - suíno



Flournoy WS, Mani S. Percutaneous external jugular vein catheterization in piglets using a triangulation technique. **Laboratory Animals**. 2009;43(4):344-349

20

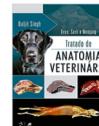


(A) Seção transversal da região ventral do pescoço, ligeiramente cranial ao manúbrio do esterno.

(B) A área abaixo e à esquerda das linhas tracejadas representa a topografia da região ligeiramente caudal às primeiras costelas.

(C) Suíno mantido em decúbito dorsal para punção da veia cava cranial (observar a agulha em posição).

- 1, Cutâneo do pescoço;
- 2, esternoioide;
- 3, esternocefálico;
- 4, linfonodos e timo;
- 5, artéria carótida comum e veias jugulares externa e interna;
- 6, veia cefálica;
- 11, I costela;
- 12, corpo de C7;
- 14, traqueia e esôfago;
- 15, veia cava cranial e artéria subclávia esquerda;
- 16, tronco bicarotídeo e artéria subclávia direita;
- 17, manúbrio do esterno, palpável;
- 18, articulação do ombro.



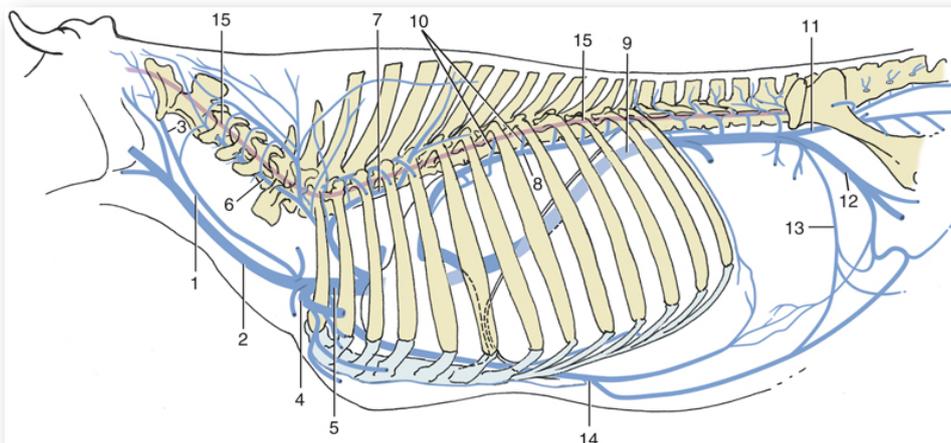
21

Bases anatômicas Acesso venoso - ruminantes

- v. jugular externa
- v. cefálica
- v. safena
- v. auricular

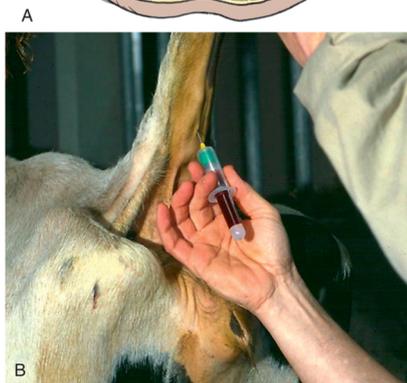
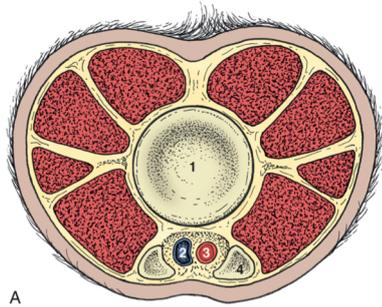


22



23

Bases anatômicas
Acesso venoso – ruminantes

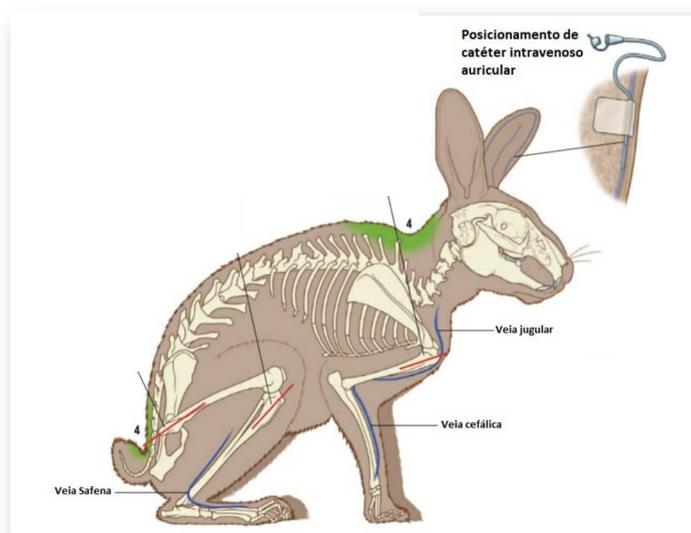


(A) Seção transversal da cauda bovina entre Cd3 e Cd4.
1, disco intervertebral;
2, veia caudal mediana;
3, artéria caudal mediana;
(B) Coleta de sangue do vaso caudal mediano



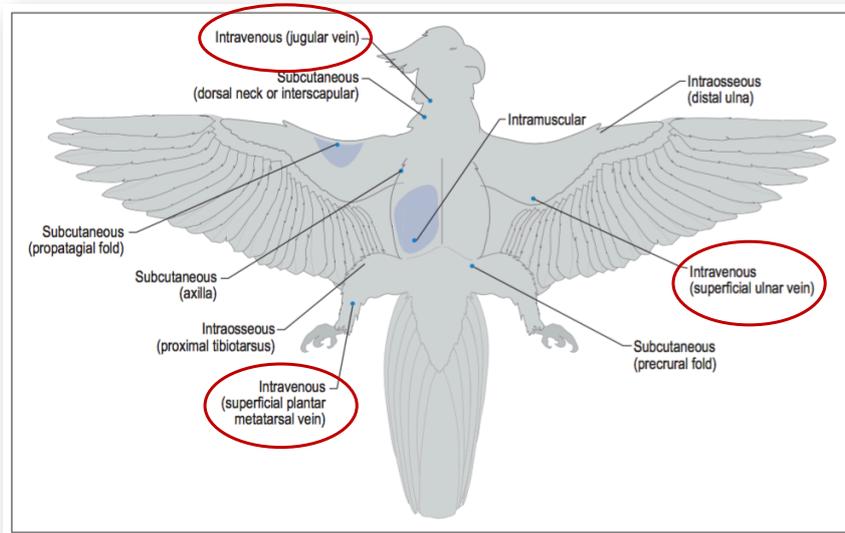
24

Bases anatômicas
Acesso venoso - leporino



25

Bases anatômicas Acesso venoso - ave



26

Bases anatômicas Acesso venoso - ave



Fonte: Mario Rego

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Bases anatômicas

Acesso venoso - ave



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Bases anatômicas

Acesso venoso - ave

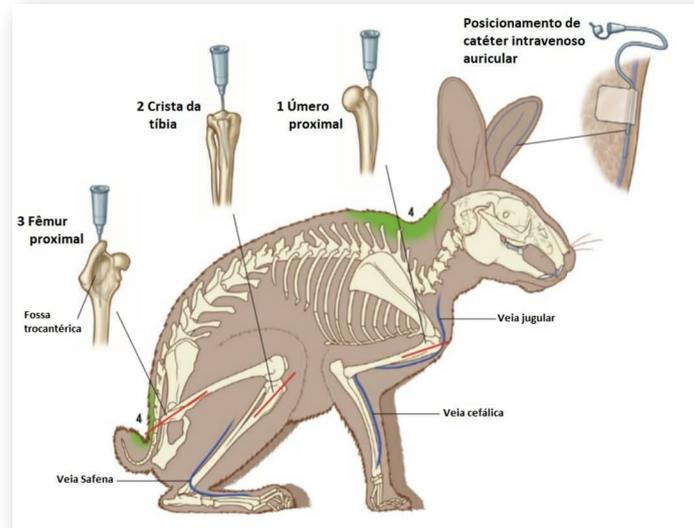


Fonte: André Justo



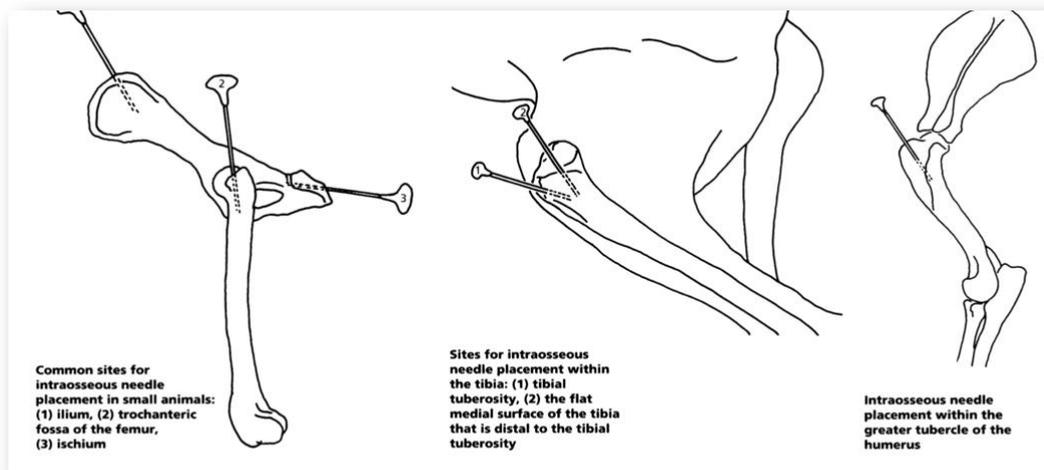
29

Bases anatômicas
Acesso intraósseo - leporino

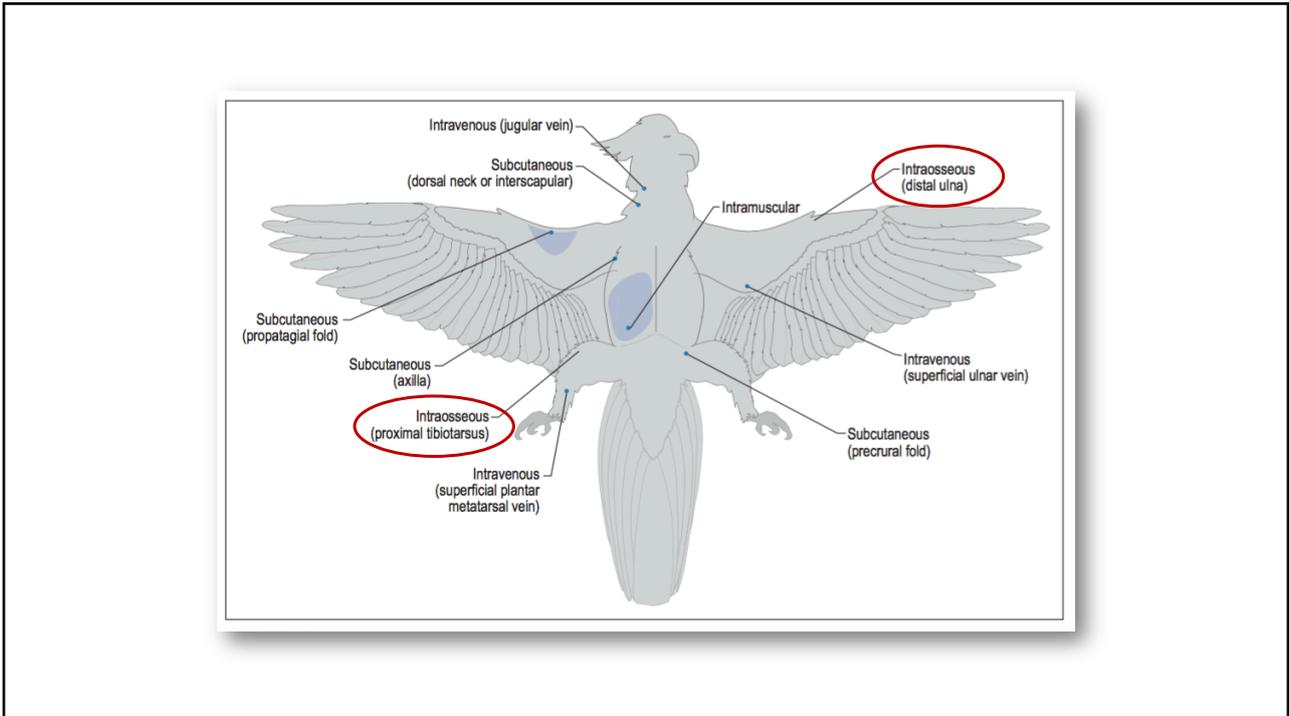


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Bases anatômicas
Acesso intraósseo - canino



