

# Biomecânica da Coluna Cervical

MFT 0833

Isabel de Camargo Neves Sacco

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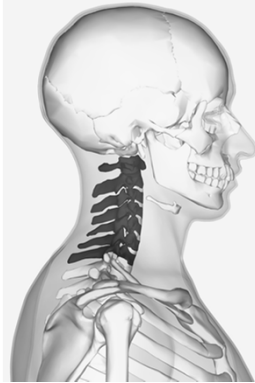
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## PROPEDÊUTICA E ANATOMIA DE SUPERFÍCIE

- Base da cabeça: C1 + occipital
- C3 - osso hióide
- C4 e C5 - cartilagem tireoidiana
- C6 - arco da cartilagem cricóide
- C7 – vértebra proeminente



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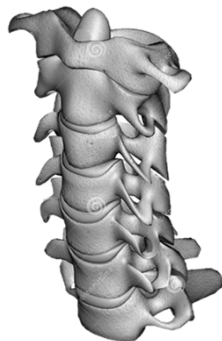
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## Características Gerais Coluna Cervical

- Movimenta-se por ela mesma, ou seja, sem muitas relações com estruturas anatômicas e viscerais quando se movimenta, diferentemente dos outros segmentos da coluna vertebral: torácica (caixa torácica) e lombar (vísceras e parede abdominal)
- Maior mobilidade por conta disso, principalmente



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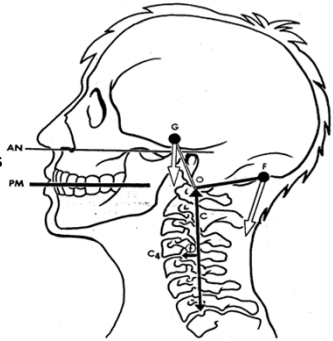
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### EQUILÍBRIO DA CABEÇA

- Alavanca Interfixa
- >> tensão sub-occipitais



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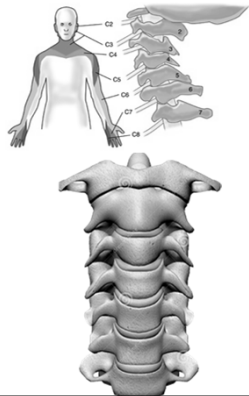
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### Características Gerais Coluna Cervical

- Suporte, estabilidade, órgãos do sentido, plexo cervical e braquial
- 3 graus de liberdade (rot, inclin, flex/ext)
- Cervical superior: atlas + axis + occipital
- Cervical inferior: C3 a C7



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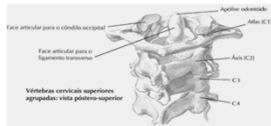
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### ARTICULAÇÕES - COLUNA CERVICAL

- Cervical superior:
  - Occipito-Atlóidiana
  - Atlanto-axoídiana, Atlanto-odontóidiana
- Cervical inferior:
  - C3-C4, C4-C5, C5-C6, C6-C7, C7-T1



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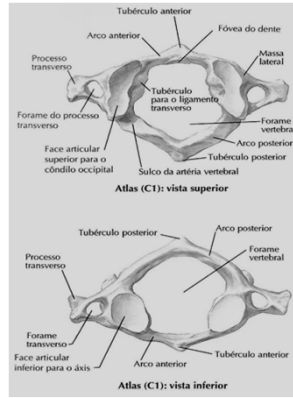
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### ATLAS

- não corpo, não proc espinhoso, anel
- 5 facetas articulares (2 sup (côncavas), 2 inf (convexas), 1 interna (com o dente âxis).



