Kliiniline küsimus nr 6

Kliiniline küsimus: Kas kõigile alla 2 kuustele imikutele teha perearstikeskuses puusaliigeste kliiniline vaatlus koos Barlow, Ortolan testidega vs ultraheliskriining puusaliigeste düsplaasia varaseks avastamiseks ja raviks.

Kriitilised tulemusnäitajad: : ravi- ja tervishoiukulude vähenemine, (re)hospitaliseerimine, EMOsse pöördumiste vähendamine

Süstemaatilised ülevaated:

Kokkuvõtte (abstrakt või kokkuvõtlikum info)	**Viide kirjandusallikale**
Selle süstemaatilise ülevaate eesmärgiks on hinnata erinevate sõeltestimise programmide mõju hilinenud puusaliigese düsplaasia diagnoosimisele. Otsing hõlmas uuringuid kuni jaanuar 2011. Ülevaatesse valiti kontrollrühmaga uuringud. Esmaseks tulemusnäitajaks oli hiline puusaliigese düplaasia diagnoosimine (vanuses > 8 nädalat), mis vajas ravi. Ei analüüsitud: ravi- ja tervishoiukulude muutusi, EMOsse pöördumiste muutusi. Tulemused: 1) Ei leitud ühtegi uuringut, kus võrreldakse sõeltestimist (kliiniline või ultraheliuuring (UH) koos võimaliku varase raviga *vs* üldse mitte sõeltestida koos võimaliku hilise raviga. 2) Leiti üks uuring, kus võrreldi: **universaalne UH-sõeltestimine *vs* ainult kliiniline uurimine** (Rosendahl *et al*, 1994), selles võrdluses uuritavaid n=7537 Selles võrdluses: Hilise diagnoosimise risk ei oluliselt ei erinenud (RR 0,54, 95% CI 0,19-1,59), hilist diagnoosi oli UH-rühmas 5 juhtu 3613 kohta (0,14%) ja kliinilise uurimise rühmas 10 juhtu 3924 uuritava kohta (0,26%). Ravi määrati üldse kokku oluliselt sagedamini UH-sõeltestimise rühmas (RR 1,88, 95% CI 1,41-2,51, NNT 100). Ravi määrati 3,4% UH-rühma lastele ja 1,8% kliinilise uurimise rühma lastele (võimalik üleravimine). Kirugilist sekkumist läks vaja 2 lapse puhul, mõlemad kliinilise uurimise rühmas (statistiliselt olulist erinevust siiski polnud kuid uuringu jõud oli ka väike selle erinevuse detekteerimiseks). Uuringus olid mitmed metodoloogilised probleemid ja kõrged või ebaselged riskid võimalike nihutatud tulemuste osas, nendest kõige olulisem, et rühmadesse jagamine ei olnud juhuslik (uuringurühmadesse jagamine ei toimunud korrektselt randomiseeritult). Uuring oli läbi viidud Norras ja seal oli mitu võrdlusrühma (1. UH kõigile, 2. kliiniline uurimine ja UH vajadusel, 3. ainult kliiniline uurimine; vt ka järgmist punkti). 3) Leiti üks uuring (n=7537), kus võrreldi: **kliiniline uurimine kõigile ja UH vajadusel *vs* ainult kliiniline uurimine** (Rosendahl *et al*, 1994), selles võrdluses uuritavaid kokku n=8312. UH vajadusel tehti, kui oli tegemist puusaliigese kliinilise ebastabiilsusega, tuharseisus sünniga, lähisugulastel esinenud puusaliigese düsplaasiaga. Tegemist juba eelmises punktis kirjeldatud Norra uuringu osaga. Selles võrdluses:	Shorter D, Hong T, Osborn DA. Screening programmes for developmental dysplasia of the hip in newborn infants. Cochrane Database Syst Rev. **2011** Sep 7;(9):CD004595. http://www.ncbi.nlm.nih.gov/pubmed/21901691 Sama ka (reprint): Evid Based Child Health. 2013 Jan;8(1):11-54. http://www.ncbi.nlm.nih.gov/pubmed/23878122

