

# Kaela tõmptrauma KT leid

Anti Karask

2017 oktoober

Tartu

**Table 1: Low-Risk Criteria for Clinical Exclusion of Cervical Spine Injury in Alert Stable Patients**

**NEXUS criteria**

**NPV 99,8%**

No posterior midline cervical tenderness

No intoxication

No focal neurologic deficit

No painful distracting injuries

**Canadian C-spine rule criteria**

**NPV 100%**

Age < 65 years

No dangerous mechanism, such as:

Fall from height of >91 cm (>3 ft)

Axial loading injury (eg, diving accident)

High-speed motor vehicle collision (MVC) (>100 km/h), rollover, or ejection

Recreational motor vehicle, motorcycle, or bicycle injury

No paresthesias

Sitting position in emergency department

Ambulatory at any time

Neck rotation of 45° left and right

# KT vs röntgen

- Retrospektiivselt on polütrauma patsientidel leitud fraktuuride diagnoosimise sensitiivsuseks 98,5% ja röntgenil 43% (Nuñez et al 1994).
- KT täpsemast diagnostikast saadav kasu kaalub üle suurema kiirgusekoormuse ja uuringu kallima hinna (Theocharopoulos et al 2009)

# KT vs MRT

- MRT-l suurem tundlikkus ligamentide ja diskide vigastuste diagnoosimisel, kõrgem ka valepositiivsete hulk.
- Kaelakrae on võimalik eemaldada KT vastuse põhjal, kuna KT NPV ligamentide vigastusele on 98,9% ja ebastabiilsele vigastusele 100% (Hogan et al 2005)
- MRT – ebaselged juhud, kirurgiline planeerimine, prognoos