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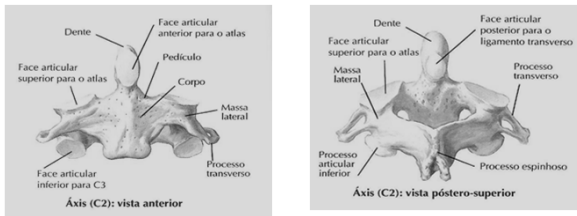
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### AXIS

- ≡ vértebra típica, corpo com dente (articula-se com atlas)



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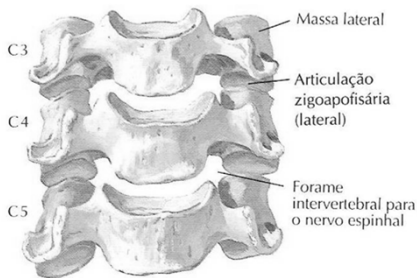
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### C3 - C5



3ª, 4ª e 5ª vértebras cervicais: vista anterior

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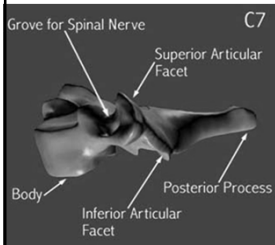
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### Características e Peculiaridades Anatômicas



- **C7 (transacional):** proc espinhoso longo, não forame transverso
- Facetas superiores **voltam-se superior e medialmente**
- Facetas inferiores **voltam-se inferior e lateralmente**

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### Características e Peculiaridades Anatômicas

- **Inclinação típica das facetas:** altera sua inclinação conforme vai descendo para cervical inferior e se aproxima da coluna torácica.
- **Quanto mais vertical a inclinação das facetas:** < rotação "funcional" e > associação com inclinação mais alta (especialmente C1 e C2).
- **Quanto mais horizontal a inclinação (próxima C1 e C2):** > rotação "funcional".
- **Portanto, ao se imobilizar e/ ou exercícios, deve-se levar isso em conta: mais funcional.**

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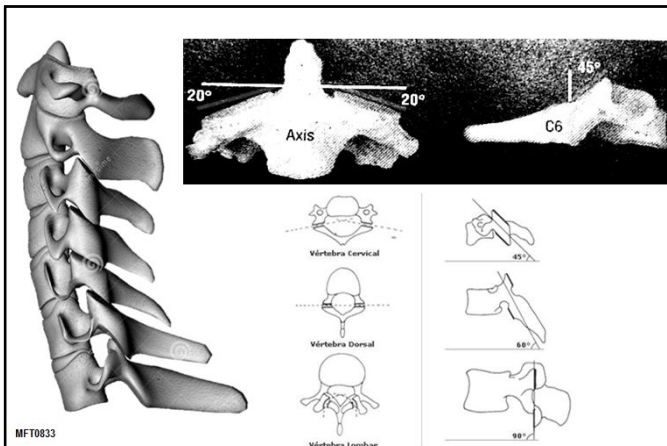
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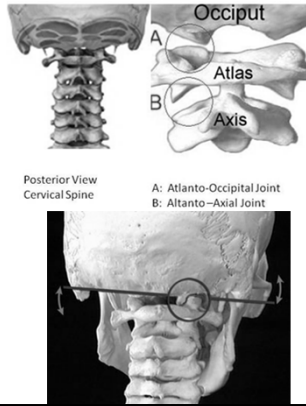
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### Articulação Occipito-atloídiana

- Articulação das facetas superiores das massas laterais do atlas com as superfícies dos côndilos do occipital.
- Facetas Occipital - **convexo**
- Facetas Atlas - **côncavas**
- Cápsulas articulares destas articulações frouxas
- Estabilidade por ligamentos + pregas sinoviais



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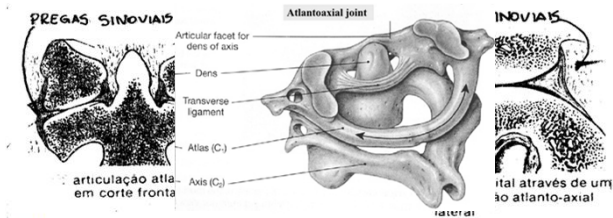
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### Articulação Atlanto-Axoidiana

- Face articular inferior do atlas e o processo articular superior do eixo
- Superfícies convexas



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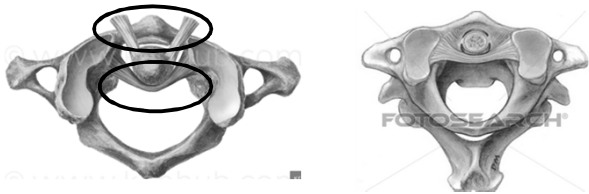
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### Articulação Atlanto-Odontoidiana

- ANTERIOR - sinovial com cápsula articular e 2 pregas. Faceta anterior da apófise odontóide e a faceta posterior do arco anterior do atlas.