Hilise diagnoosimise risk ei oluliselt ei erinenud (RR 0,80, 95% CI 0,33-1,98), hilist diagnoosi oli UH vajadusel rühmas 9 juhtu 4833 kohta (0,19%) ja vaid kliinilise uurimise rühmas 10 juhtu 3924 uuritava kohta (0,26%). Ravi määramises osas statistiliselt olulist erinevust ei ilmnenud, ravi määrati 2,0% UH vajadusel rühma lastele ja 1,8% kliinilise uurimise rühma lastele. Kirugilist sekkumist läks vaja ühe lapse puhul. 4) Leiti kaks uuringut, milles võrreldi: **universaalne UH sõeltestimine kõigile *vs* kliiniline uurimine ja UH ainult vajadusel**. (Rosendahl *et al*, 1994, Holen *et al*, 2002), kokku uuritavaid n=23 530. Hilise diagnoosimise risk ei oluliselt ei erinenud (RR 0,49, 95% CI 0,19-1,26), hilist diagnoosi oli universaalse UH rühmas 6 juhtu 11453 uuritava kohta (0,05%) ja UH vajadusel rühmas 14 juhtu 12077 uuritava kohta (0,12%). Ravi rakendamise osas meta-analüüsi ei tehtud, sest uuringutulemused olid heterogeensed. Ravi määrati 1,7% universaalse UH rühma lastele ja 1,3% UH vajadusel rühma lastele. Kirurgilise sekkumise osas olulist erinevust ei ilmnenud: RR 0,36, 95% CI 0,04 - 3,48. Olulisi erinevusi ei ilmnenud ka asendiravi võimalike tüsistuste (reieluupea avaskulaarne nekroos või osteoartroos) osas: RR 0,33, 95% CI 0,01-8,02. Selle süstemaatilise ülevaate **järeldus**: *There is insufficient evidence to give clear recommendations for practice. There is inconsistent evidence that universal ultrasound results in a significant increase in treatment compared to the use of targeted ultrasound or clinical examination alone. Neither of the ultrasound strategies have been demonstrated to improve clinical outcomes including late diagnosed developmental dysplasia of hip (DDH) and surgery. The studies are substantially underpowered to detect significant differences in the uncommon event of late detected DDH or surgery. For infants with unstable hips or mildly dysplastic hips, use of delayed ultrasound and targeted splinting reduces treatment without significantly increasing the rate of late diagnosed DDH or surgery.*	

Viited juhuslikustatud kontrollitud uuringutele (*randomized controlled trials*, RCT)

Kokkuvõtte (abstrakt või kokkuvõtlikum info)	**Viide kirjandusallikale**
Tegemist on Norras 1988-1990 sündinud laste hulgas läbi viidud RCT (Rosendahl *et al*, 1994) kaugtulemuste hindamisega, algses uuringus oli 11 925 last, kes olid jaotatud kolme erinevasse sõeltestimise rühma: universaalne UH *vs* kliiniline hindamine+UH vajadusel *vs* ainult kliiniline hindamine. Järelkontrolli kutse saadeti 19 a hiljem 3935 isikule, uuringusse tuli 2011 isikut. Kõigile tehti vaagna röntgenülesvõte, hinnati puusaliigese düsplaasia ja puusaliigese degeneratiivsete muutuste radioloogilisi tunnuseid. Rühmade vahel statistiliselt olulisi erinevusi ei ilmnenud – ei puusaliigese düsplaasia ega ka ravi võimaliku tüsistusena tekkivate degeneratiivsete muutuste osas.	Laborie *et al.* Screening strategies for hip dysplasia: long-term outcome of a randomized controlled trial. Pediatrics. **2013** Sep;132(3):492-501. http://www.ncbi.nlm.nih.gov/pubmed/23958776

Viited vaatlusuuringutele, sh ökoloogilistele uuringutele erinevate sõeltestimise taktikate kohta