31



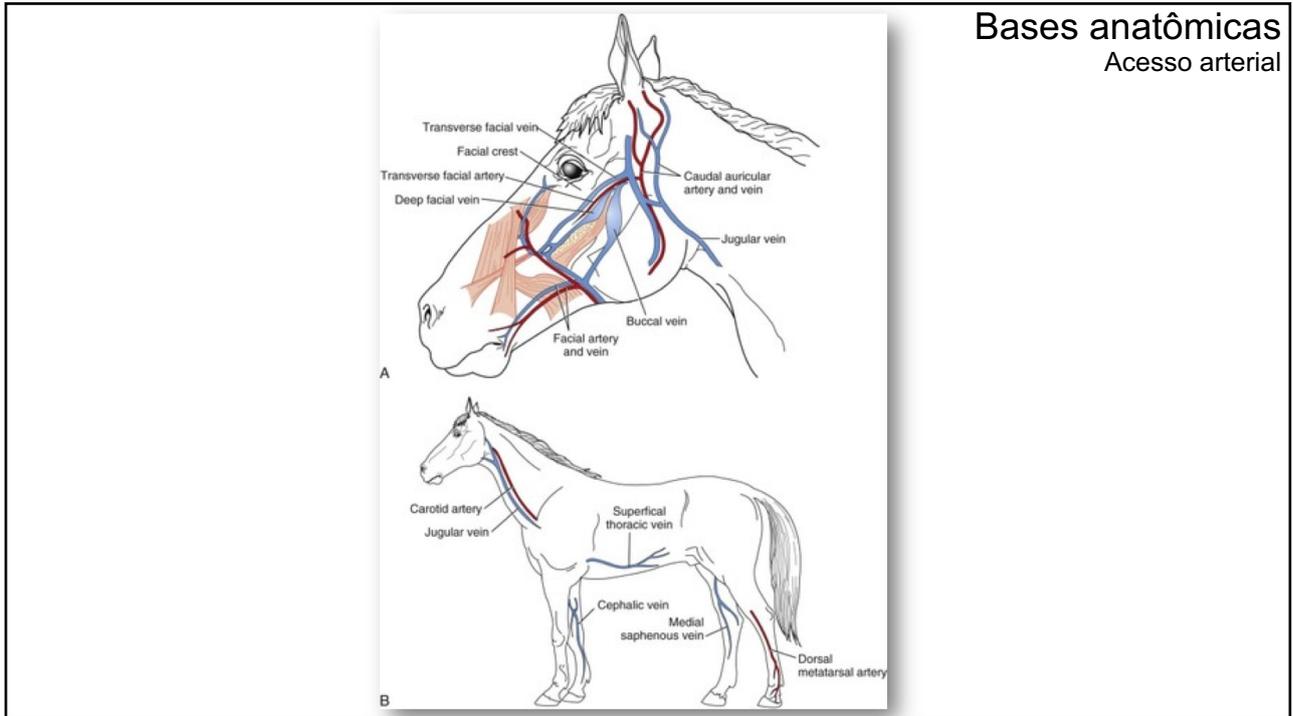
32

Bases anatômicas
Acesso intraósseo - ave

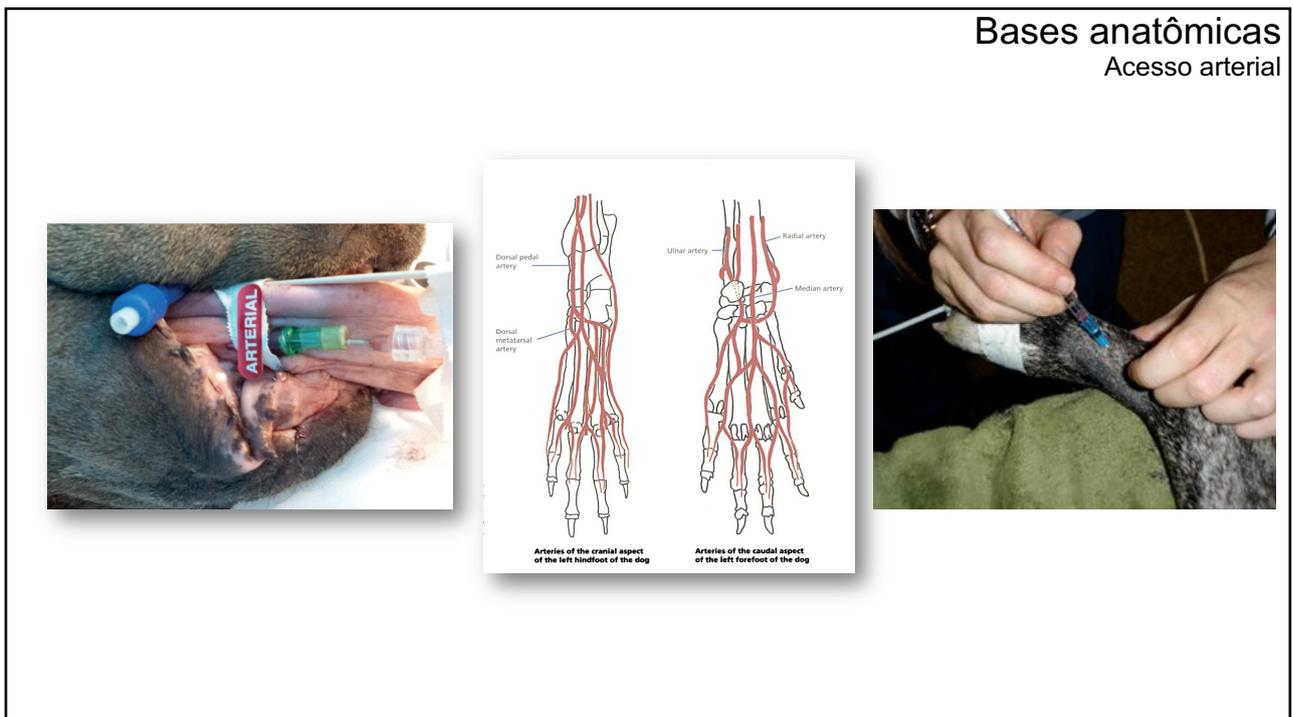
Vet Clin Exot Anim 10: 345–394, 2007

Seminars in Avian and Exotic Pet Medicine
14:(4): 263–276, 2005

33



34



35

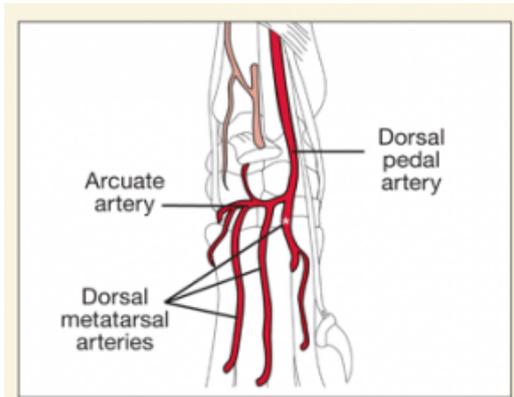
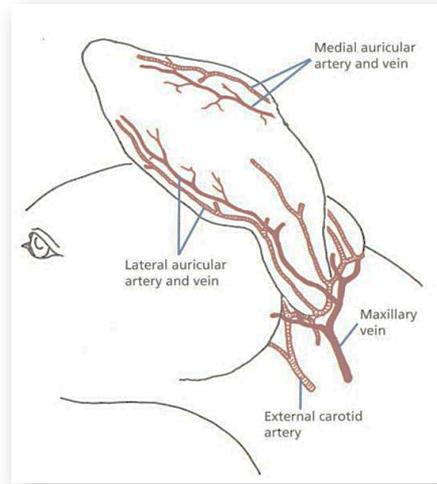
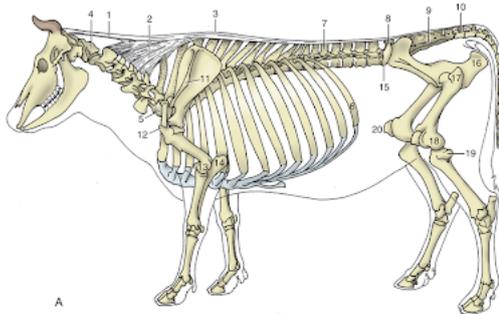


Figure 3. Diagram showing the dorsal pedal artery and its branches, the dorsal metatarsal arteries. The branch between the second and third metatarsals(*) is most commonly used for arterial puncture and arterial catheter placement.



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38

A injeção intramuscular no centro de uma linha imaginária traçada da tuberosidade isquiática ao côndilo lateral da tibia não determina risco de lesão do nervo isquiático.

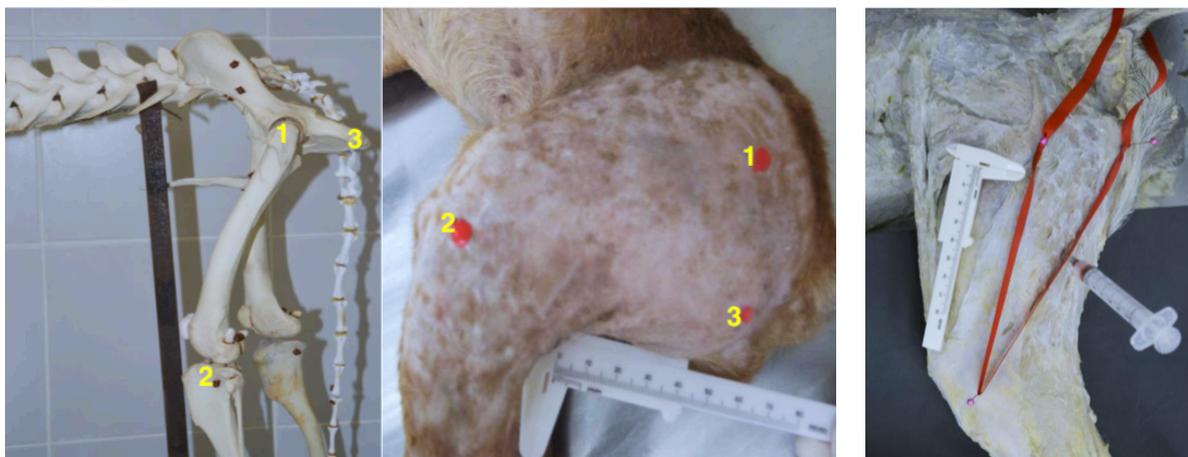


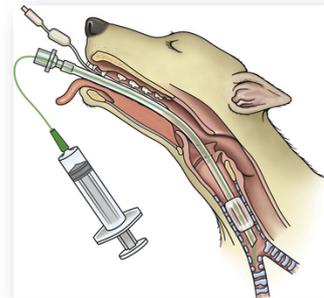
Figura 1 – Fotografias do membro pélvico esquerdo de cão SRD. Evidenciam-se os pontos ósseos, visíveis e/ou palpáveis, o trocanter maior do fêmur (1), côndilo lateral da tibia (2) e tuberosidade isquiática (3).