- POSTERIOR - articulação sem cápsula, anel ósteo-fibroso (lig. transverso) e o dente.

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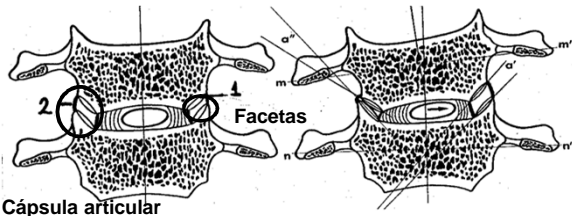
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### CERVICAL INFERIOR

- Articulação entre os corpos: disco 3mm (proporção entre corpo e disco de 2/5) - maior mobilidade
- Articulações unco-vertebrais (uncus)



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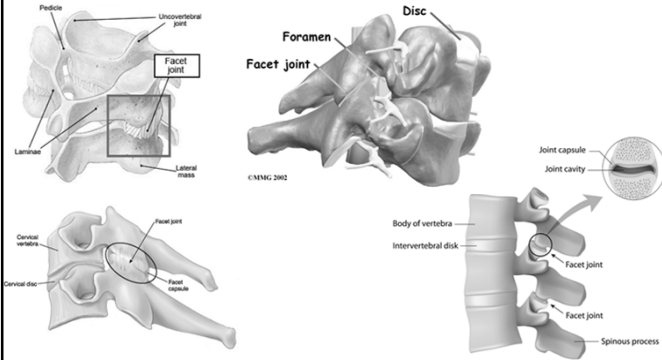
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### CERVICAL INFERIOR

- Articulações zigapofisárias (processos articulares - facetas)




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### GRAUS DE LIBERDADE

Articulação	Flex-Ext	
Occipito-Atlóidiana	5-10°	
Atlanto-axoídiana	5-10°	
Intercervical	35-70°	
Total	45-50° / 90°	

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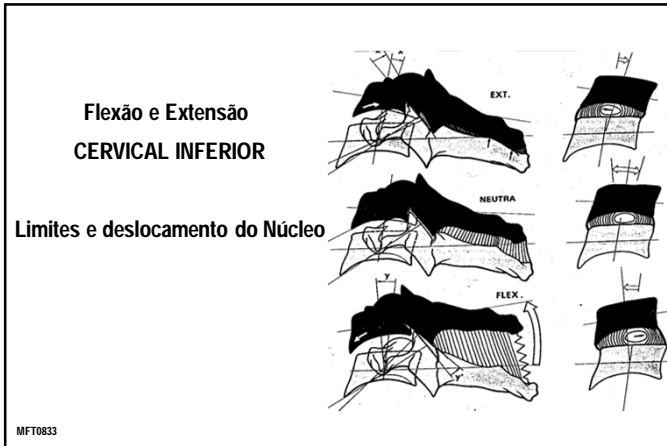
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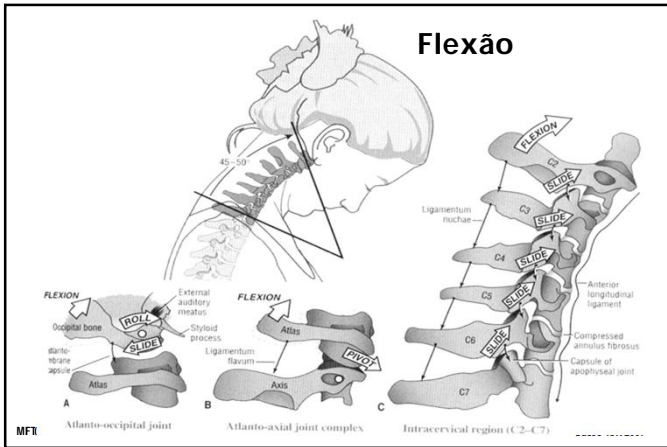
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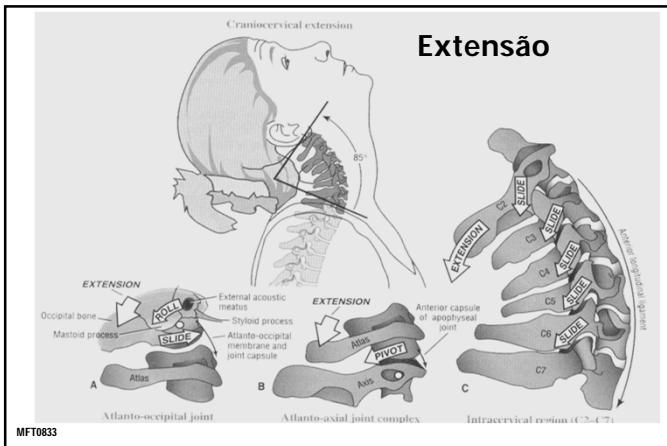
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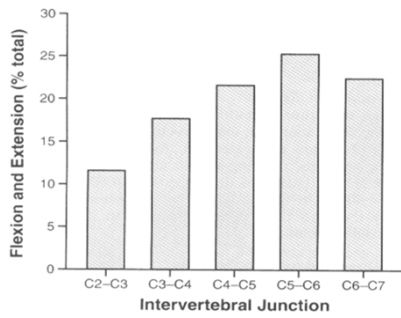
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Graus de Liberdade - Flexão / Extensão