## Table 2: Risk Factors for Blunt Cerebrovascular Injury

Le Fort II or III facial fractures

Skull base fracture extending to petrous internal carotid artery canal

Fractures of C1–C3

Fracture line reaching a transverse foramen

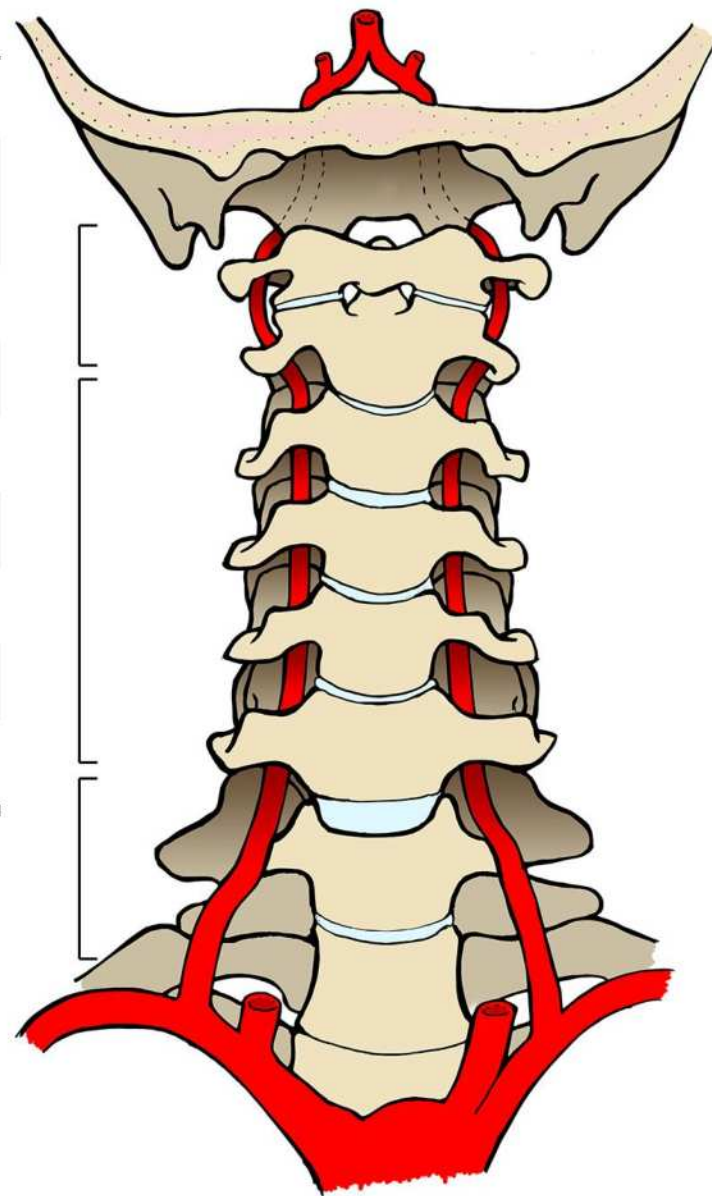
Facet subluxation or dislocation

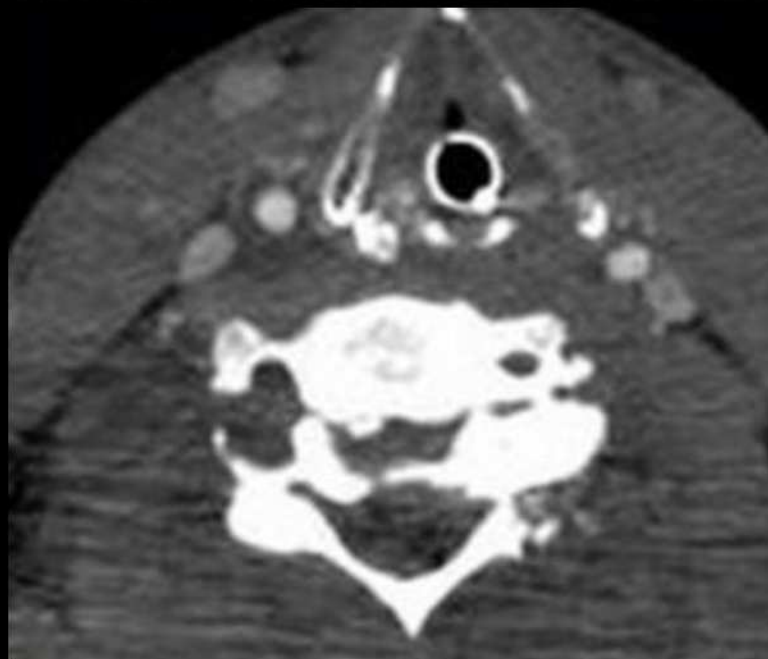
Scalp degloving injury

Severe mandibular fractures

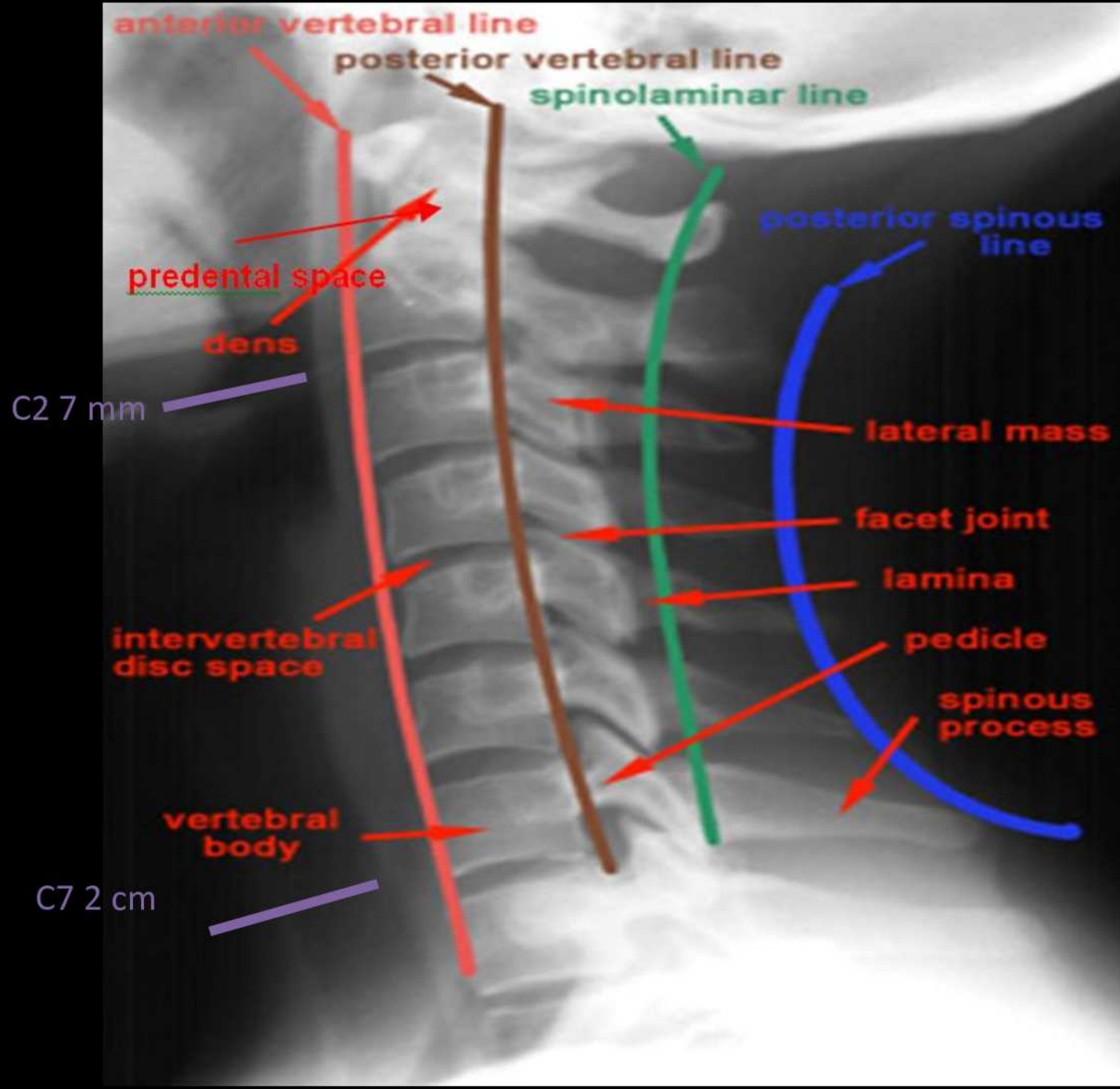
Closed head injury

Major chest trauma





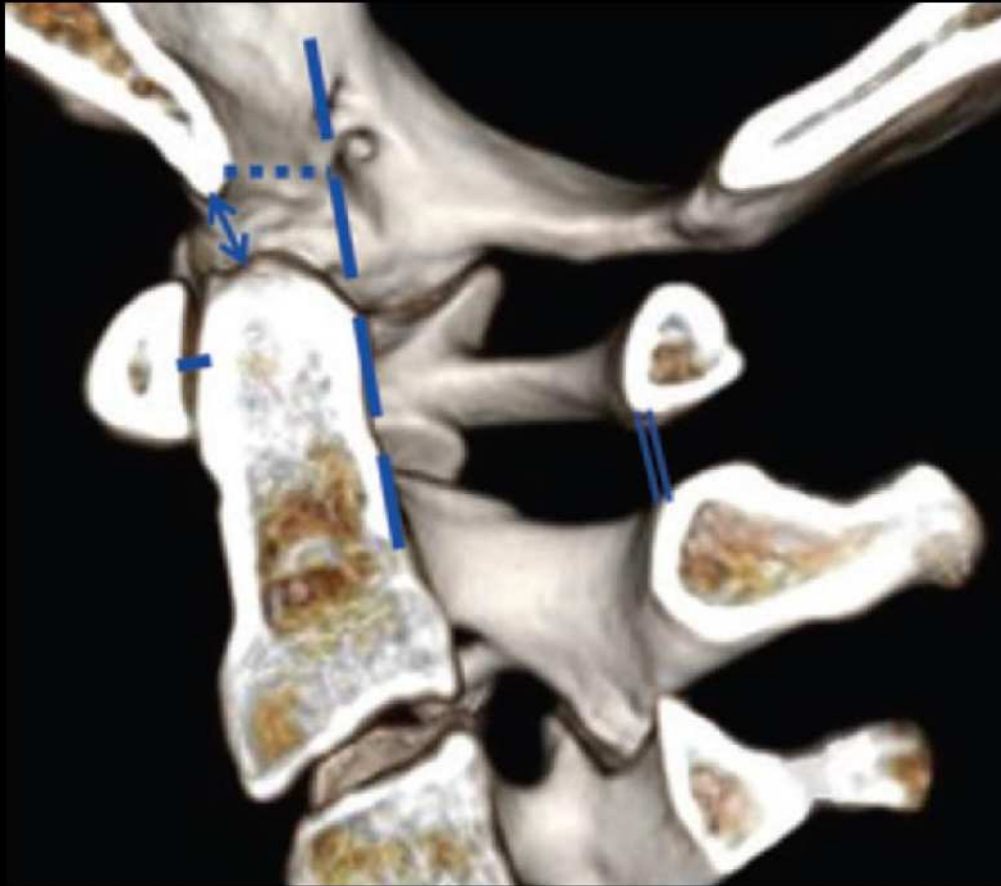
Mootorsõidukiõnnetus,  
kaelal turvavöö jälg.  
C5 nihe ~50%, lukustunud  
fassetid.