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Intubação traqueal

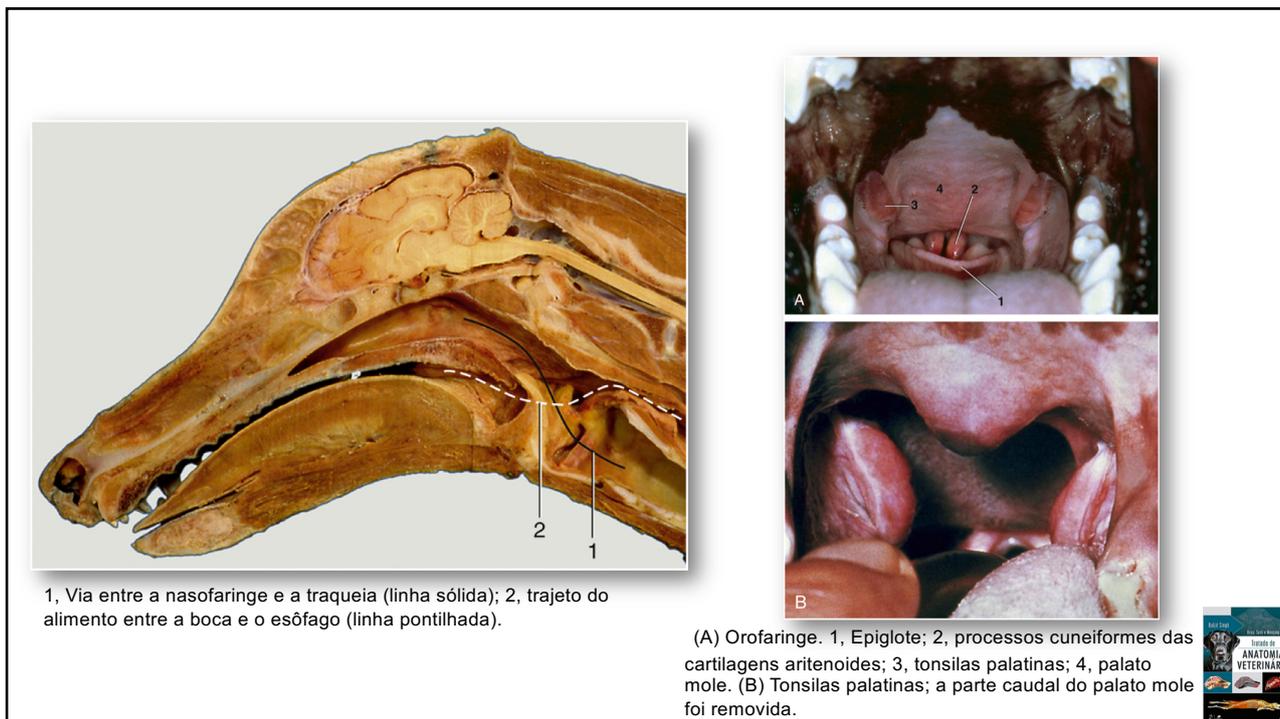
40

Bases anatômicas Intubação traqueal

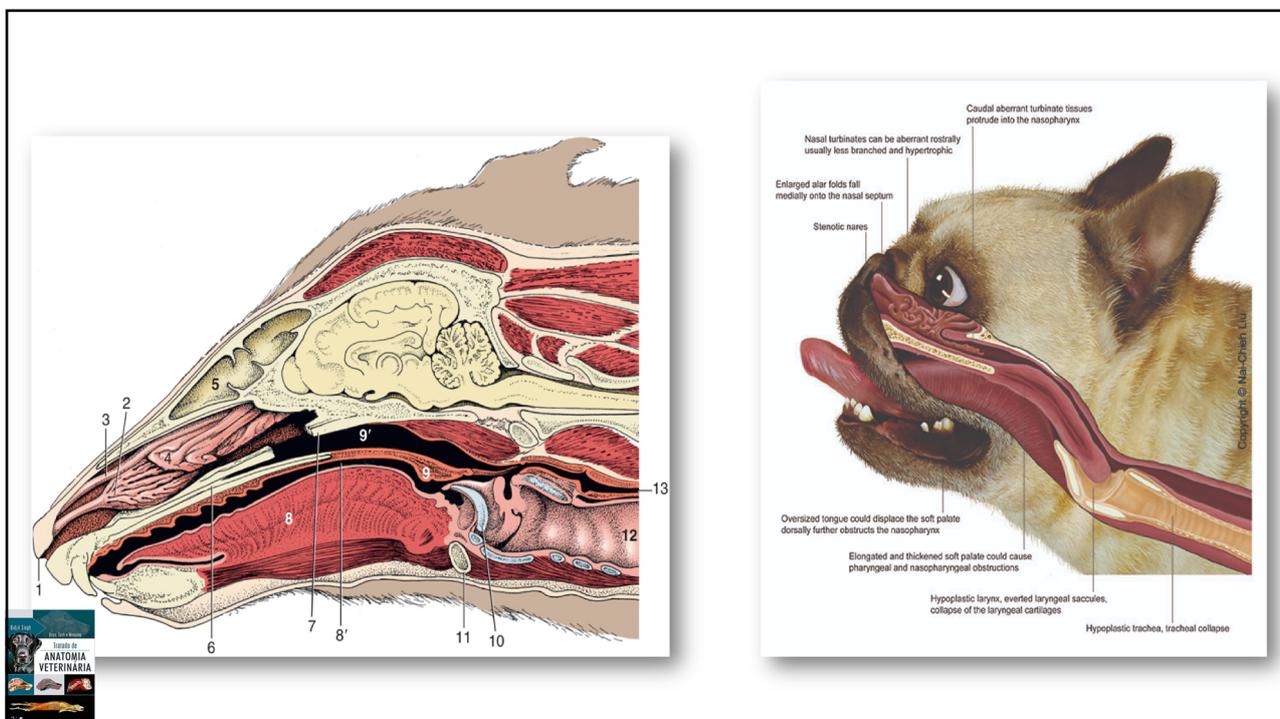


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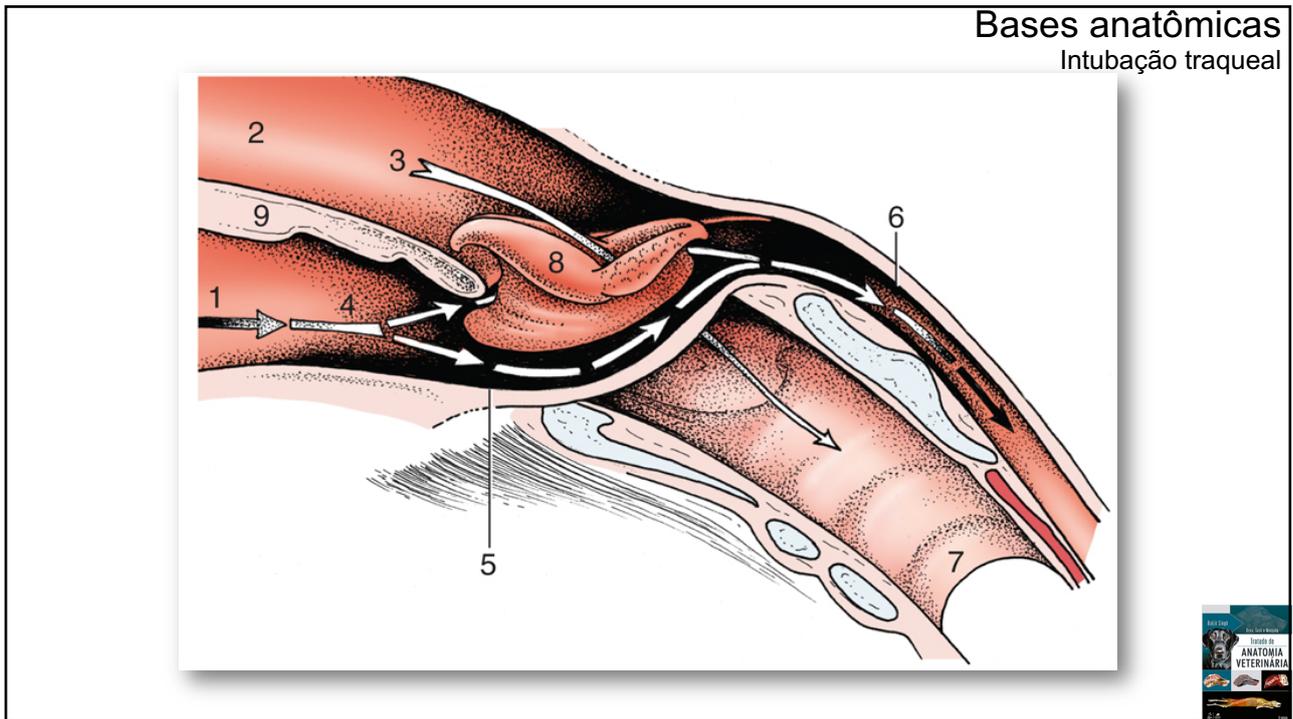
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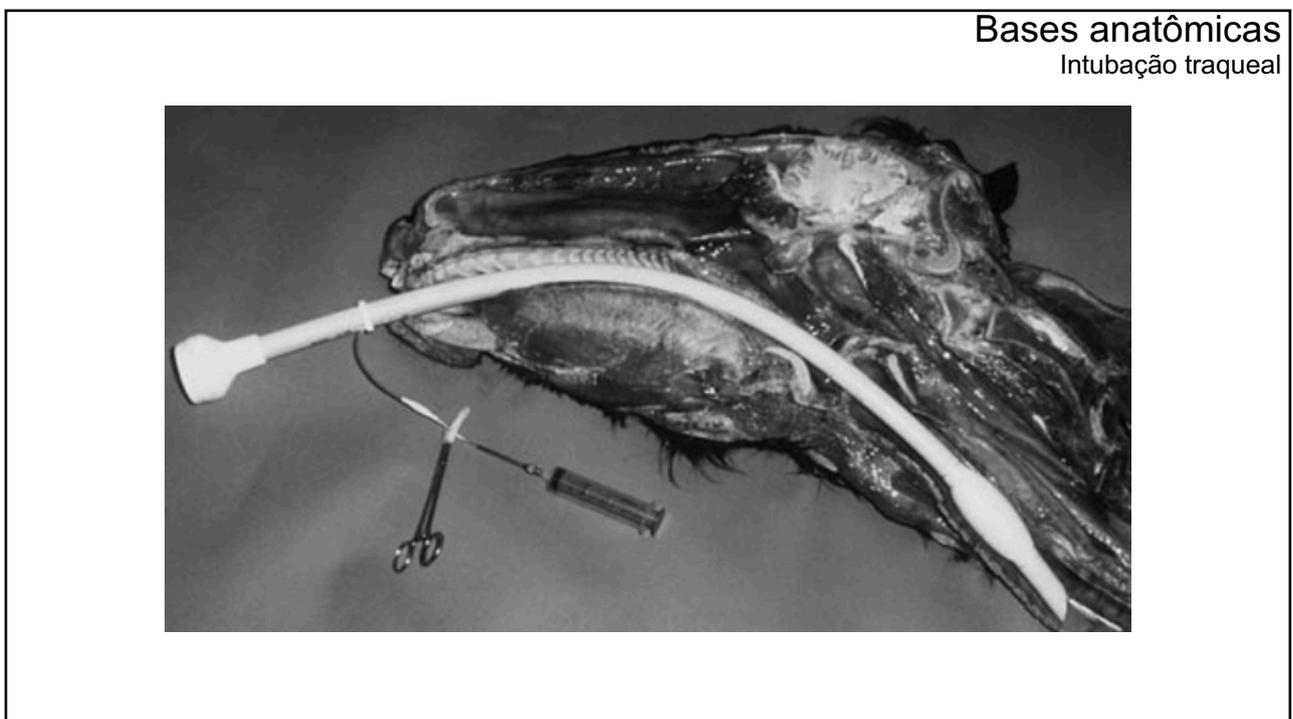
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43



44



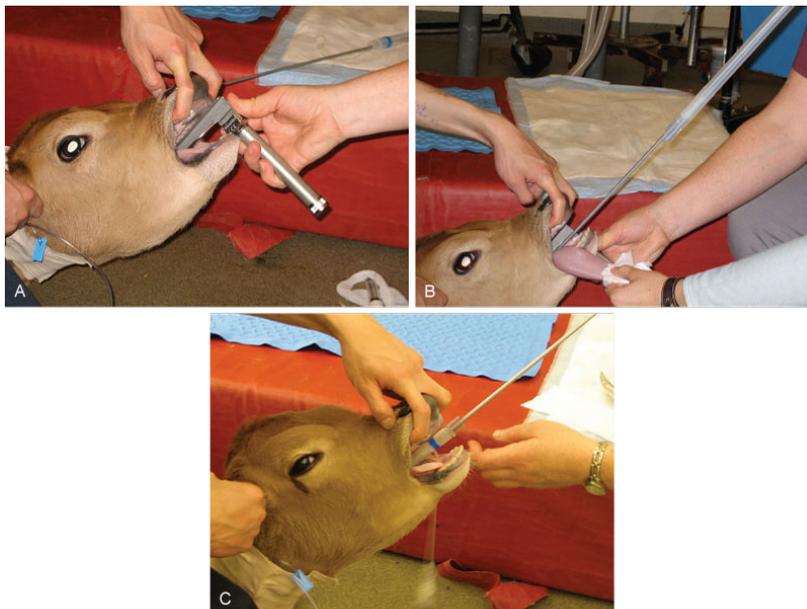
45

Bases anatômicas
Intubação traqueal



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Bases anatômicas
Intubação traqueal