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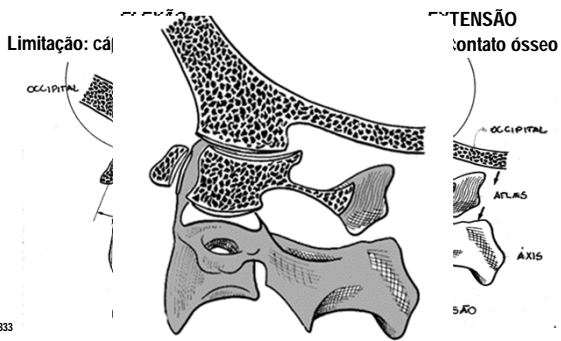
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Flexo-extensão OCCIPITO-ATLOIDIANA e ATLANTO-AXOIDIANA



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GRAUS DE LIBERDADE

Articulação	Flex-Ext	Rot. Axial	
Occipito-Atlóidiana	5-10°	-	
Atlanto-axoíidiana	5-10°	40-45°	
Intercervical	35-70°	45°	
Total	45-50° / 90°	90°	

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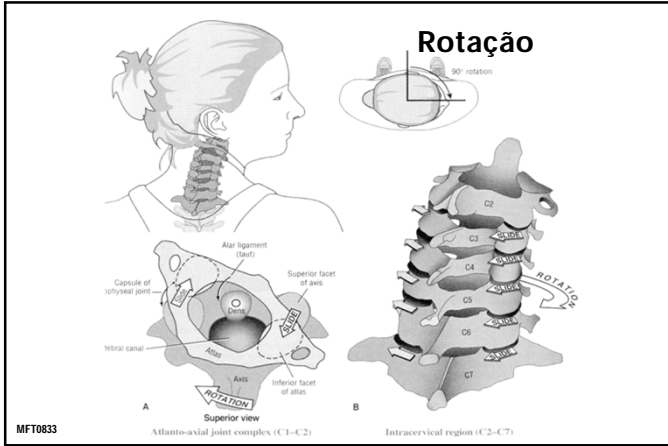
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**GRAUS DE LIBERDADE**

Articulação	Flex-Ext	Rot. Axial	Incl. lat
Occipito-Atlóidiana	5-10°	-	± 5-8°
Atlanto-axoídiana	5-10°	40-45°	
Intercervical	35-70°	45°	35-40°
Total	45-50° / 90°	90°	± 45°