# Kraniotservikaalsed vigastused: distraktsioon



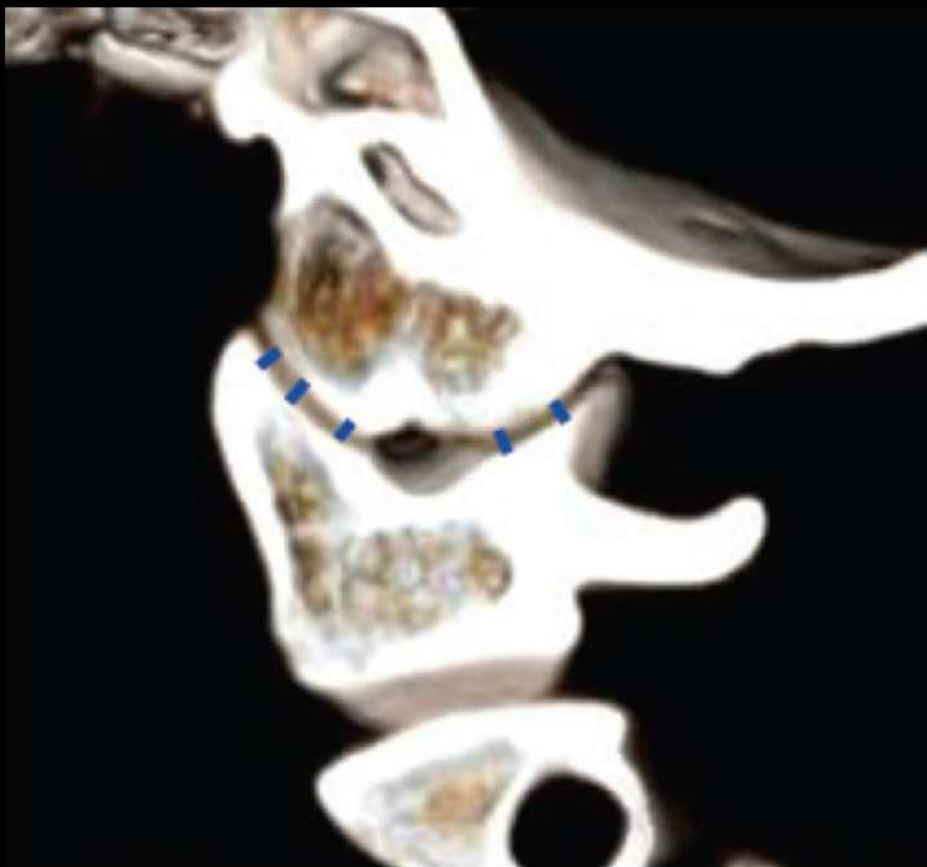




\*Basion-densi intervall –  
8,5-9,5 mm

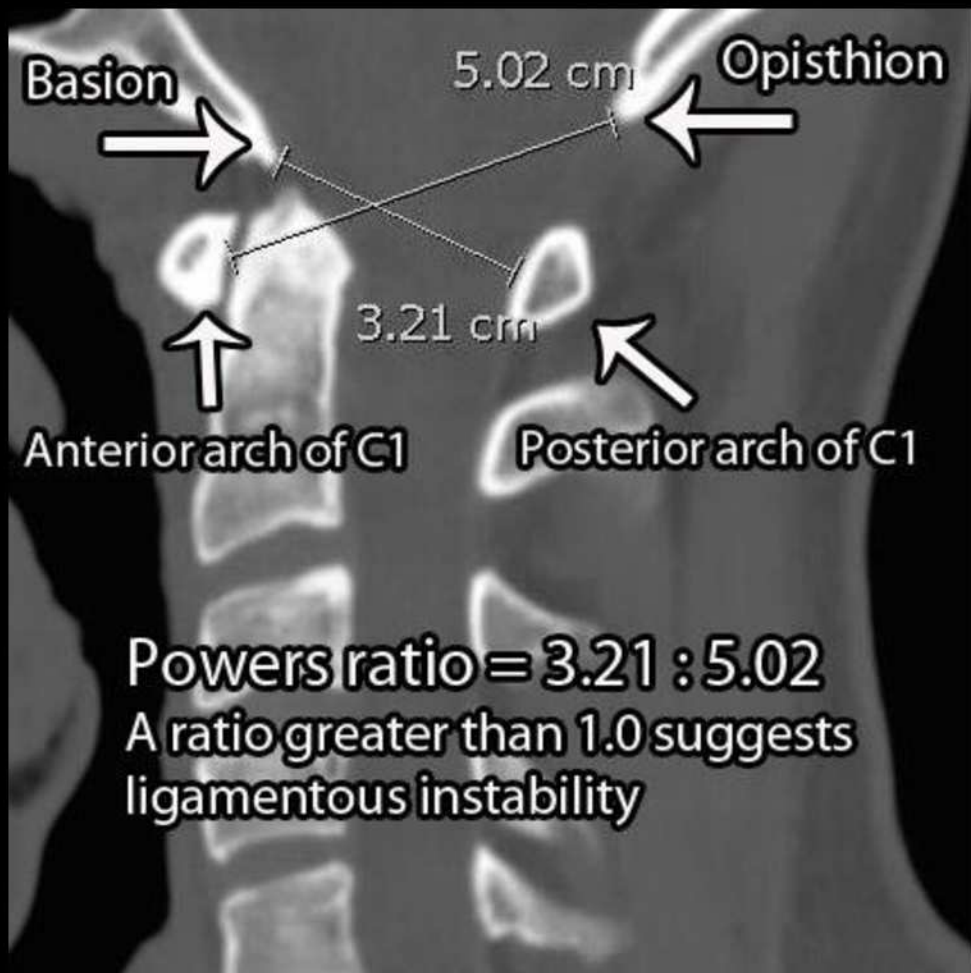
\*Atlantodentaalne  
intervall – 2 mm

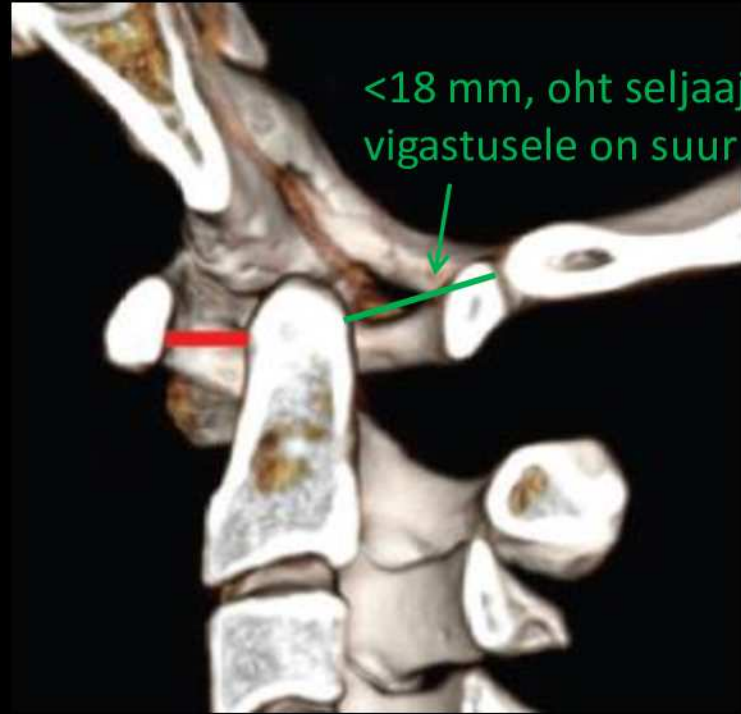
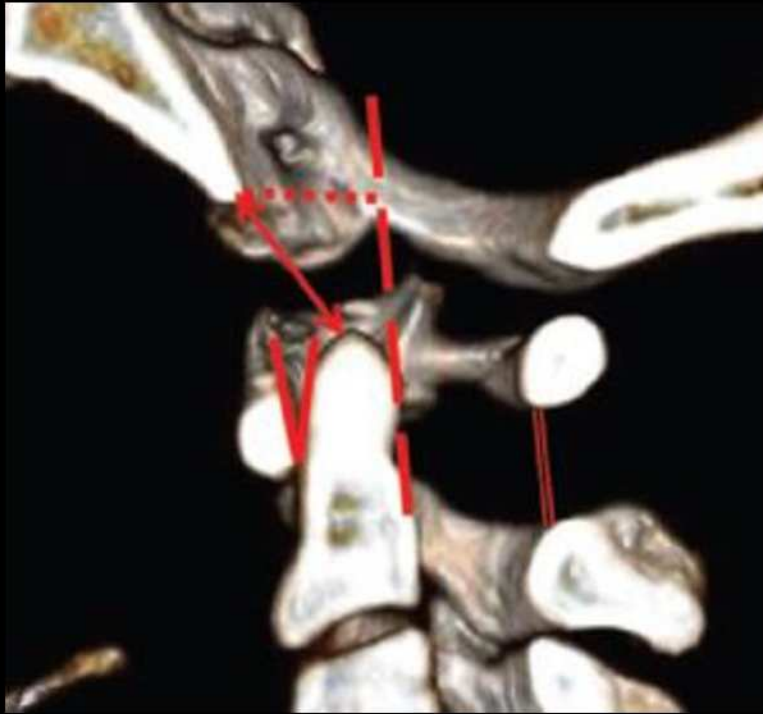
\*Basion-aksiaalse joone  