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Bases anatômicas
Intubação traqueal

- 1 - Concha nasal dorsal
- 2 - concha nasal ventral
- 3 - conchas etmoidais
- 4 - palato mole
- 5 - língua
- 6 - **orofaringe**
- 7 - **nasofaringe**
- 8 - pelos mentuais
- 9 - músculo genioioide
- 10 - osso basi-hioide
- 11 - ventrículo da laringe
- 12 - **laringe**
- 13 - **divertículo faríngeo**
- 14 - atlas
- 15 - áxis
- 16 - **esôfago**
- 17 - **traqueia**
- 18 - glândula tireoide
- 19 - músculo esternoióideo

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Bases anatômicas
Intubação traqueal

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Bases anatômicas
Intubação traqueal



50



Fonte: Mario Rego

51



Aidan Rafferty In Practice 2013;35:272-278



Fonte: André Justo

52

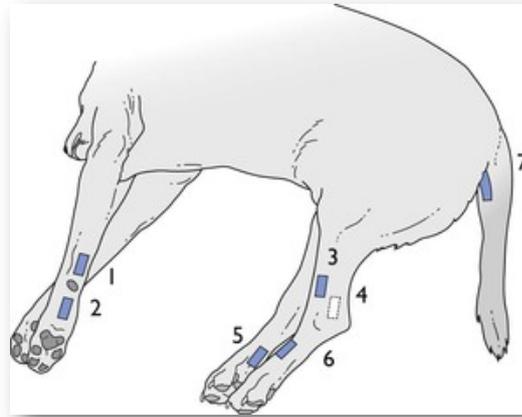
Monitoração

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Bases anatômicas
Monitoração

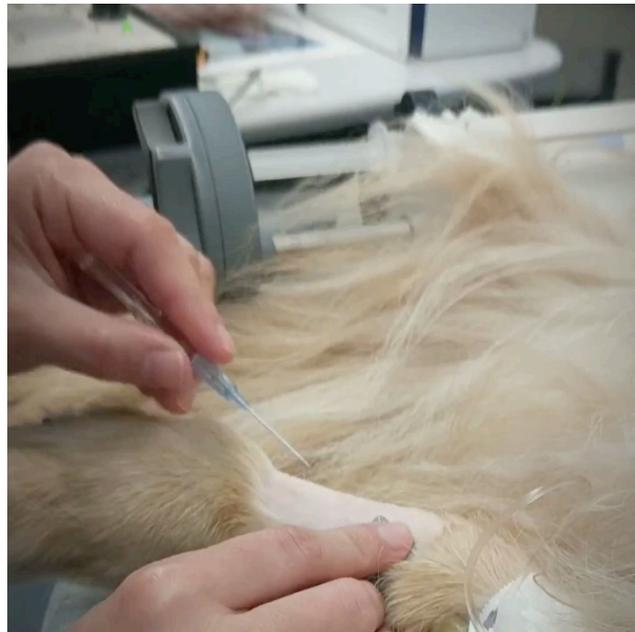


J Vet Emergen Crit Care, 32 (4): 545-548, 2021



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Bases anatômicas
Monitoração

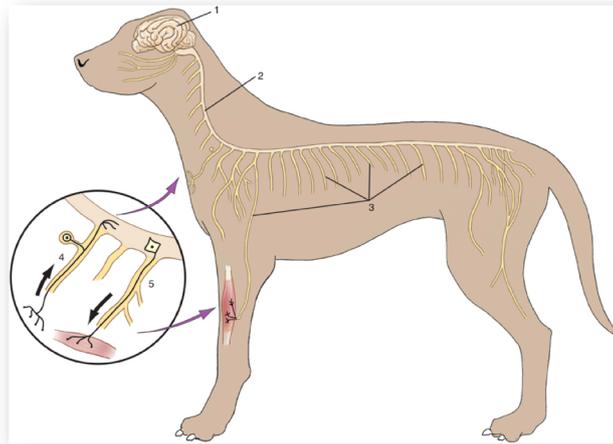


55

Bases anatômicas

- Bloqueios regionais
 - Pequenos animais
 - Equinos
 - Ruminantes

56



Sistema Nervoso

- sistema nervoso central: encéfalo (1), medula espinhal (2)
- sistema nervoso periférico: nervos periféricos (3) e gânglios associados
 - sistema sensitivo, ou aferente (4)
 - sistema motor, ou eferente (5)

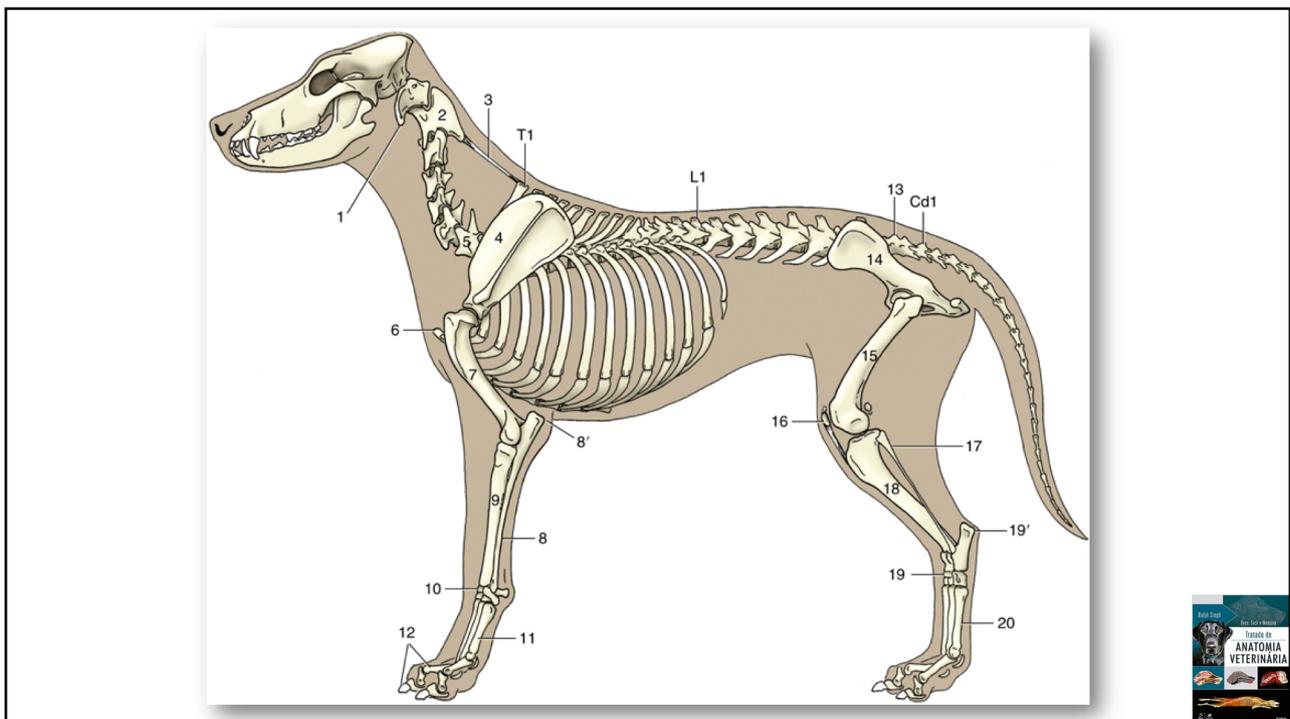


57

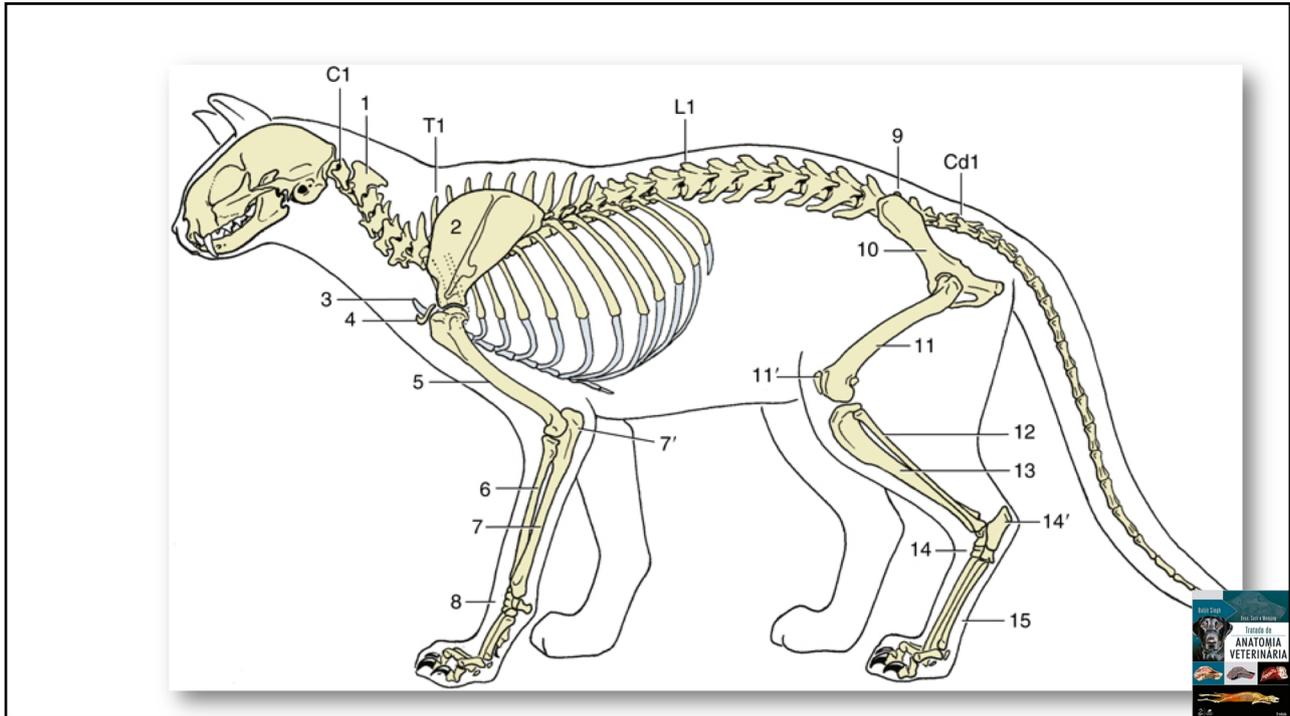
Divisão Principal	Subdivisões	Principais Derivados	Lume
Prosencéfalo	Telencéfalo	Córtex cerebral Núcleos da base	Ventriculos laterais (pareados)
	Diencefalo	Sistema límbico Epitálamo Tálamo Hipotálamo	Terceiro ventrículo
Mesencéfalo		Tecto (corpos quadrigêmeos) Tegmento	Aqueduto do mesencéfalo
Rombencéfalo	Metencéfalo	Cerebelo	Parte rostral do quarto ventrículo
	Mielencéfalo	Ponte Medula oblonga	Parte caudal do quarto ventrículo
Restante do tubo neural		Medula espinal	Canal central