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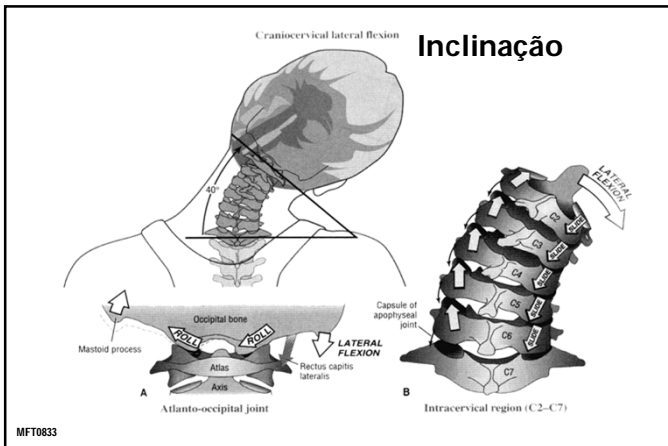
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## Inclinação OCCIPITO-ATLOIDIANA e ATLANTO-AXOIDIANA

- **Há** na occipito-atloidiana
- Há um deslizamento dos côndilos do occipital para a direita durante a inclinação esquerda e vice-versa.
- O côndilo occipital se aproxima do processo odontóide, mas aumenta a tensão da cápsula articular da occipito-atloidianas e do lig. alar contralateral.
- **Não há** na atlanto-axoidiana, a inclinação efetua-se entre o áxis e C3.

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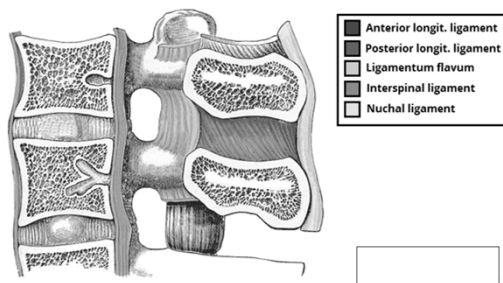


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## Ligamentos Cervicais comuns



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## LIGAMENTOS sub-occipitais

- POSTERIORES
  - PLANO PROFUNDO
  - PLANO MÉDIO
  - PLANO SUPERFICIAL
- ANTERIORES

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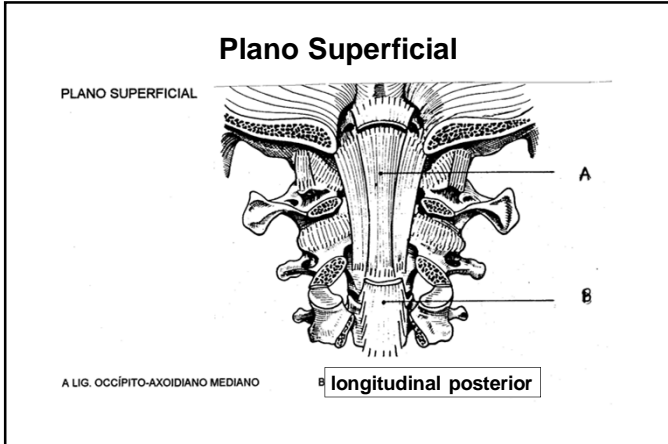
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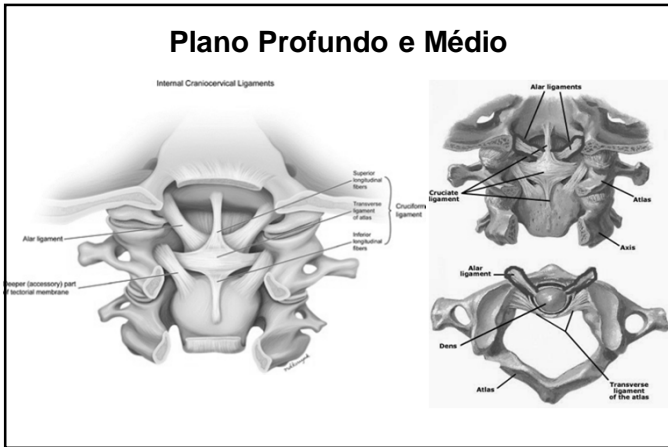
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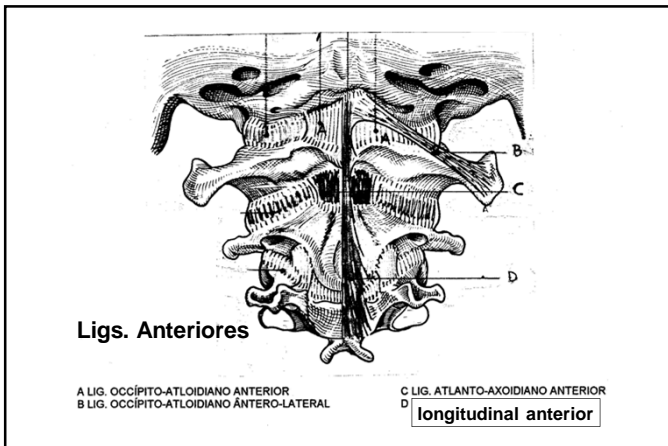
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## MÚSCULOS DA CERVICAL