intervall – raske  
reprodutseerida



Atlanto-okspitaalne intervall  
– 4 mm (summeeritud), 2,5  
mm üks mõõt





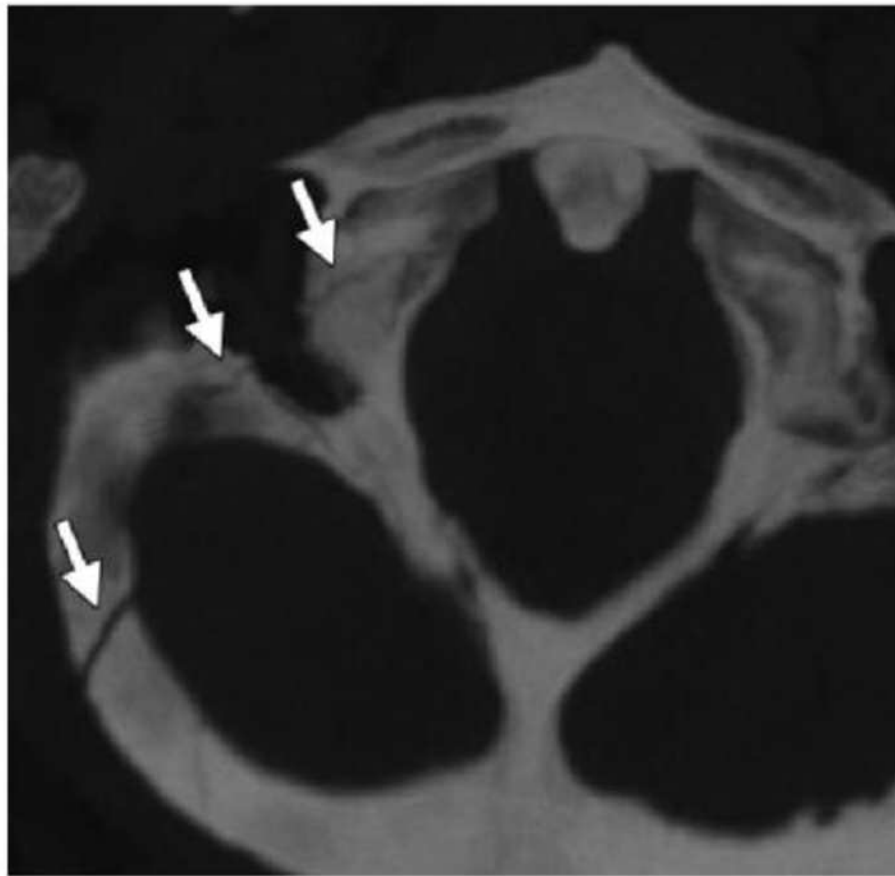


<18 mm, oht seljaaju vigastusele on suur

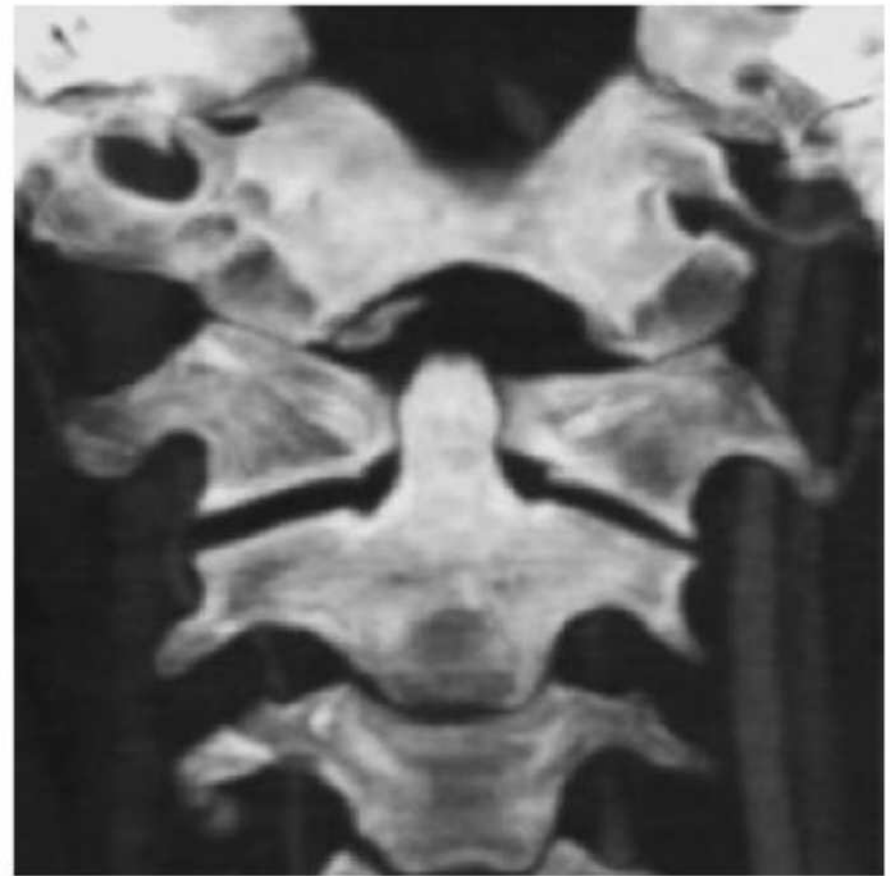
Kraniotservikaalsed vigastused:  
kuklaluu põntade murrud