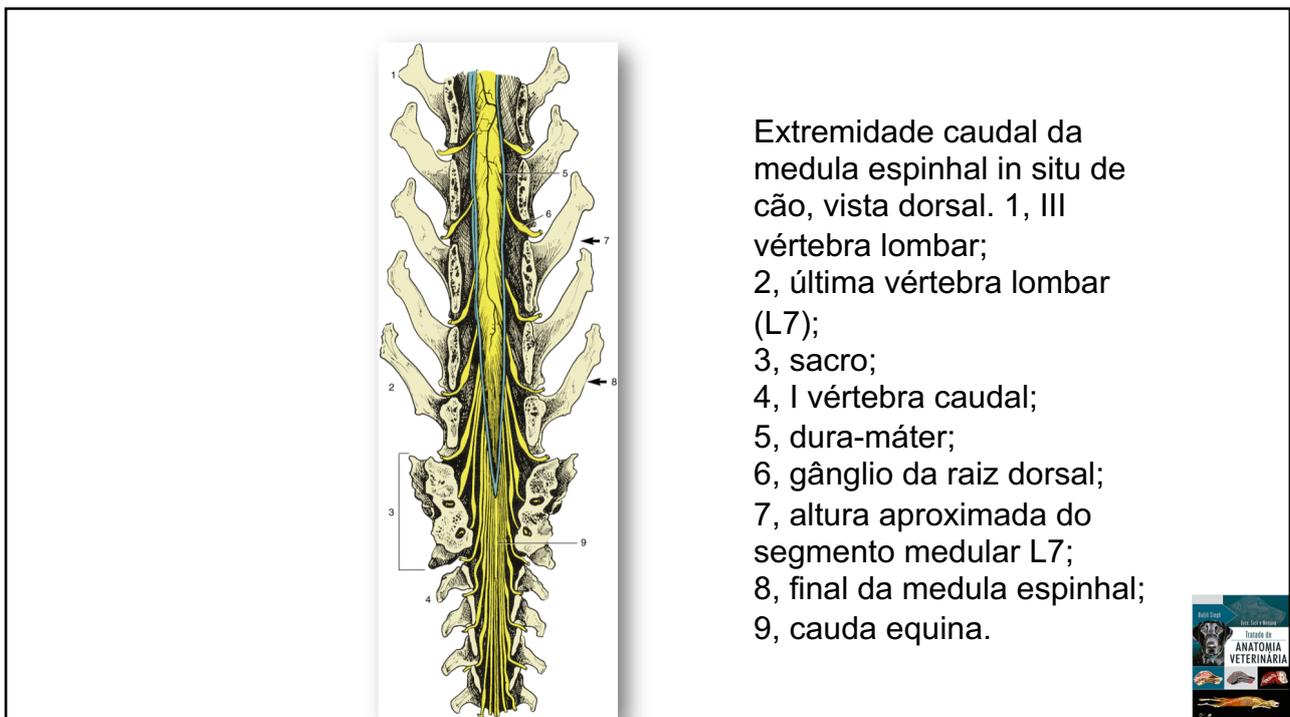
58



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Extremidade caudal da medula espinhal in situ de cão, vista dorsal. 1, III vértebra lombar; 2, última vértebra lombar (L7); 3, sacro; 4, I vértebra caudal; 5, dura-máter; 6, gânglio da raiz dorsal; 7, altura aproximada do segmento medular L7; 8, final da medula espinhal; 9, cauda equina.

61

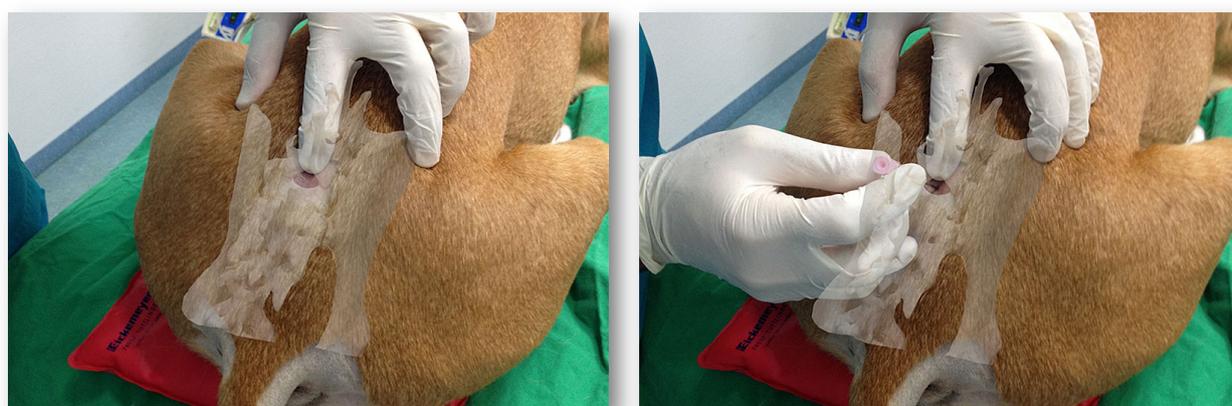
Bases anatômicas
Bloqueio peridural



<https://www.bbraun-vetcare.com/en/products-and-therapies/anesthesia/regional-anesthesia/epidural-anesthesia.html#step-by-step>

62

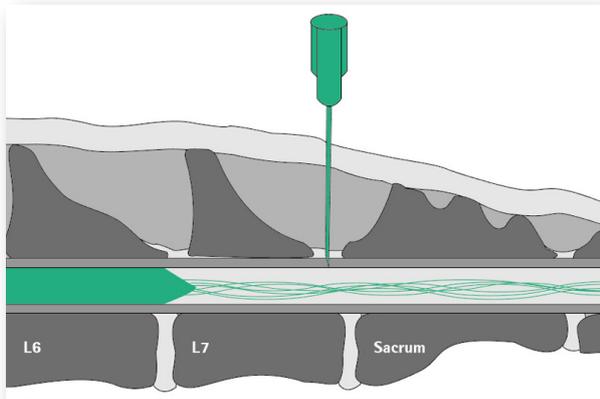
Bases anatômicas
Bloqueio peridural



<https://www.bbraun-vetcare.com/en/products-and-therapies/anesthesia/regional-anesthesia/epidural-anesthesia.html#step-by-step>

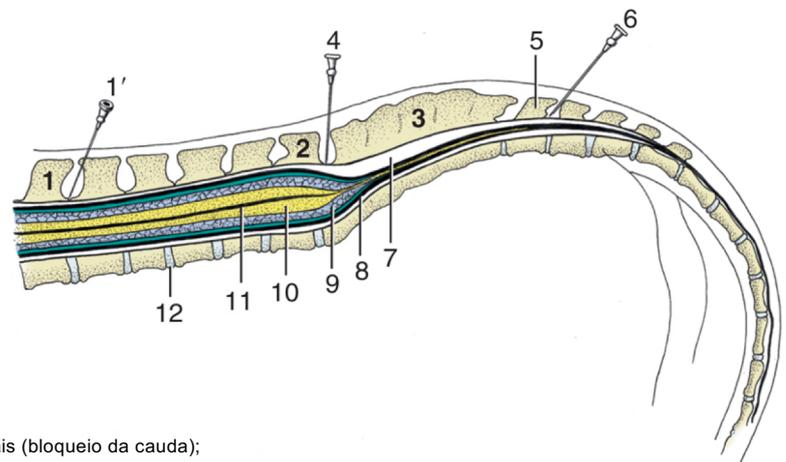
63

Bases anatômicas
Bloqueio peridural



<https://www.bbraun-vetcare.com/en/products-and-therapies/anesthesia/regional-anesthesia/epidural-anesthesia.html#step-by-step>

64

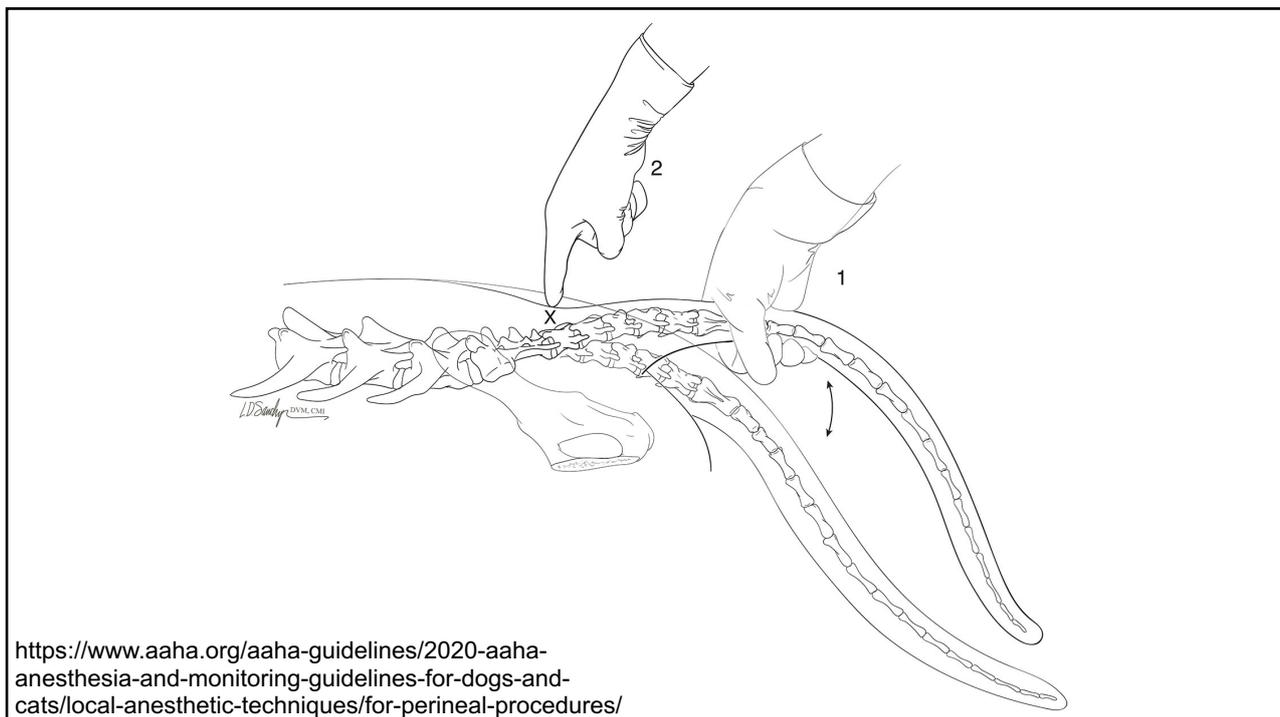


Bovino

- 1, Primeira vértebra lombar;
- 1', agulha em posição para anestesia de flanco;
- 2, última vértebra lombar (L6);
- 3, sacro;
- 4, agulha no espaço lombossacral;
- 5, primeira vértebra caudal;
- 6, agulha entre a primeira e segunda vértebras caudais (bloqueio da cauda);
- 7, espaço epidural;
- 8, dura-máter;
- 9, espaço subaracnóideo;
- 10, medula espinhal;
- 11, canal central;
- 12, disco intervertebral.



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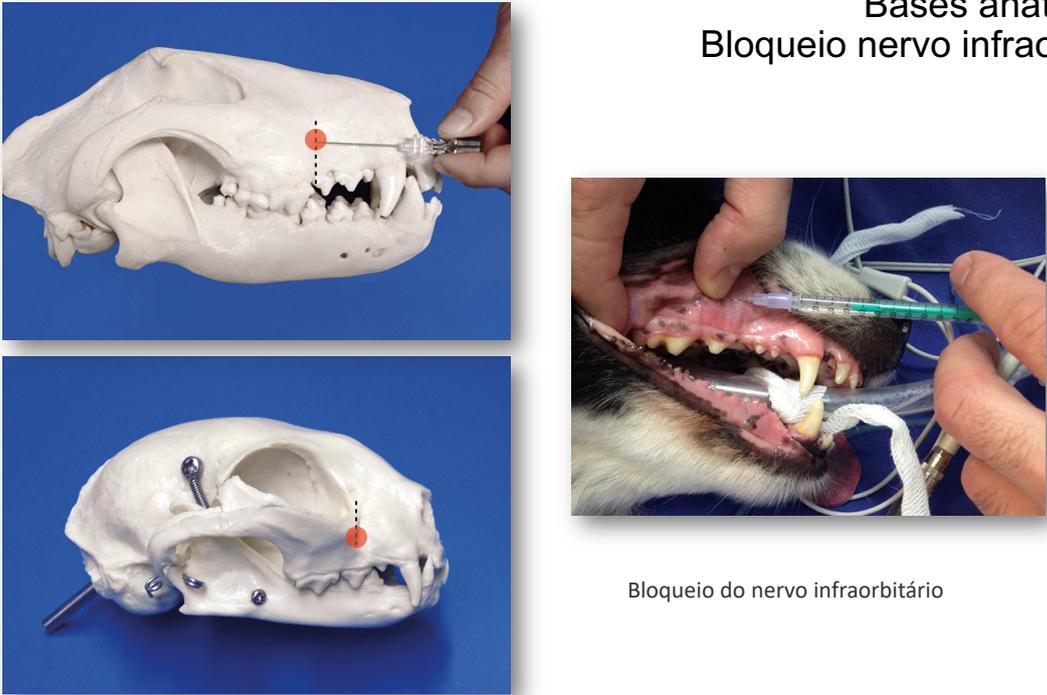


