



Estonia.eu
Positively surprising



Kõhre patoloogia

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Ortopeedia Arstid/TÜ Sporditrauma
Keskus

Pärnu 10.11.2016

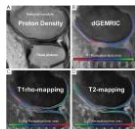


Kõhre patoloogia

- Ühest lokaalsest kahjustusest kuni osteoartriidini
- Äge traumaatilise - krooniline koormuslik
- Kõhre pehmenemisest ja fissuuridest osteokondraalse murruni
- Üksik kõhre kahjustus või kaasvate vigastustega: menisk, sidemed, põlvekedre nihestus

Diagnoos

- Sümptoomid: valu, turse, kinnijäämise episoodid
- Röntgen ja KT: EI AITA
- **MRT:** üle 1,5 Tesla
- eri resolutsioonid
- selgitada lisanduvad kahjustused



MRT and asymptomatic cartilage abnormalities in professional basketball players : up to 89% of players

Walczak BE, McCulloch PC, Kang RW, Zelazny A, Tedeschi F, Cole BJ. Abnormal findings on knee magnetic resonance imaging in asymptomatic NBA players. *J Knee Surg.* 2008;21:27-33.

William Hunter (1718–1783)



Hunter W. Of the structure and diseases of articular cartilages.

Philos

Trans R Soc Lond B Biol Sci 1744; 42B:514-21.

...repair of cartilage 'to be a very troublesome disease; that it admits of a Cure and more Difficulty than a carious Bone; and that, when destroyed, it is never recovered'.

Kõhre vigastused: sport

- Increasing incidence rate of cartilage injuries: increasing participation on recreational and competitive sports
- The overall prevalence of full thickness focal chondral defects 36% among all athletes/16% - general population
- 46% of career ending injuries were knee injuries in professional soccer : 25% of them - cartilage injuries
- In athletes 12 times more osteoarthritis than general population

Flanigan DC et al (2010) Prevalence of chondral defects in athletes knee: a systematic review. *Med Sci Sports Exerc* 42(10):1795-1801

Kõhre vigastused: artroskoopia versus MRT

Knee Surg Sports Traumatol Arthrosc (2016) 24:1627-1633

Diagnosis and classification of chondral knee injuries: comparison between magnetic resonance imaging and arthroscopy

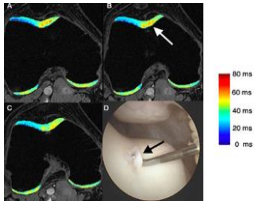
Marcus Vinicius Danieli- João Paulo Fernandes Guerreiro Alexandre deOliveira Queiroz et al

Sensitiivsus Spetsiifilisus

Patella	76,3	73,4
Trohklea	88,2	78,7
FMC	60,7	82,0
MP	85,7	85,5
LFC	81,8	93,0
LP	75,0	90,6

Diagnoos

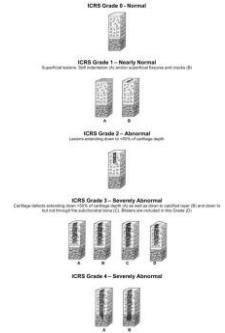
- Artroskoopia
- „Golden standard“



ICRS, Outerbridge

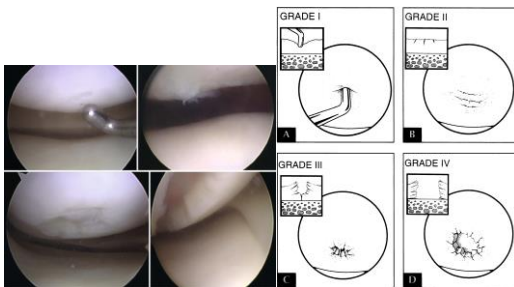
Table 1 – Classification of chondral lesions according to the ICRS system.