- Pré vertebrais - anteriores
  - Longos cabeça e pescoço
  - Retos anterior e lateral da cabeça
  - Escalenos
  - ECM
- Pós vertebrais - posteriores
  - Profundos - sub-occipitais, interespinhais, intertransversais
  - Intermédios - semis (tórax, pescoço e cabeça), multifídeos
  - Superficiais - iliocostal cervical, dorsal longo, esplênios (cabeça e pescoço), elevador escápula, trapézio

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## Músculos Posteriores

Músculos	Contração Unilateral	Bilateral
pós intermédios (proc. transversos – espinhosos)	inclinação lat, rotação mesmo lado contração	Extensão cervical sup e inf
pós superficiais	inclinação lat e rotação lado oposto contração	extensão cervical sup e inf
m. trapézio	rotação lado oposto, inclinação lat. mesmo lado contração	extensão cervical sup e inf

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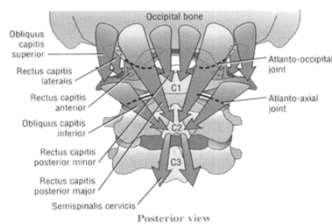
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MUSCLES	ATLANTO-OCCIPITAL JOINT			ATLANTO-AXIAL JOINT		
	FLEXION	EXTENSION	LATERAL FLEXION	FLEXION	EXTENSION	AXIAL ROTATION*
Rectus capitis anterior	XX	-	X	-	-	-
Rectus capitis lateralis	-	-	XX	-	-	-
Rectus capitis posterior major	-	XXX	XX	-	XXX	XX(L)
Rectus capitis posterior minor	-	XX	X	-	-	-
Obliquus capitis inferior	-	-	-	-	XX	XXX(L)
Obliquus capitis superior	-	XXX	XXX	-	-	-

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### Músculos Anteriores

Músculo	Condição Habitual	Habitual
M. longo pescoço	inclinação lat, flexão	rot. cervical, flexão cervical
M. longo cabeça	inclinação lat sup	rot. cervical sup, flexão sup
M. reto anterior da cabeça	inclinação lat e rotação mesmo lado contração	flexão cabeça sobre o atlas
M. reto lateral da cabeça	inclinação lat	flexão cabeça sobre o atlas
M. escaleno	inclinação lat e rotação lado oposto contração	se retificada - flexão cervical se não - hiperlordose levanta 2 caéxilas quando plo fixo na cervical
M. I CM	rotação lado oposto, inclinação e extensão mesmo lado contração	se retificada - flexão cervical sup (protrusão cabeça) se não - hiperlordose e extensão cervical sup