Kokkuvõtte (abstrakt või kokkuvõtlikum info)	**Viide kirjandusallikale**

Sama uurimisrühma tehtud vaatlusuuring, kes on läbi viinud ka erinevate sõeltestimistaktikate RCT koos kaugtulemuste hinnanguga Norras (Rosendahl *et al*, 1994, Laborie *et al*, 2013). See uuring käsitleb sellist sõeltestimise taktikat, kus **kõiki vastsündinuid on hinnatud kliiniliselt ja riskirühma lapsi on hinnatud 1-3 päeva vanuselt UH-uuringuga**. Riskirühmas olid lapsed kellel: puusaliigese kliiniline ebastabiilsus, tuharseisus sünd, lähisugulastel esinenud puusaliigese düsplaasia, kaasasündinud labajalgade deformatsioon. Jälgimisperiood ≥5,5 aastat. Sõeltestiti 81 564 vastsündinut, nendest 14,1% kuulusid riskirühma. Ravi said: 2,3% alates neonataalperioodist 0,7% alates 6 nädala vanusest Lisaks 3,3% lastest olid sünnijärgses UH-uuringus muutused, mis taandusid ilma ravita (*watchful waiting*). 0,032% (kokku 26 last) diagnoositi puusaliigese subluksatsioon/dislokatsioon hiliselt (ehk > 1 kuu vanuses), nendest 2 kuulusid riskirühma. 0,038% (kokku 31 last) vajasid kirurgilist ravi. Avaskulaarne nekroos diagnoositi 7 lapsel, neljal peale varast ravi ja kolmel peale hilist ravi. Autorite järeldus: *The first 16 years of a standardised **selective** ultrasound screening programme for developmental dysplasia of the hip resulted in acceptable rates of early treatment and US follow-ups and low rates of late subluxated/dislocated hips compared to similar studies.*	Laborie *et al.* Selective ultrasound screening for developmental hip dysplasia: effect on management and late detected cases. A prospective survey during 1991-2006. Pediatr Radiol. **2014** Apr;44(4):410-24. http://www.ncbi.nlm.nih.gov/pubmed/24337789
Tegemist on retrospektiivse ülevaatega Põhja-Iirimaal puusaliigeste sõetestimise kohta aastatel 2008-2010. Sõeltestimine toimub vastavalt Ühendkuningriikides kehtivale NIPE protokollile (*Newborn and Infant Physical Examination*). Vastavalt sellele juhendile on tegemist **kõigi laste kliinilise sõeltestimisega ja valikulise UH-testimisega puusaliigese arengulise düsplaasia (DDH) suhtes.** Ühendkuningriikides alustati DDH kliinilise sõeltestimisega 1969. a ning juhiseid täiendati 1986. a. Vastavalt sellele juhendile tuleb hinnata: kõigi laste puusaliigeseid kliiniliselt vahetult sünnijärgselt ja 6-8 nädala vanuses, UH-uuringule suunatakse kliinilise leiuga vastsündinud 2 nädala vanuses ja kliinilise leiuta, kuid riskirühma kuuluvad lapsed 6 nädala vanuses. Kui kliiniline leid ilmneb 6-8 nädala vanuses, siis suunatakse kohe ortopeedile läbivaatuseks ca 10 nädala vanuses. Uuringuperioodil oli 75 856 elussündi, nendest 645 (0,85%) diagnoositi DDH ja said vastavat konservatiivset ravi. Kokku 32 lapsel (0,042%) diagnoositi DDH peale 1. aasta vanuseks saamist. Uuringus analüüsiti neid juhtusid ja hinnati, et korrektse käsitluse korral oleks nendest 21 juhul (66%) võinud probleemi diagnoosida enne 1. eluaastat. Kirurgilist ravi vajasid selles kohordis kokku 41 last (0,054%)	Donnelly *et al.* Delayed diagnosis of developmental dysplasia of the hip in Northern Ireland: can we do better? Bone Joint J. **2015** Nov;97-B(11):1572-6. http://www.ncbi.nlm.nih.gov/pubmed/26530663
Tegemist on retrospektiivse ülevaatega puusaliigeste sõeltestimise kohta Austrias aastatel 1992-2008 (nn ökoloogiline uuring). Sõeltestimine toimub alates 1992. a **universaalse puusaliigeste UH-uuringuna**.	Thallinger *et al.* Long-term results of a nationwide general ultrasound screening