## Occipital condyle fractures (Anderson and Montesano [53])

Type I: axial loading with minimal or no fracture displacement	Stable
Type II: skull base fracture extending through the condyle	Stable
Type III: alar ligament avulsion fracture	Unstable



II tüüp



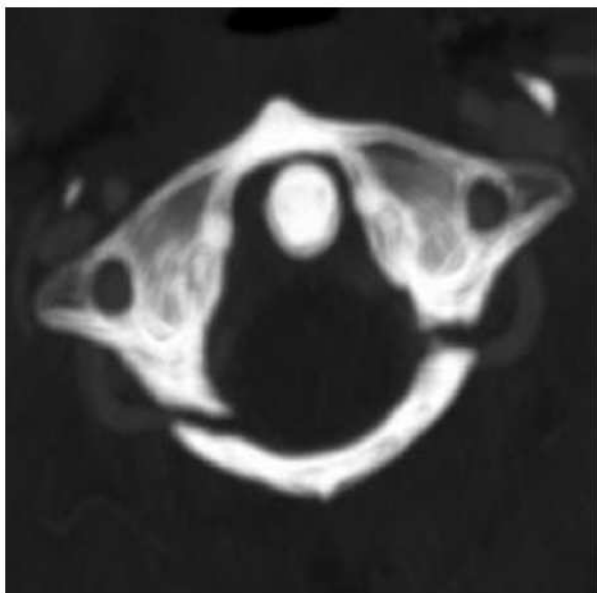
III tüüp (paremal avulseerunud fragment)

Kraniotservikaalsed vigastused: atlas

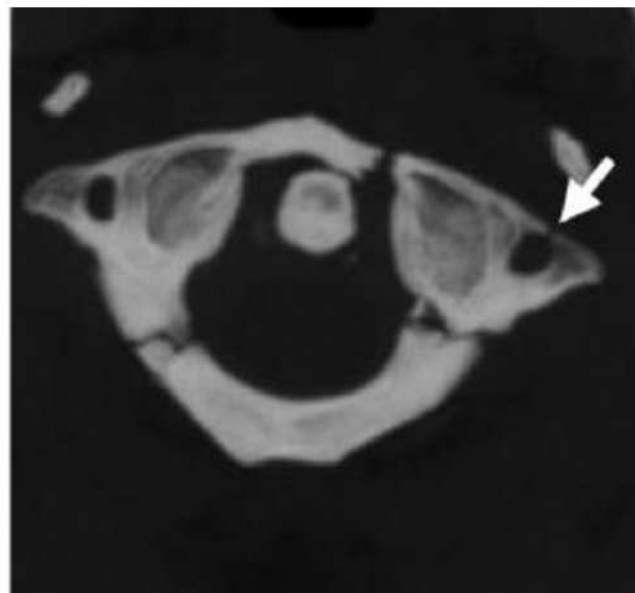


## Atlas fractures (Jefferson, as modified by Gehweiler et al [54])

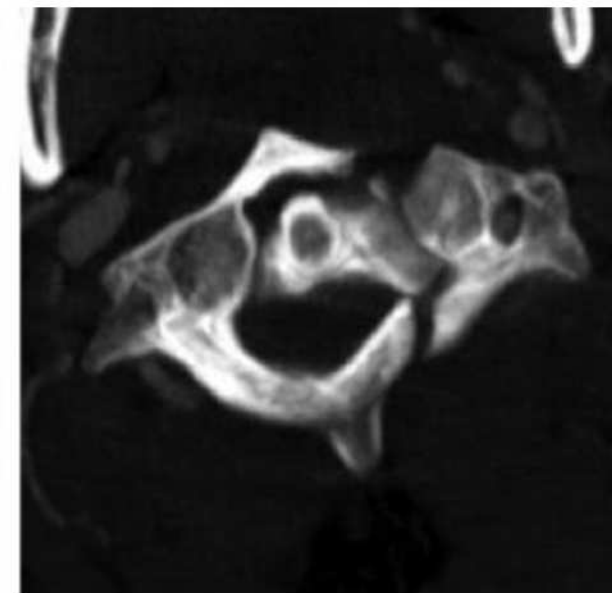
Type I: posterior arches	Stable
Type II: anterior arch	Stable
Type III: bilateral posterior arch with bilateral or single unilateral anterior arch ("Jefferson burst")	Depends on integrity of transverse ligament
Type IV: lateral mass	Stable
Type V: transversely oriented anterior arch fractures (avulsion of longus colli or atlantoaxial ligament)	Stable