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Cabeça

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Bases anatômicas
Bloqueio nervo infraorbitário

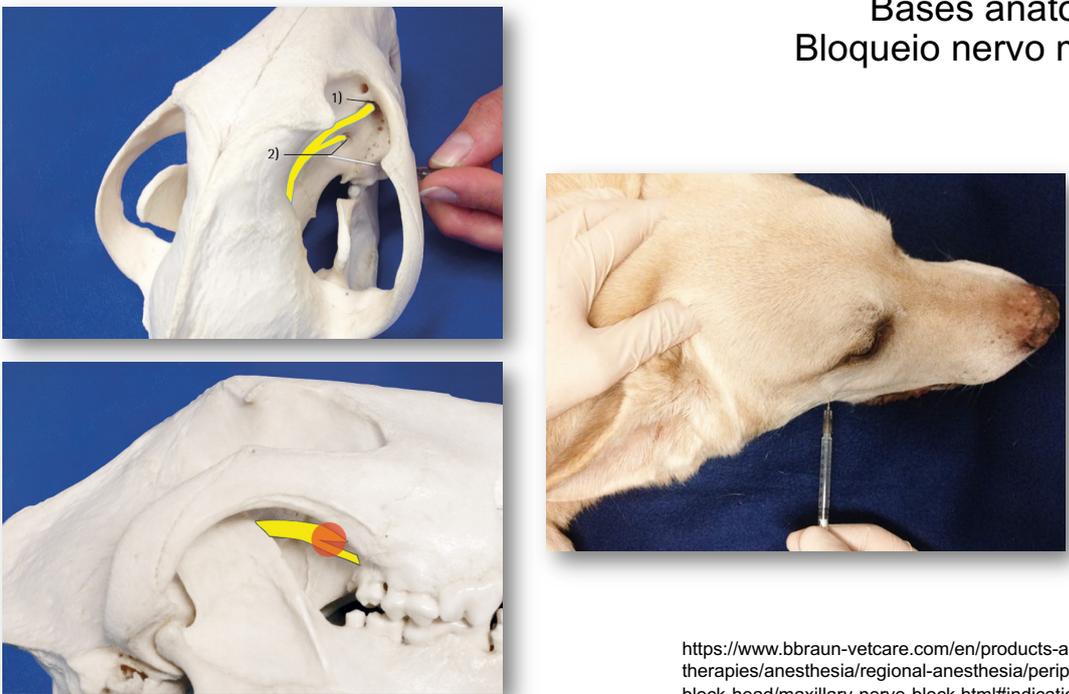


The image contains three photographs. On the left, two anatomical views of a dog's skull: the top one shows a lateral view with a red dot and a dashed line indicating the injection site near the infraorbital foramen, and the bottom one shows a ventral view with a red dot and a dashed line indicating the same site. On the right, a clinical photograph shows a person performing the procedure on a dog's face, with a needle inserted into the infraorbital foramen.

Bloqueio do nervo infraorbitário

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Bases anatômicas
Bloqueio nervo maxilar

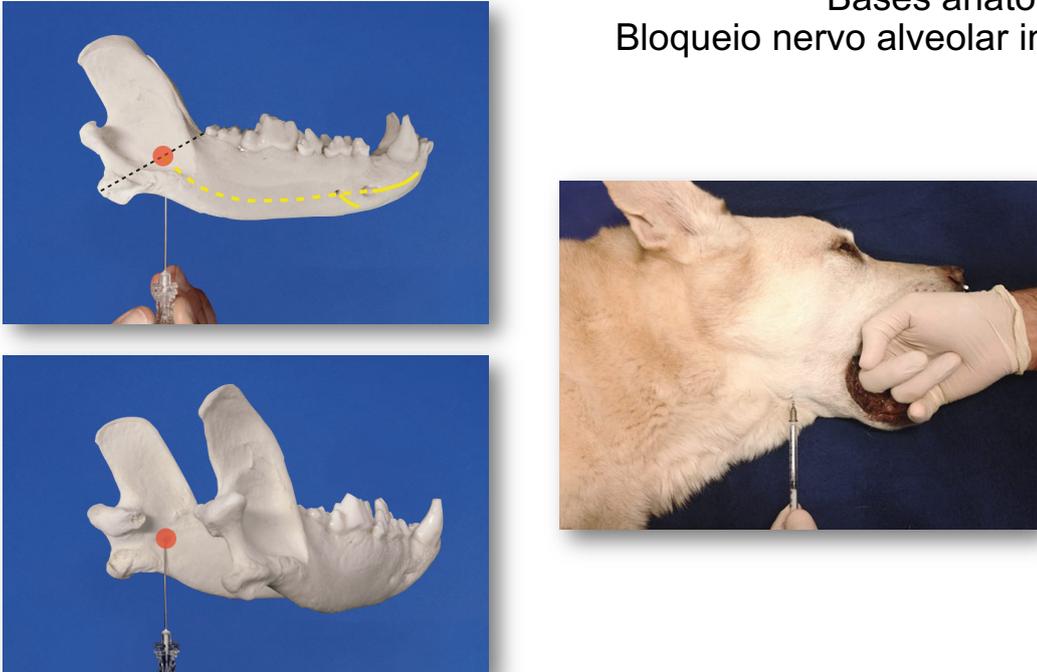


The image contains three photographs. On the left, two anatomical views of a dog's skull: the top one shows a lateral view with a yellow line tracing the path of the maxillary nerve and a red dot at the injection site, labeled '1)' and '2)', and the bottom one shows a ventral view with a yellow line and a red dot indicating the injection site. On the right, a clinical photograph shows a person performing the procedure on a dog's face, with a needle inserted into the infraorbital foramen.

<https://www.bbraun-vetcare.com/en/products-and-therapies/anesthesia/regional-anesthesia/peripheral-nerve-block-head/maxillary-nerve-block.html#indication>

69

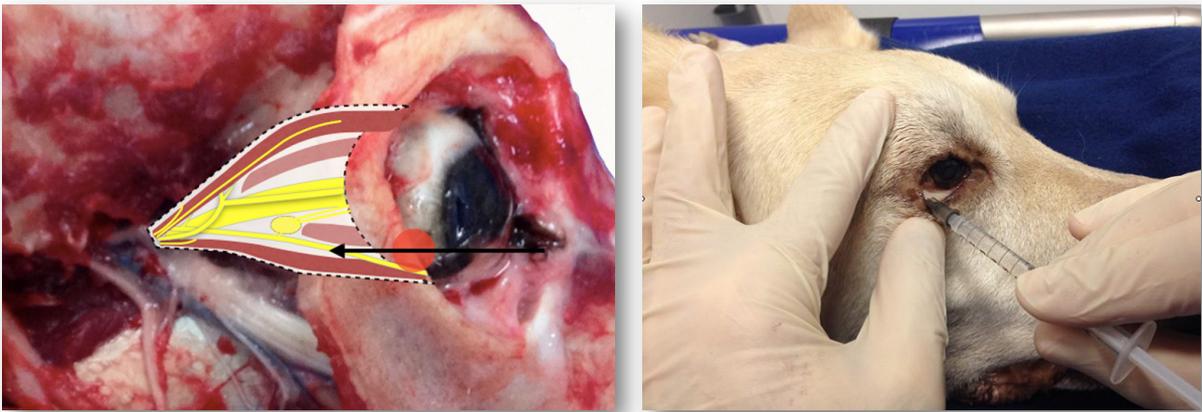
Bases anatômicas
Bloqueio nervo alveolar inferior



The image contains three panels. On the left, two anatomical diagrams of a dog's mandible are shown against a blue background. The top diagram is a lateral view with a red dot on the inferior border of the mandible and a yellow dashed line tracing the path of the inferior alveolar nerve. The bottom diagram is a medial view with a red dot on the medial surface of the mandible. On the right, a clinical photograph shows a dog's head in profile with a gloved hand holding the lower lip and a syringe injecting anesthetic into the lower jaw.

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Bases anatômicas
Bloqueio retrobulbar



The image contains two panels. On the left, an anatomical diagram shows a cross-section of the retrobulbar space with yellow and red lines representing the retrobulbar plexus and the retrobulbar artery. A red dot indicates the injection site. On the right, a clinical photograph shows a dog's head with a gloved hand holding the eye and a syringe injecting anesthetic into the retrobulbar space.

<https://www.bbraun-vetcare.com/en/products-and-therapies/anesthesia/regional-anesthesia/peripheral-nerve-block-head/retrobulbar-block.html#local-anesthetics>

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Figure 1—Photograph (rostral view) to illustrate the needle placement required for retrobulbar injection performed via the ITP technique in an anesthetized dog.

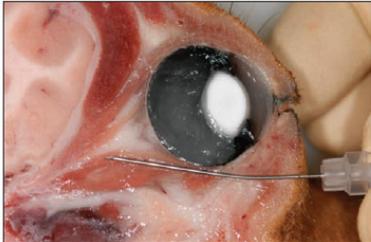
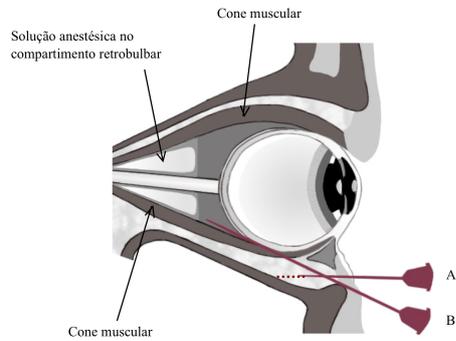


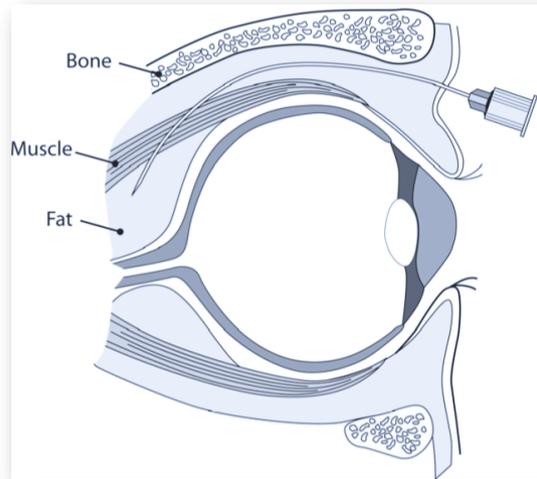
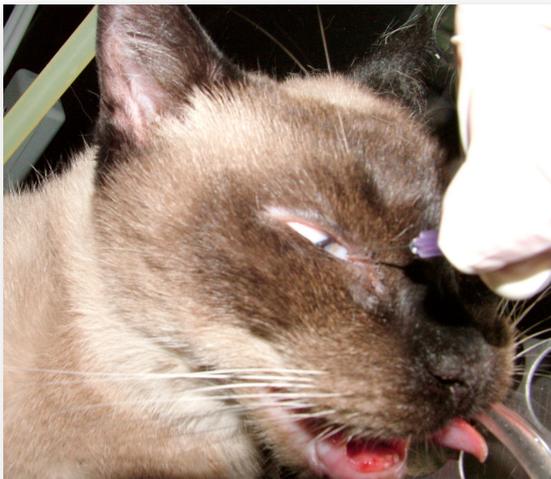
Figure 2—Photograph of a frozen canine skull that has been sectioned through an eye and orbit to illustrate the approximate path of needle placement required for retrobulbar injection performed via the ITP technique. Notice that the tip of the needle terminates in the intraconal fat.