Uuringus ei ole toodud täpset sündide arvu aastas ega nende laste osakaalu, kellele oli määratud DDH ravi, v.a. 2008. a kohta, kui konservatiivsete meetoditega (Pavliku rihmad, erinevad lahased (*abduction splint, plaster cast*) määrati ravi 2.8% selle sünnikohordi lastest. DDH tõttu hospitaliseerimiste arv vähenes uuringuperioodil 0,95% (1993. a) kuni 0,36% (2008. a) vastava sünnikohordi elussündidest. Kirurgilise ravi vajadus vähenes uuringuperioodil 0,13% kuni 0,07% vastava kohordi elussündidest (*märkus*: olles ikkagi suurem, kui tabelis ülalpool toodud Põhja-Iirimaal tehtud ülevaates (0,054%) või Norras läbi viidud vaatlusuuringus (0,038%), mõlemas oli kasutusel valikuline UH-sõeltestimine). Autorite järeldus: *Compared with routine clinically based screening programs, our results confirm low numbers of open reductions and pelvic surgeries. We, therefore, advocate a standardized nationwide general ultrasound screening program to reduce the rates of operative interventions and hospital admissions associated with the treatment of DDH.*	system for developmental disorders of the hip: the Austrian hip screening program. J Child Orthop. **2014** Feb;8(1):3-10. http://www.ncbi.nlm.nih.gov/pubmed/24488847
Tegemist on retrospektiivse ülevaatega Austrias Tirooli piirkonnas puusaliigeste sõetestimise kohta aastatel 1978-1997, kusjuures analüüsiti eraldi kahte perioodi: 1978-1982, kui toimus vaid kliiniline läbivaatus (periood 1) ja 1993-1997 (periood 2) , kui toimus universaalne UH-sõeltestimine. Selles piirkonnas sünnib aastas keskmiselt 8257 last. Kirurgilist ravi >1 a vanuses vajasid: Perioodil 1 (kliiniline sõeltestimine): keskmiselt 17,8 last aastas (SD ±2,8) Perioodil 2 (universaalne UH-sõeltestimine): keskmiselt 2,6 last aastas (SD ±1,4)	Thaler *et al.* Cost-effectiveness of universal ultrasound screening compared with clinical examination alone in the diagnosis and treatment of neonatal hip dysplasia in Austria. J Bone Joint Surg Br. **2011** Aug;93(8):1126-30. http://www.ncbi.nlm.nih.gov/pubmed/21768641
Tegemist on Saksamaal läbi viidud vaatlusuuringuga. Uuringu taust: Saksamaal on alates 1996. a DDH sõeltestimise programm, kus soovitatakse kõigile imikutele esimese 6 elunädala jooksul puusaliigeste UH-uuringut. Tegemist on juht-kontrolluuringuga. Juhud: DDH tõttu opereeritud 9 nädala kuni 5 aasta vanused lapsed aastatel 1996-2001, n=446 Kontrollid: ühest telefoniküsitlusest (teemaks vaktsineerimishõlmatus, kuid küsiti ka lisaküsimus puusaliigeste UH kohta imikueas), n=1173 Juhtude ja kontrollide vanuseline ning sooline jaotus oli statistiliselt erinev, sh poisse/tüdrukuid juhtude hulgas 17%/83% ja kontrollide hulgas 52%/48%. Juhtudest ei olnud õigeaegselt UH-sõeltestitud 102 (23%) ja kontrollidest 128 (11%). Õigeaegse UH-sõeltestimise vanusele ja soole kohandatud šansisuhe oli 0,48 (95% CI 0,33-0,68) ehk operatsiooni vajanud laste hulgas oli šanss olla õigeaegselt sõeltestitud oluliselt madalam. P.S. seda uuringut ei ole hea kvaliteediga ravijuhendi teaduskirjanduse süstemaatilisse ülevaatesse lülitatud. Kontrollrühma moodustamise meetodi tõttu nihete risk kõrge (*high risk of bias*).	Von Kries *et al.* General ultrasound screening reduces the rate of first operative procedures for developmental dysplasia of the hip: a case-control study. J Pediatr. **2012** Feb;160(2):271-5. http://www.ncbi.nlm.nih.gov/pubmed/21962602

Ravijuhendid

Kõigepealt on toodud **Eestis praegu kehtivas juhendis** Kuni 18-aastaste laste tervisekontrolli juhend (kooskõlastatud 2010. a) olevad soovitused puusaliigeste kontrolli osas.

Seejärel on toodud **AGREE hindamisel sekretariaadi poolt kõrge hinnangu saanud ravijuhendi kokkuvõte ja vastavate uuringute koondtabelid**, viide: Mulpuri K, Song KM, Goldberg MJ, Sevarino K.J Detection and Nonoperative Management of Pediatric Developmental Dysplasia of the Hip in Infants up to Six Months of Age. Am Acad Orthop Surg. 2015 Mar;23(3):202-5.