Normal	Grade 0
Almost normal	Grade 1a – superficial lesion/suffring Grade 1b – As in 1a and/or superficial fissures or cracks
Abnormal	Grade 2 – extent < 50% of thickness
Severe lesion	Grade 3a – extent > 50% Grade 3b – down to the calcified layer Grade 3c – down to the surface of the subchondral bone (without penetration) Grade 3d – includes bulging of the cartilage around the lesion
Vary severe lesion	Grade 4a – penetration of the subchondral bone but not across the entire diameter of the defect Grade 4b – penetration across the full diameter of the defect



Kirurgilise ravi näidustus

- Süмптоmaatiline kõhre vigastus
- Konservatiivne ravi ei aita 3 – 6 kuu jooksul
- Grade 3 – 4 kõhre kahjustus (MRT)

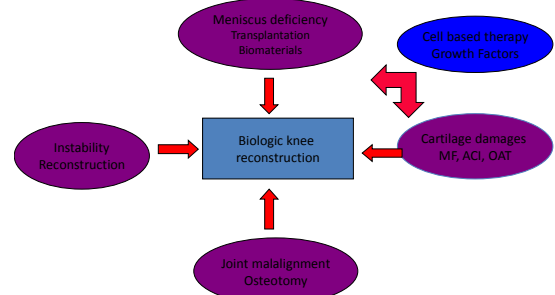


Kõhre vigastuse ravi

Kaasuvad vigastused

- Sidemed
- Luutelg
- Menisk

Ravi kompleksne ja ...



Vastunäidustus kirurgilisele ravile

- BMI üle 35
- Põletikuline seisund liigesel
- Suitsetamine
- Patsiendi lootused ebarealaalsed
- Koostöö võimetus või võimaluse puudus rehabilitatsiooniks

Management of knee articular cartilage injuries in athletes: chondroprotection, chondrofacilitation, and resurfacing.
 Murray IR¹, Benke MT, Mandelbaum BR.
[Knee Surg Sports Traumatol Arthrosc.](#) 2015 Feb 7. [Epub ahead of print]

Chondroprotection: prevent loss of existing cartilage

- exercises and activity modifications,
- stability, save the meniscus, alignment

Chondrofacilitation: facilitate intrinsic repair of damaged cartilage

viscosupplementation, growth factors (PRP, BMAC), pulsed electromagnetic field, microfracture

Resurfacing:

osteochondral (auto, allo)transplantation, autologous chondrocyte transplantation, synthetic products to fill the defect with variety of techniques

Kõhre lokaalne kahjustus: kirurgilise ravi

- Debridment
- BMS: mikrofraktuur, nanofraktuur
- OAT: auto, allo
- ACI: autoloogne kondrotsüütide implantatsioon
- Kollageen membraanid, geelid jm defektide täitmiseks
- Eri tehnikate kombinatsioon (AMIC, MACI)

Ravimeetodi valik

- Sügavus
- Suurus
- Asukoht
- Patsiendi vanus/aktiivsuse tase
- Defekti vanus

Defekti suurus

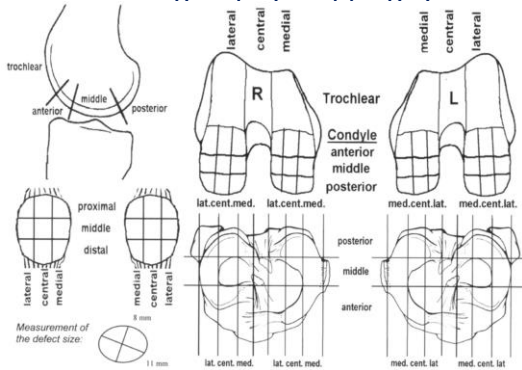
- väike : alla 2cm²
- keskmine : 2 – 4 cm²
- suur : üle 4 cm²

Asukoht

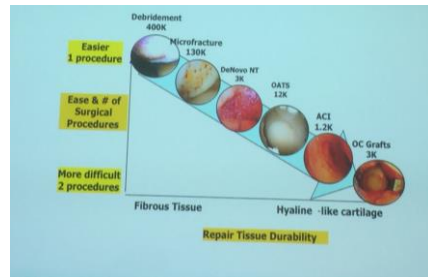
- Tibofemoraal
- Patellofemoraal
- Unipolar
- Bipolar



ICRS cartilage injury mapping system



Kõhre operatsioonid USA 2015



Oluline teada

- Subkondraalse luu olukord mõjutab kõhre taastavaid operatsioone
- Kõhre operatsioon võib kahjustada subkondraalset luud



Kõhre taastav operatsioon peab taastama kõhr + subkondraalse üksuse

Debridment

- Enim kasutatav protseduur kõhrevigastuse parandamiseks: tavaliselt 2 – 3 astme kõhre muutused
 - Tasandamine käsiinstrumentidega
 - Tasandamine shaveriga
 - Tasandamine radiofrekventsaparaadiga: Paragon RF tera