JAVMA, Vol 229, No. 2, July 15, 2006



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Shilo-Benjamini et al. (2013)

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Anestesia Retrobulbar

- Compreende a injeção do anestésico local atrás do olho, dentro do cone muscular, formado pela musculatura extrínseca do bulbo ocular
- Efeitos
 - analgesia do bulbo ocular pelo bloqueio das fibras nervosas que saem do bulbo ocular e passam pelos nervos ciliares;
 - perda temporária da visão devido a anestesia do nervo óptico,
 - bloqueio do reflexo oculocardíaco
 - acinesia do bulbo ocular

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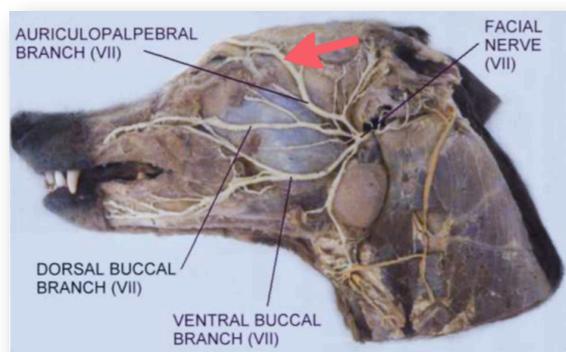
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Acinesia palpebral

- Inibição da movimentação palpebral
- Intervenções diagnósticas e terapêuticas

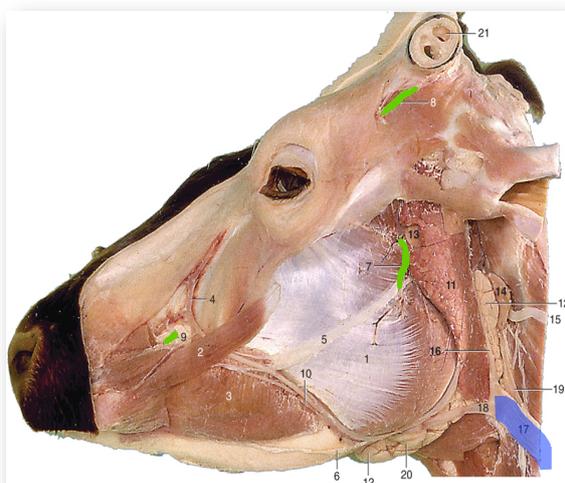


Giuliano & Walsh, 2013



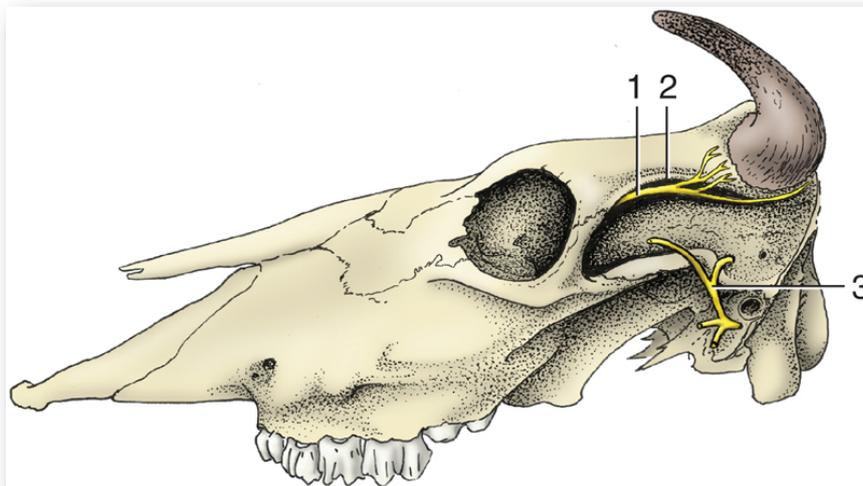
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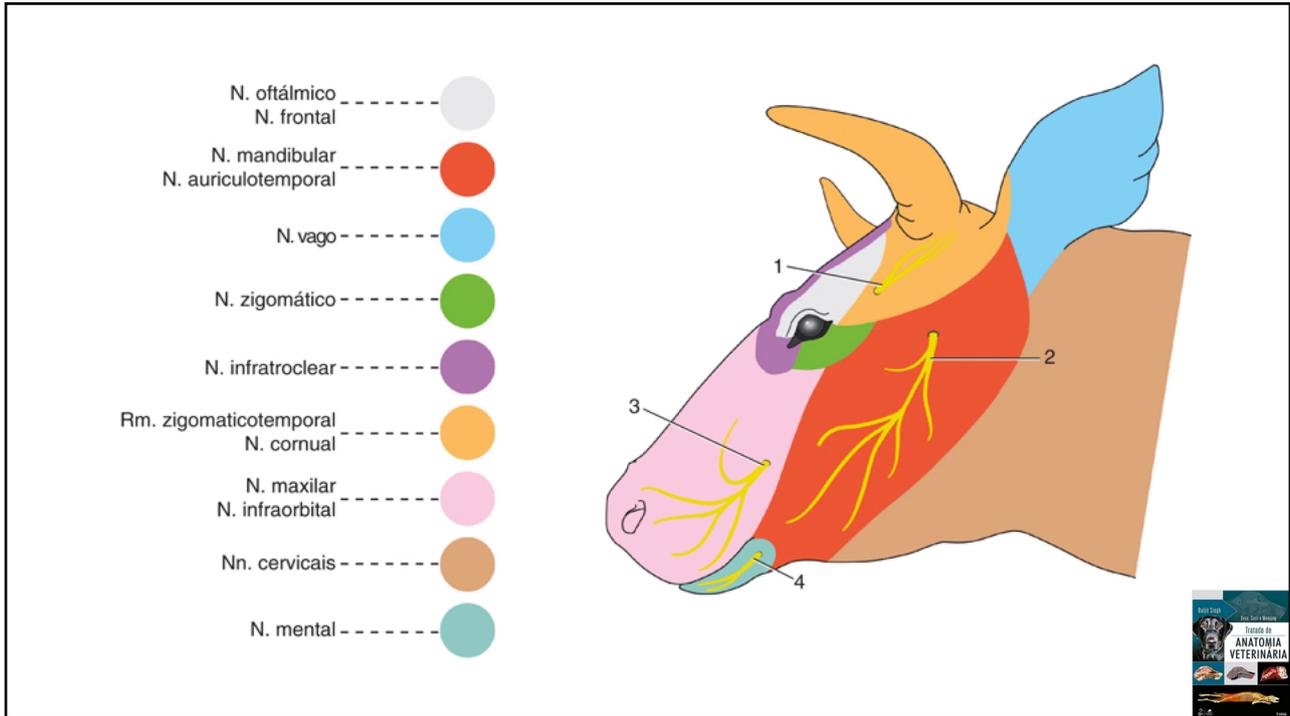
Dissecção superficial da cabeça. 1, Masseter; 2, zigomático; 3, bucinador; 4, veia facial; 5, e 6, ramos bucais dorsal e ventral do nervo facial, respectivamente; **7, nervo auriculotemporal; 8, nervo cornual; 9, nervo infraorbital**; 10, ducto parotídeo e artéria e veia faciais; 11, glândula parótida; 12, glândula mandibular; 13, linfonodo parotídeo; 14, linfonodo retrofaríngeo lateral; 15, nervo acessório espinal; 16, veia maxilar; 17, veia jugular externa; 18, veia linguofacial; 19, artéria carótida comum; 20, linfonodo mandibular; 21, divertículo cornual do seio frontal.

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- Nervo cornual (1) segue a linha temporal (2) no crânio bovino,
- O nervo auriculopalpebral (3) é palpável no local em que cruza o arco zigomático.

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Cabeça

Anestesia para descorna - caprinos

- Anestesia dos nervos: ramo cornual n. zigomaticotemporal **(A)** e r. cornual do n. infratroclear **(B)**
- 2 a 3 ml lidocaína a 2% em cada lado
- Atenção
 - Sedação
 - dose total anestésico local



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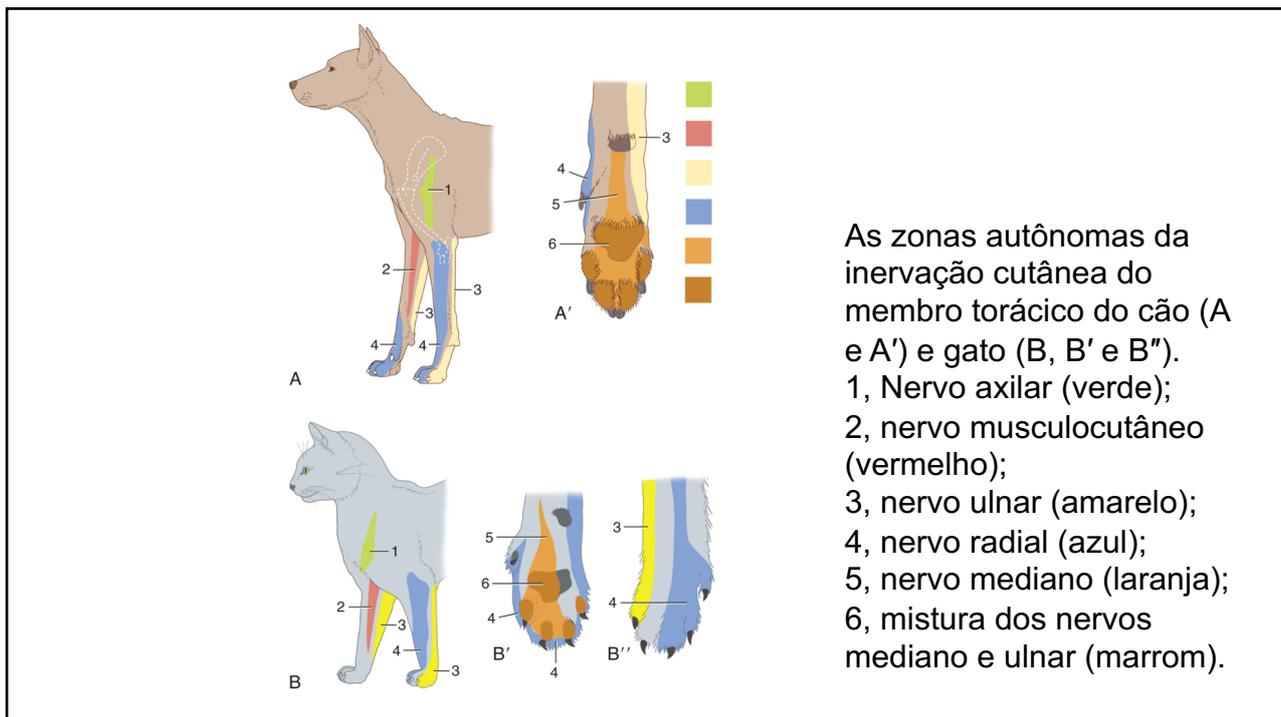
Membro torácico

80

Membro torácico Cães

- Bloqueio de Plexo Braquial
- Bloqueio paravertebral cervical
- Bloqueio dorsal paramediano
- Bloqueio subescapular do plexo braquial
- Bloqueio dos nervos radial, ulnar, mediano e musculocutâneo

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Membro pélvico

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Membro pélvico Cães

- Bloqueio paravertebral do plexo lombar
- Bloqueio do plexo lombar no compartimento psoas
- Bloqueio inguinal do nervo femoral
- Bloqueio do nervo femoral cutâneo lateral
- Bloqueio paravertebral do plexo sacral
- Bloqueio lateral do nervo isquiático
- Bloqueio do nervo femoral cutâneo caudal
- Bloqueio do nervo peroneal

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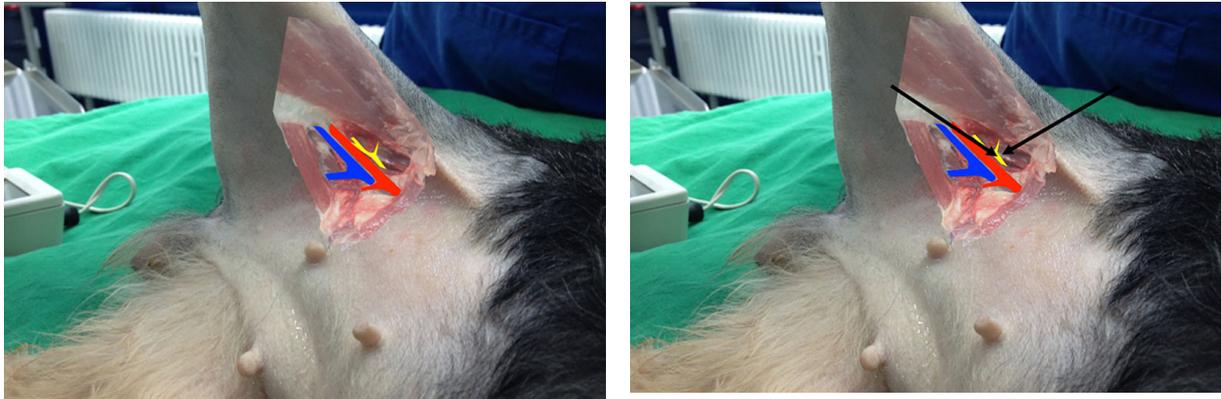
Bases anatômicas Bloqueio nervo femoral