Lisaks on sellest allpool toodud **U.S. Preventive Task Force** 2006. aastal koostatud raporti Screening for developmental dysplasia of the hip: recommendation statement järeldused ning 2011. a koostatud Euroopa lasteradioogide puusaliigese arengulise düsplaasia rakkerühma (European Society of Pediatric Radiology's Task force Group on DDH) soovitus sõeltestimise osas.

Eestis praegu kehtivas juhendis Kuni 18-aastaste laste tervisekontrolli juhend (kooskõlastatud 2010. a) on soovitused puusaliigeste kontrolli osas järgmised (läbiviijaks reeglina perearst või pereõde 4,5 ja 7 vanuses):

- 2 nädala vanuses: Ortolani ja Barlow manöövrid (abduktsioon-adduktsioon), tuharavoltide sümmeetria. Abduktsioonil-adduktsioonil tekkiva plõksatuse/naksu korral puusaliigese düsplaasia kahtlus, vajalik suunata lastekirurgi/ortopeedi konsultatsioonile.
- 1 kuu vanuses: Ortolani ja Barlow manöövrid (abduktsioon-adduktsioon), tuharavoltide sümmeetria. Abduktsioonil-adduktsioonil tekkiva plõksatuse/naksu korral puusaliigese düsplaasia kahtlus, vajalik lastekirurgi/ortopeedi konsultatsioon.
- 2 kuu vanuses: abduktsioon-adduktsioon, tuharavoltide sümmeetria. Abduktsioonil-adduktsioonil tekkiva plõksatuse korral puusaliigese düsplaasia kahtlus, vajalik ortopeedi/lastekirurgi konsultatsioon.
- 3 kuu vanuses: tuharavoltide sümmeetrilisuse ja puusaliigese liikuvuse hindamine abduktsioonil-adduktsioonil. Puusaliigesese abduktsiooniraskuse korral vajalik („puus kinni") lastekirurgi/ortopeed konsultatsioon.
- 4,5 kuu vanuses: Puusaliigeste liikuvus abduktsioonil, tuharavoltide sümmeetria hindamine.
- 6 kuu vanuses: Puusaliigeste liikuvuse hindamine.
- 7 kuu vanuses: Puusaliigeste liikuvus abduktsioonil, tuharavoltide sümmeetria hindamine.
- 9 kuu vanuses: Puusaliigeste liikuvuse hindamine.
- 12 kuu vanuses: Puusaliigeste liikuvus.

Ameerika Ortopeedide Akadeemia (*American Academy of Orthopaedic Surgeons*, AAOS) juhend:

Detection and Nonoperative Management of Pediatric Developmental Dysplasia of the Hip in Infants up to Six Months of Age.

Avaldatud: Am Acad Orthop Surg. 2015 Mar;23(3):202-5 (link , täistekst koos lisadega veebis).

Juhend on heaks kiidetud järgmiste erialaühingute poolt: *Society of Diagnostic Medical Sonography, the Society for Pediatric Radiology, American Academy of Pediatrics, and the Pediatric Orthopaedic Society of North America.*

Juhise koostamise aluseks oli tõendusmaterjali süstemaatiline ülevaade ja tõendusmaterjali kriitiline hindamine, ülevaatesse hõlmati uuringud, mis olid avaldatud kuni septembrini 2013. aastal.

Järgnevalt on toodud selle juhendi **sõeltestimist käsitlevad soovitused**:

1. **Mitte viia läbi imikute universaalset sõeltestimist UH-uuringuga (mõõduka tugevusega tõendusmaterjal)** – ingl. k : *Moderate evidence supports not performing universal ultrasound screening of newborn infants*.
2. **Läbi viia radioloogiline uuring enne 6 kuu vanust ühe või mitme järgmise riskiteguri olemasolul: tuharseisus sündimine, perekonnaanamnees, kliiniliselt ebastabiilne puusaliiges (mõõduka tugevusega tõendusmaterjal)** – ingl. k: *Moderate evidence supports performing an imaging study before 6 months of age in infants with one or more of the following risk factors: breech presentation, family history, or history of clinical instability.*