I tüüp

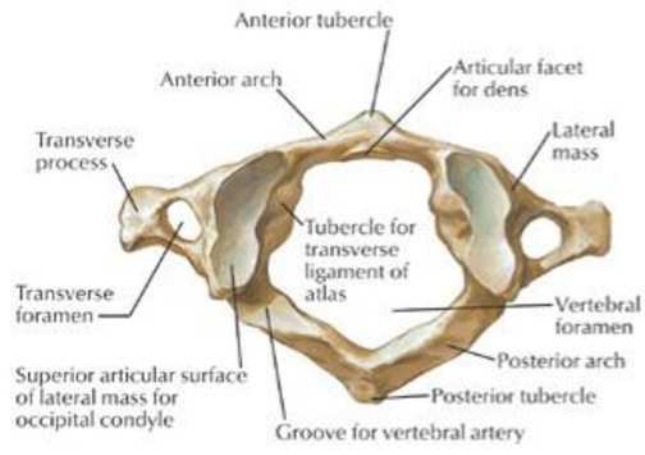


III tüüp, klassikaline  
Jeffersoni murd

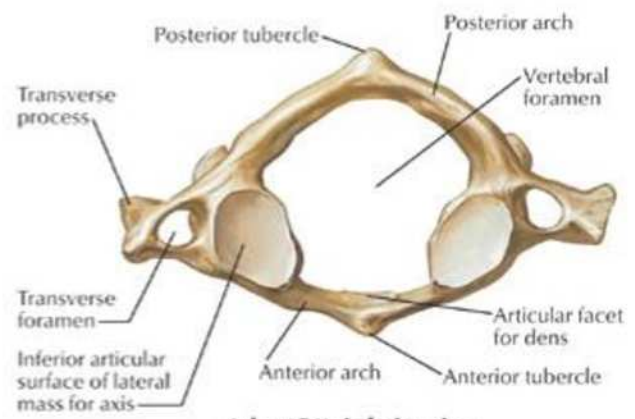


IV tüüp

Aksiaalsed jõud. Enamus atlase murde on stabiilsed, ravi vajadus sõltub transversaaligamendi intaktsusest.



**Atlas (C1): superior view**



**Atlas (C1): inferior view**



Transversaalligamendi kinnituskoha avulsioonmurd.  
Ebastabiilne.

Kraniotservikaalsed vigastused: axis

## Odontoid fractures (Anderson and D'Alonzo [55])

Type I: oblique fracture through the tip of the odontoid, result of alar ligament avulsion

Type II: dens-body junction

Type III: cancellous portion of the axis body

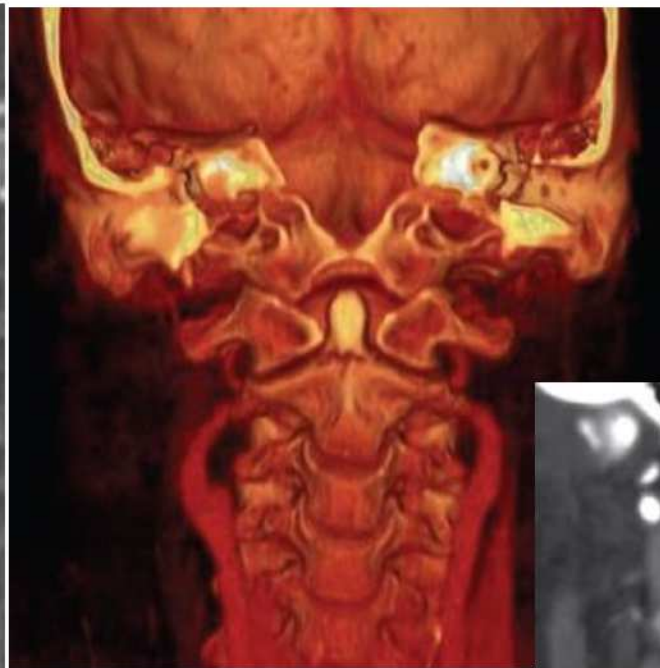
Stable

Unstable\*

Heals well with immobilization but can cause canal compromise



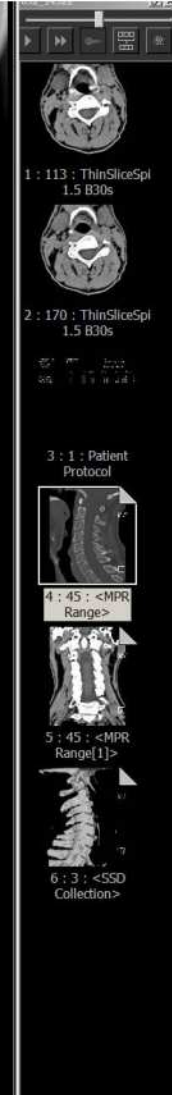
I tüüp



II tüüp (ebastabiilne)



III tüüp



M 43. Densi II tüüpi murd,  
(Teostatud osteosüntees)



Hangman fractures (Effendi et al [56], modified by Levine and Edwards [57])

Type I: hairline fractures, <2-mm translation

Type II: angulation > 11°, >2-mm translation

Type IIa: severe angulation without translation, intact anterior longitudinal ligament

Type III: bilateral facet dislocation

Stable

Variable, external immobilization often used

Angulation can worsen with initial traction

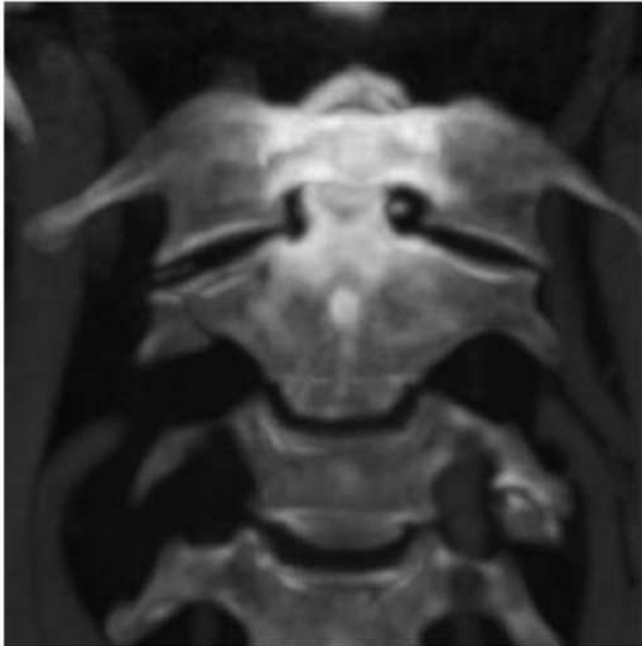
Unstable



II tüüp

Bilat. Parsinterarticularise spondülolüüs. Hüperekstensioon.  
Neuroloogilisi nähte ¼ juhtudest.