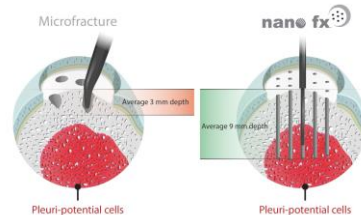
Mikrofraktuuring

Pridie 1950, Rodrigo 1994, Steadman 1999

1. Parim: sümptomaatiline, lokaalne, äge ICRS grade 3, 4 kahjustus
2. Reie põntade toetusala, sääre platoo(FT) ++
3. Patellofemoraal (PT) +
4. Hea servaga kõhredepekt alla 2cm²(PF) – 4 cmTF).
5. Aktiivne patsient, alla 40 a
6. Taastumine spordiks 8 ± 1 (2 -16) kuud, halveneb seis 2 – 5 aasta pärast
7. Odav protseduur .
8. Kaasuv PRP and BMAC kasutamine parandab tulemusi (Fortier 2010, Milano 2010)

- Fibrooskõhr
- 75 – 80% taastub (Stedman 2003)
- 49% (Gudas 2005)

Ülioluline rehabilitatsiooni protokoll!!



Osteochondral Autograft Transfer

(Hangody 1992)

1. Ideaalne sümptomaatilisele, lokaalse, ICRS grade 3, 4 subkondraalse plaadi ja luu kahjustusega
2. Reiepõntade toetusala ++
3. Patellofemoraaalne +
4. Defekt korralike servadega alla 4 cm².
5. Aktiivne, alla 30 aastasel: alla 2 cm²
6. Taastumine spordiks: 7 ± 2 (4 – 11) kuud



Suurim hüaliinkõhrega täitumus vrd teiste tehnikatega.

Tehniliselt pole lihtne.

Doonorpinna kaebused (pole allograftil!!!)

94% recovery in athletes (Gudas 2005)

Good to excellent results after 17 years in athletic population:

91% femoral, 86% of tibial, 74% of PF mosaicplasty (Hangody 2010)



Return to Sports Participation After Articular Cartilage Repair in the Knee: Scientific Evidence

Kai Mithoefer, Karen Hambly, Stefano Della Villa, Holly Silvers and Bert R. Mandelbaum
Am J Sports Med 2009

Systematic review of twenty studies with 1363 patients

Average follow up of 48 months

Good and excellent results were reported on average in 79% of athletes

- 67% after microfracture,
- 82% after autologous chondrocyte transplantation
- 93% after osteochondral autograft transfer

Autoloogsete Kondrotsüütide Implantation(ACI)

Brittberg 1994

1. Suur, ebaregulaarse konfiguratsiooniga Outerbridge grade III-IV
2. Reie põndad ++
3. Patellofemoraalsed pinnad ++
4. Lokaalne 1 – 10 cm². alla 8 mm sügavuse luukaoga
5. Aktiivne, noor alla 40 aastat
6. Taastumine 18 ± 4 (12 to 36) kuud

Kahe etapiline, 6 nädalase vahega.

Kallis ja tehniliselt raske

- Good to excellent results 85-92% after 2 years, better in femoral condyle than PF (Peterson 2002)

Mithoefer 2009

	A	B	C	D	E	F	G
MF	67	66	8	68	52	40	2
OAT	93	91	7	70	52	30	2
ACT	82	67	18	71	96	25	ND

A – good and excellent results (8%)
B – return to sports (%)
C – return to sport (months)
D – return to sport at the preinjury level (%)
E – durability after average FU 50 months (%)
F – age related results (years)
G – lesion size (cm²)

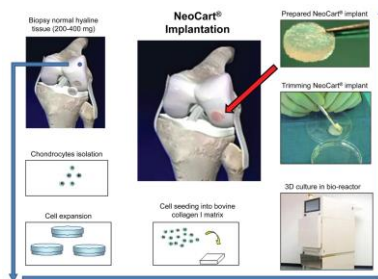
Uued tehnoloogilised lahendused

- **Allograft**: USA väga populaarne
- **Kollageen maatriks, membraan**

Microfraktuuriringuga (AMIC)

Koos ACI (MACI)

- Kollageeniga kaetud ACI
- Kollageeni külvatud rakud ACI
- **Minced articular cartilage technique**
- neocartilage implantation (Neocart)
- cartilage autograft implantation system (CAIS - Johnson and Johnson)
- juvenile allograft from donor (DeNovo NT – Zimmer)
- Osteochondral graft substitutes (The Trufit plug – Smith and Nephew)
- Biocartilage (dehydrated micronized allograft + PRP) (Arthrex)



Tänan !