<https://www.bbraun-vetcare.com/en/products-and-therapies/anesthesia/regional-anesthesia/peripheral-nerve-block-hindlimbs/femoral-nerve-block.html#>

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Bases anatômicas
Bloqueio nervo femoral

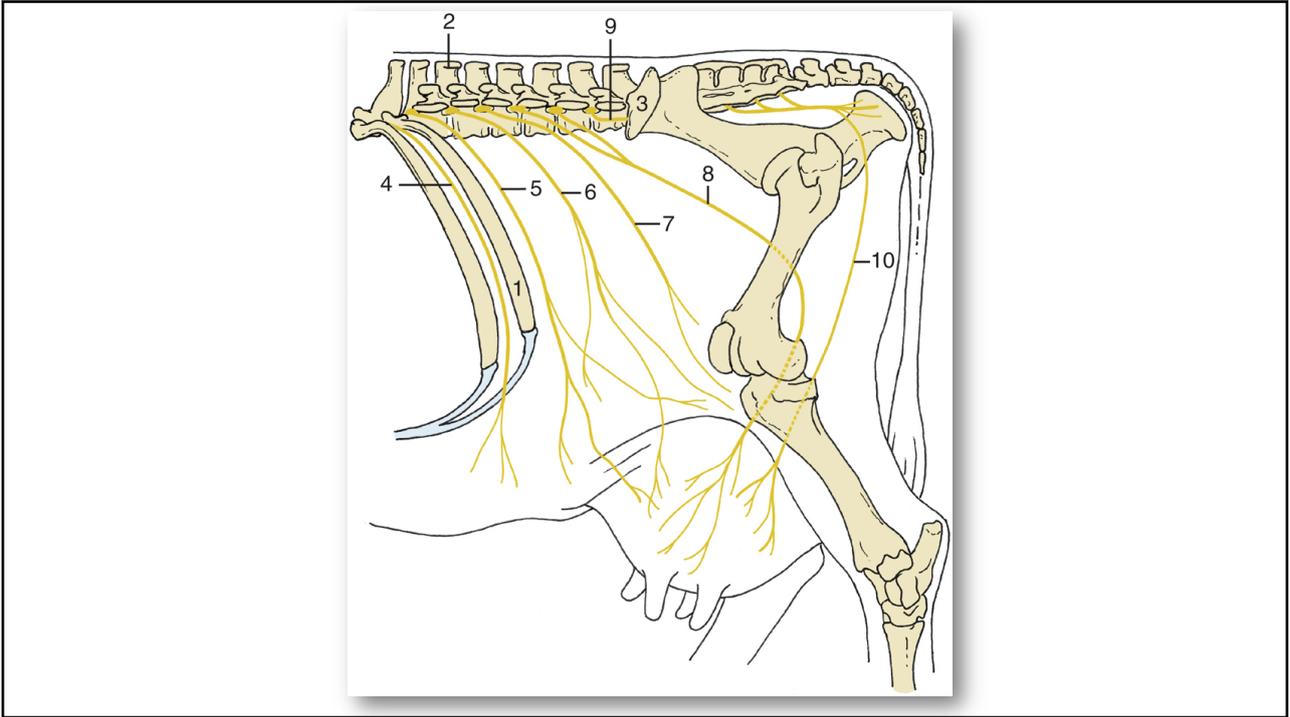


<https://www.bbraun-vetcare.com/en/products-and-therapies/anesthesia/regional-anesthesia/peripheral-nerve-block-hindlimbs/femoral-nerve-block.html#>

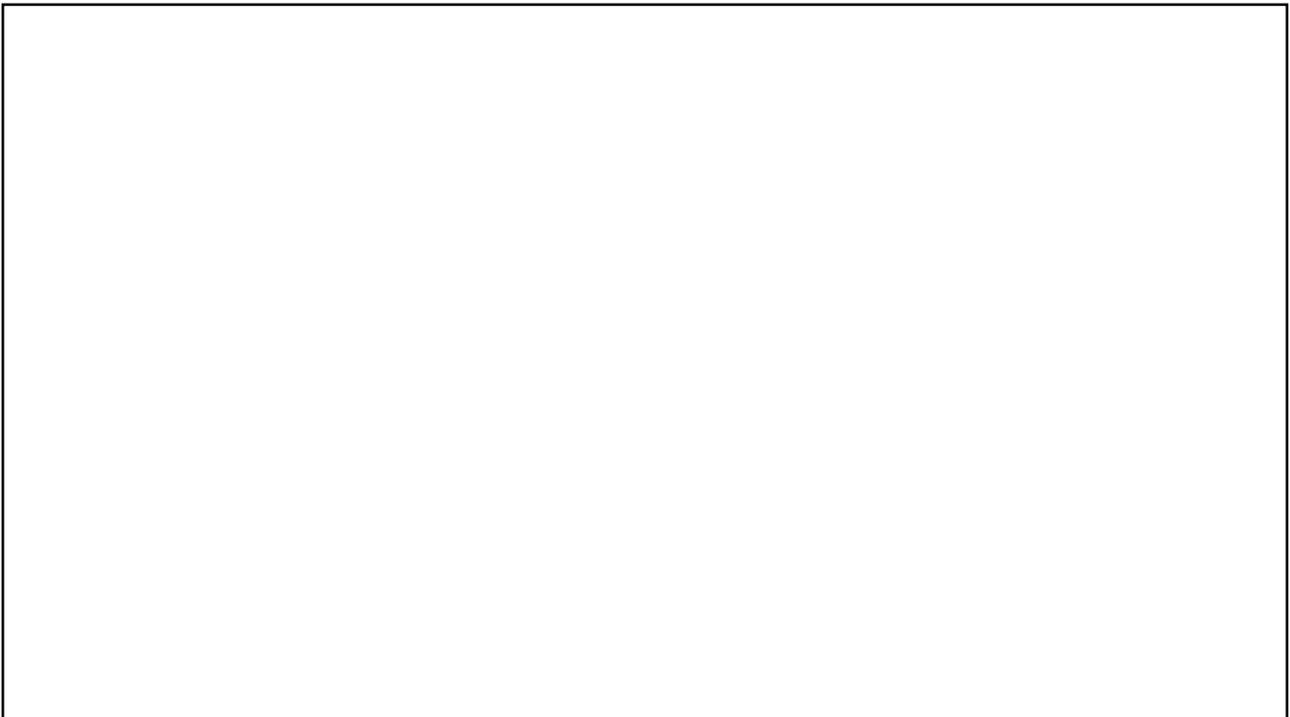
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Tronco

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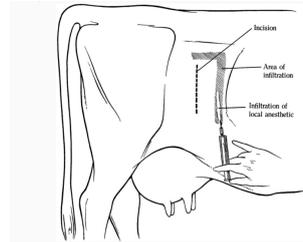
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Anestesia infiltrativa “L” invertido

- Área bloqueada
 - Flanco caudal e ventral ao local da injeção
- Local do bloqueio
 - Linha ao longo da borda da última costela e ao longo porção ventral do processo transverso
 - L1 a L4
 - Intramuscular e subcutâneo



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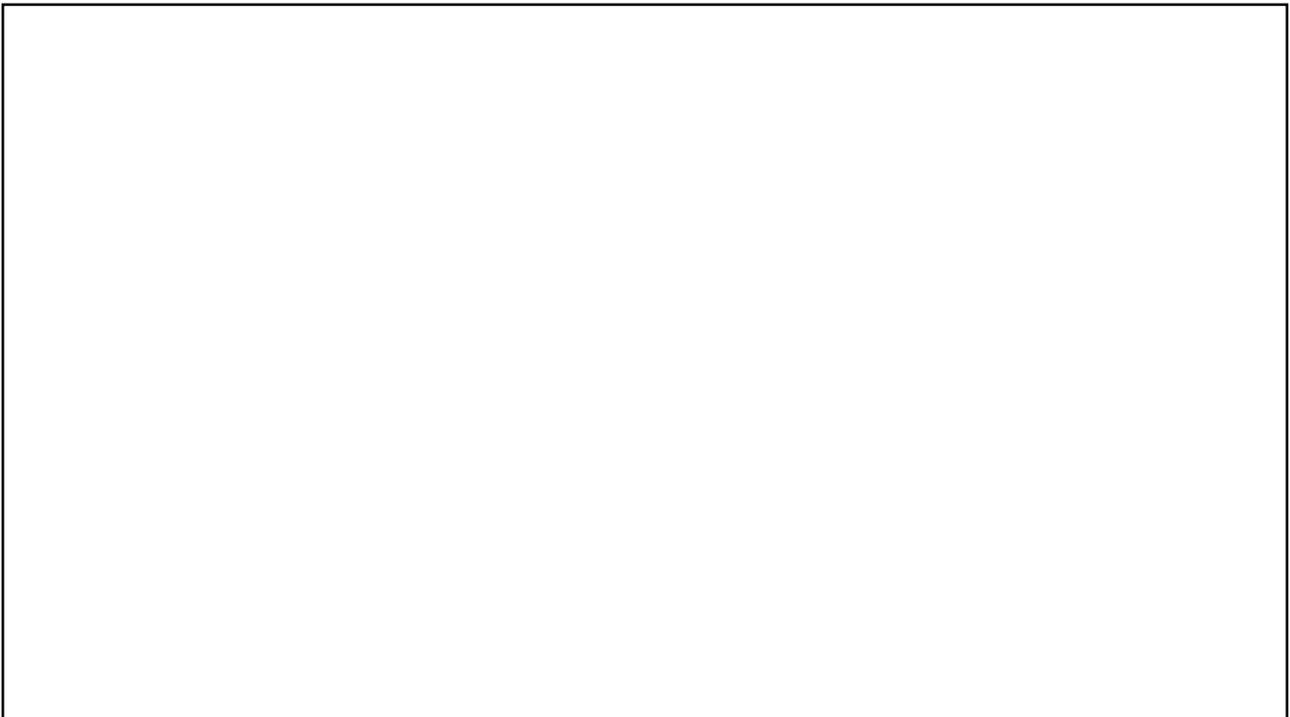
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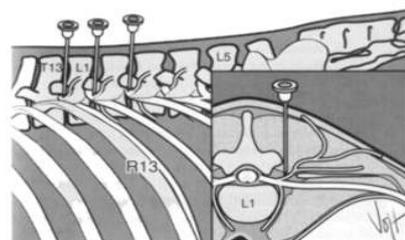
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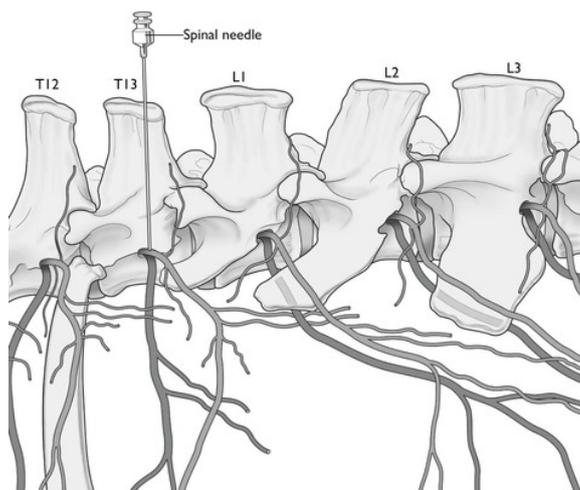
Anestesia paravertebral proximal

- Área bloqueada
 - flanco do lado no qual a técnica é realizada
 - nn bloqueados
 - ramos ventrais e dorsais de T13, L1 e L2
 - L3: se bloqueado, pode provocar ataxia
- Local
 - 2,5 a 5 cm da linha média
 - T13 imediatamente na frente do processo transverso de L1...



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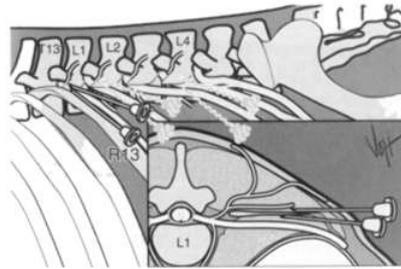


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Anestesia paravertebral distal

- Área bloqueada: flanco do lado correspondente à realização
 - Ramos ventral e dorsal de T13, L1 e L2
- Local: porções distais dos processos transversos lombares de L1, L2 e L4



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Considerações Finais