# Mitte *densi*- ega *hangman*-tüüpi murrud



C2 lateraalse massi  
fraktuur

## Atlantoaxial rotatory subluxation and fixation

(Fielding and Hawkins [58])

Type I: rotatory fixation in normal physiologic range ( $<48^{\circ}$ – $52^{\circ}$  left or right), dens acts as a pivot, intact alar and transverse ligaments

Type II: transverse ligament injured, center of rotation shifts to lateral mass, anterior displacement of the atlas  $< 5$  mm

Type III: transverse and alar ligaments both deficient, similar to type II but anterior displacement of the atlas  $> 5$  mm

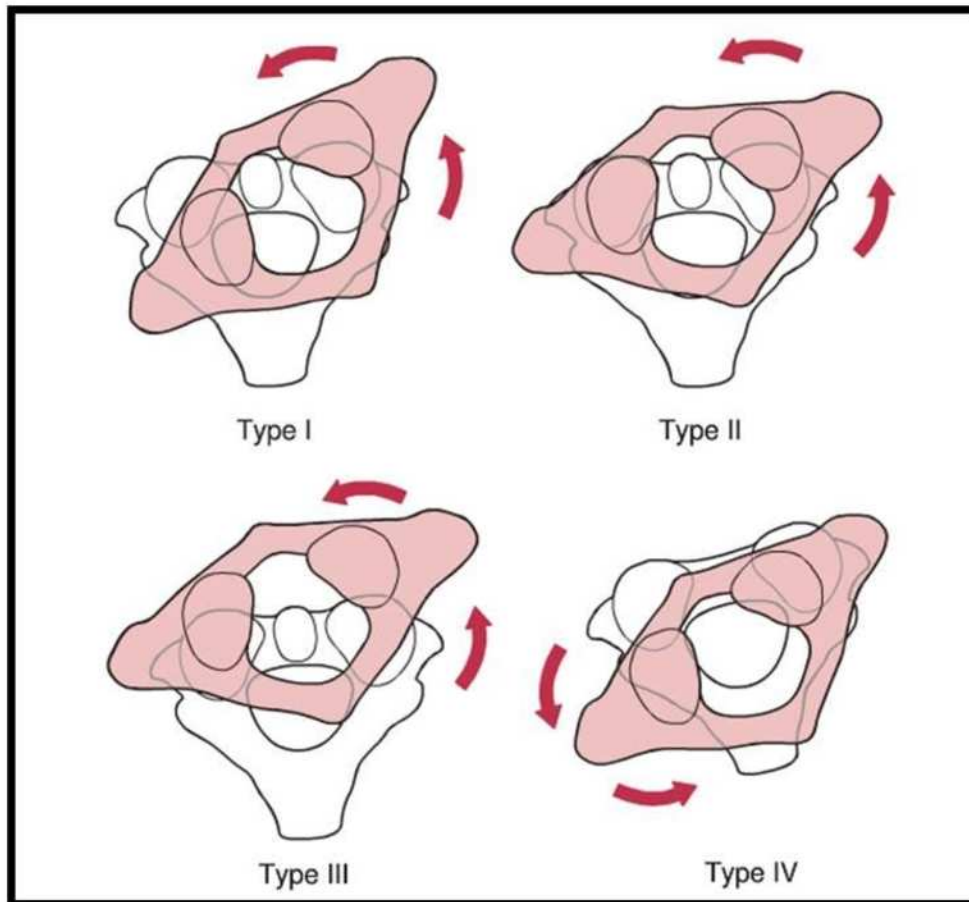
Type IV: deficient odontoid, with posterior displacement of the atlas

Need for surgery depends on degree of rotation, prognosis improves with early reduction

Unstable

Unstable

Unstable



- Täiskasvanutel harvad
- Fiksatsioon  
kinnitamiseks KT  
„tavaasendis“ ja  
maksimaalselt  
kontralateraalse  
rotatsiooniga



# Subaksiaalsed vigastused

- 65% lüliamba kaelaosa vigastustest
- 75% dislokatsioonidest

# Subaksiaalsed vigatused

- Fraktuurid (burst, wedge, teardrop, jt)
- Translatoorsed ja rotatoorsed vigastused (uni- või bilateraalsed fassetide dislokatsioonid või fraktuur-dislokatsioonid)
- Vigastuste muster on kompleksne
- Erinevad klassifikatsioonid

# CLASSIFICATION OF LOWER CERVICAL SPINE INJURIES

## A COMPRESSION INJURIES



I. Tassement antérieur



II. Comminutive fracture



III. "Tear drop" fracture

## B FLEXION-EXTENSION-DISTRACTION INJURIES



I. Entorse "moyenne"



II. Entorse grave



III. Luxation fracture biarticulaire



I. Entorse "moyenne"



II. Entorse grave



III. Luxation fracture biarticulaire

## C ROTATION INJURIES



I. Fracture uniaarticulaire (E.U.A.)



II. Fracture-séparation du massif artulaire (F.S.M.A.)



III. Luxation uniaarticulaire (E.U.A.)



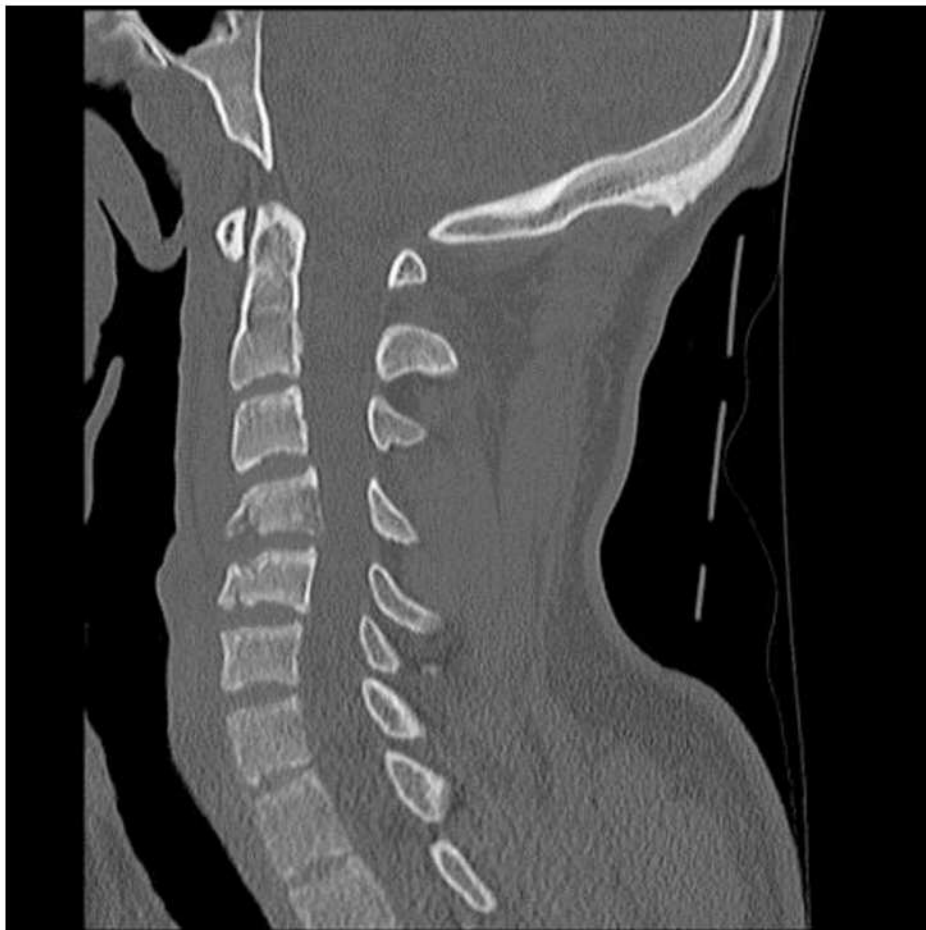
C6 burst-tüüpi kompressioonmurd.  
Aksiaalsed jõud, tagumise ligamentoosse kompleksi  
intaktsusel on murd stabiilne, antud juhul  
posterioorselt dislotseerunud fragment