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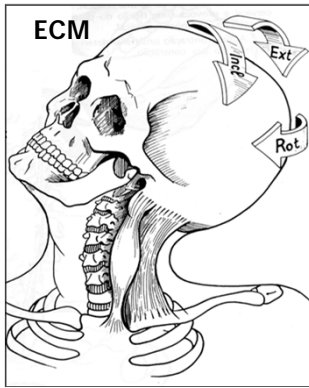
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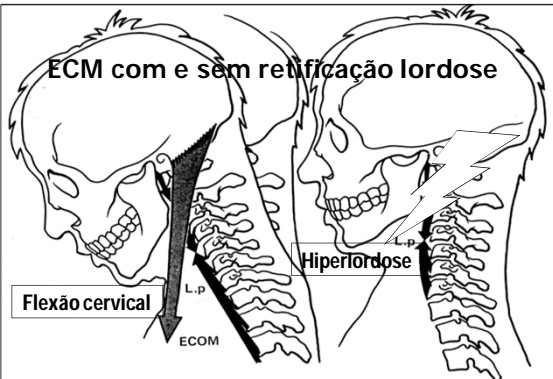
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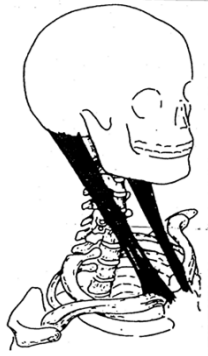
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## ECM

• Função fisiológica:  
NÃO é "inclinação" da cabeça.

• Torcicolo Congênito: m. esternocleido unilateral. Percepção da assimetria  $\pm$  3 anos, porém grande adaptações sensoriais devido ao posicionamento da cabeça (auditivo, visual, ATM, crescimento mandíbula).



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## Lordose - Protração - Retificação Cervical

- Lordose cervical (fisiológica): função de distribuição de forças. Mm. estabilizadores.
- Protração - m. esternocleido, mm. suboccipitais. Tendência a abrir a boca - m. platisma.
- Retificação - mm. hióideos, mm. anteriores de cervical empurram coluna para trás para "retificar" tubos, mm. mastigadores - masseter.
- Deglutição em protração: + difícil pq hióideos estão alongados, desvantagem mecânica.
- Deglutição em retificação: - difícil pq hióideos contraídos, porém mais fácil executar sua ação.

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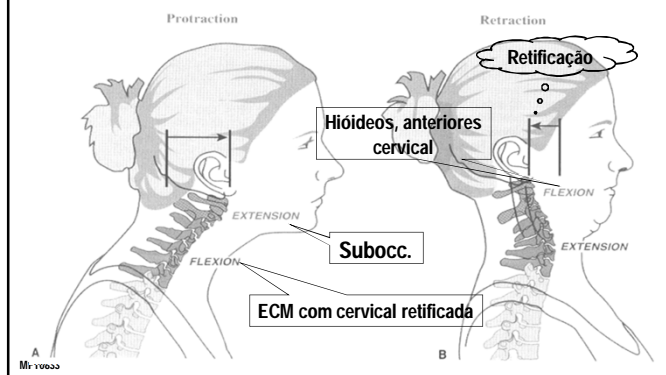
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### Protração

### Retração Cabeça




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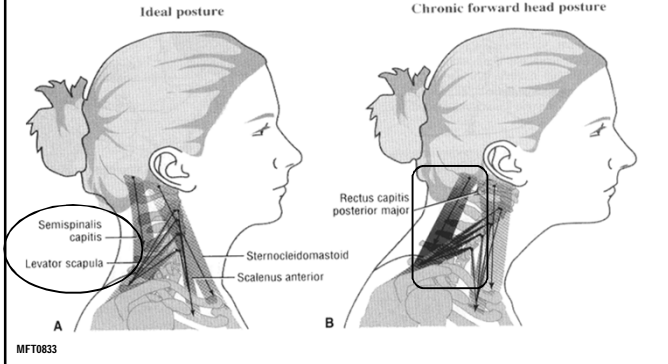
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# PROTRAÇÃO




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# AVALIAÇÃO

- Num fim de semana ensolarado, durante o almoço familiar dominical, sua tia vem reclamar para você de dor no pescoço. Você saberia identificar através da movimentação do segmento, onde é exatamente o problema? Se em cervical superior ou inferior? Se for possível, como?

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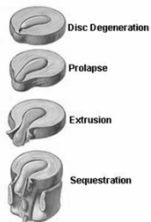
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