Hüperekstensioon tüüpi teardrop fraktuur



Tavaliselt C2-C3  
Enamasti stabiilne ja ei vaja kirurgilist ravi  
Ei haara tagumisi sambaid (vrd  
hüperfleksioon-teardrop)

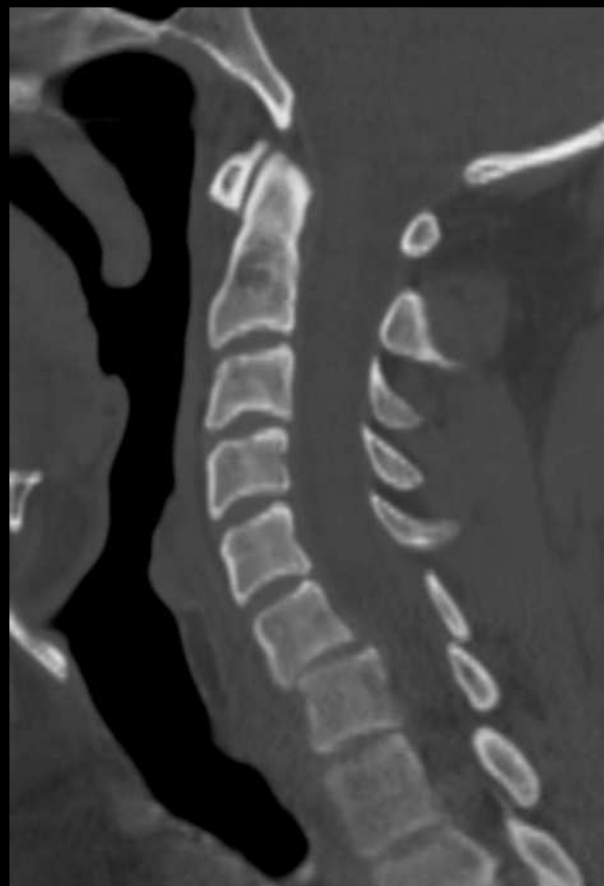
Hüperfleksioon tüüpi teardrop fraktuur



Madalama asetsusega  
Haaratud lüli dislotseerub posterioorsele,  
suur risk seljaaju kahjustusele.  
Haaratud taseme kõiki ligamente haarav  
kahjustus, eesmise pikiligamendi  
avulsioonmurd



subluksatsioon

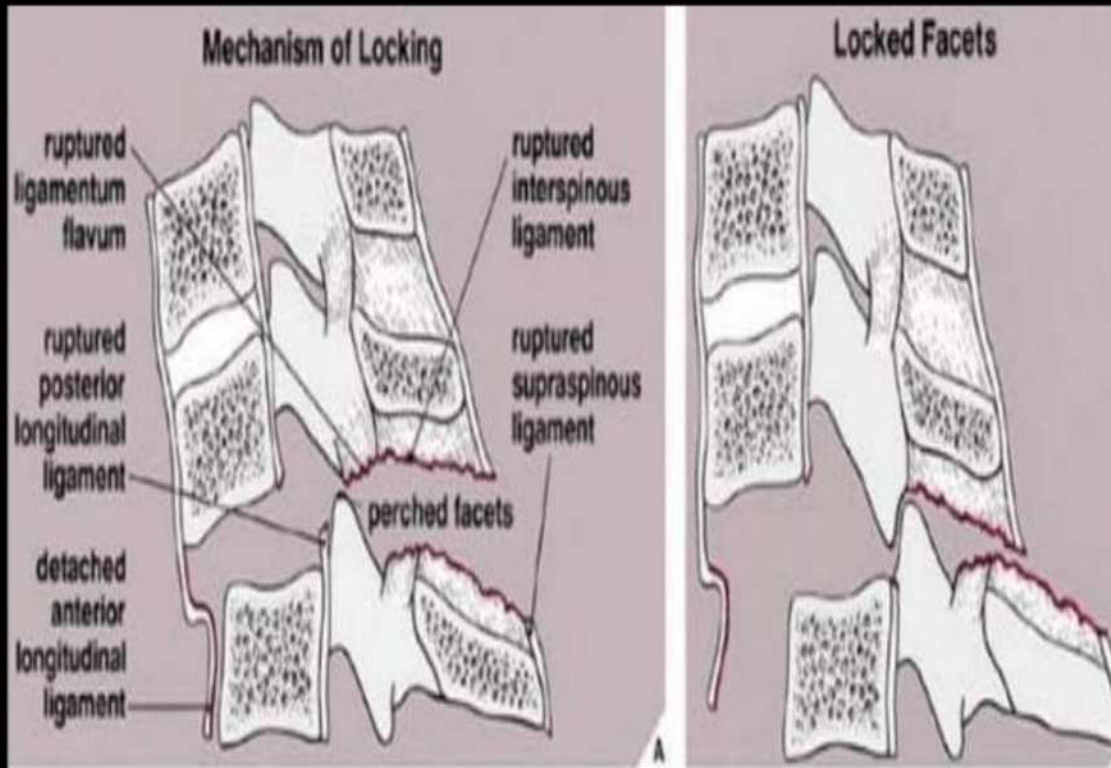


<50% C6  
anterolistees



õrsfassetid  
(perched)





# Komistuskiivid



*Atlase tagumise kaare*  
kongenitaalne defekt +  
fraktuur



Kongenitaalsed defektid.



*Os odontoidesum,*  
9 a



## Komistuskiivid (2)

Degeneratiivsed  
muutused



# Haigusjuht

# Tänaan kuulamast!

Tänaan dr Karin Vesket ja dr Mare Lintropi!

# Kirjandus

- D. Dreizin et al 2014. Radiographics. Multidetector CT of Blunt Cervical Spine Trauma in Adults.
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- [http://webapp1.dlib.indiana.edu/virtual\\_disk\\_library/index.cgi/4931363/FID2617/DATA/operationalmed/lab/c-spine/jeff%20fx%20ct%20250.jpg](http://webapp1.dlib.indiana.edu/virtual_disk_library/index.cgi/4931363/FID2617/DATA/operationalmed/lab/c-spine/jeff%20fx%20ct%20250.jpg) (08.10.17)
- <https://www.ossurwebshop.co.uk/blog/the-anatomy-and-function-of-the-spine> (08.10.17)
- <https://radiopaedia.org/cases/cervical-vertebral-body-burst-fracture-with-retropulsed-fragment> (08.10.17)