1. soovituse põhjendus (põhjendus toodud ainult inglise keeles, sest toortõlge eesti keelde võiks moonutada sisu):

There is moderate evidence to not do universal screening of all infants for DDH. Two moderate strength studies showed no statistical difference between universal and selective ultrasound screening of the infant hip for diagnosis of late presenting DDH (Rosendahl *et al*, 1994, Holen *et al*, 2002). Holen augmented clinical screening with either universal or selective (risk) ultrasound. The rate of late cases in Holen's study was 0.13/1000 with universal ultrasound screening and 0.65/1000 with selective (risk) screening. The difference in late detection was not statistically significant. Rosendahl used three matched study groups: general ultrasound screening, risk factor screening and only clinical screening. Late cases identified by group were 0.3/1000, 0.7/1000 and 1.3/1000 respectively and these differences were not statistically significant.

Screening of all infants with ultrasound has the potential to lead to over-treatment. Rosendahl's study found that general ultrasound screening resulted in a higher treatment rate (3.4%) than either selective ultrasound screening (2.0%) or clinical screening (1.8%). The higher rate with universal screening is statistically significant. Universal ultrasound screening requires considerable diagnostic and therapeutic effort and these studies which involve large numbers of newborns indicate that such a commitment of resources will not significantly impact the prevalence of late cases.

Risks and harms of recommendation: There is a potential to miss a case of DDH in an infant with a normal clinical examination and no risk factors. This could lead to a late diagnosis with concerns for a potential of higher rate of treatment complications as a result of late diagnosis.

1. soovituse tõendusmaterjali kvaliteedi hindamise ja tulemuste kokkuvõte:

SUPPORTING EVIDENCE

QUALITY AND APPLICABILITY

Table 12. Quality and Applicability: Studies for Universal Ultrasound Screening

●: Domain free of flaws
○: Domain flaws present
◐: Moderate power

Study	Outcome	Prospective	Group Assignment	Blinding	Group Comparability	Treatment Integrity	Measurement	Investigator Bias	*Quality*	Participants	Intervention and Expertise	Compliance and Adherence	Analysis	*Applicability* Study	*Strength*
Holen KJ 2002	Instability at birth	●	○	●	●	●	○	●	Moderate	●	○	●	○	Moderate	Moderate
Holen KJ 2002	Dysplasia after 6-11 years	●	○	●	●	●	○	●	Moderate	●	○	●	○	Moderate	Moderate
Rosendahl K. 1994	Dysplasia within neonatal period	●	○	●	○	●	○	●	Moderate	●	○	●	●	Moderate	Moderate
Rosendahl K. 1994	Treatment with a splint within 42.4 months	●	○	●	○	●	○	●	Moderate	●	○	●	●	Moderate	Moderate

●: Domain free of flaws
○: Domain flaws present
◐: Moderate power

Study	Outcome	Prospective	Group Assignment	Blinding	Group Comparability	Treatment Integrity	Measurement	Investigator Bias	*Quality*	Participants	Intervention and Expertise	Compliance and Adherence	Analysis	*Applicability* Study	*Strength*
Rosendahl K. 1994	Abnormality at a mean age of 4.5 months (2.5-18)	●	○	●	○	●	○	●	Moderate	●	○	●	●	Moderate	Moderate
Rosendahl K. 1994	Acetabular dysplasia at a mean age of 4.5 months (2.5-18)	●	○	●	○	●	○	●	Moderate	●	○	●	●	Moderate	Moderate
Rosendahl K. 1994	Radiographic subluxation at a mean age of 4.5 months (2.5-18)	●	○	●	○	●	○	●	Moderate	●	○	●	●	Moderate	Moderate
Rosendahl K. 1994	Dislocation at a mean age of 4.5 months (2.5-18)	●	○	●	○	●	○	●	Moderate	●	○	●	●	Moderate	Moderate

FINAL STRENGTH OF EVIDENCE

Moderate

RESULTS

Table 13. Imaging of the Unstable Hip (Universal Ultrasound Versus Risk-Stratified Ultrasound)

Study	N	Group 1	Group 2	Group 3	Outcome	Results	Significance	Strength
Holen KJ 2002	15,178	Universal ultrasound	Selective ultrasound	-	Dysplasia after 6-11 years	RR=0.205 (0.024, 1.757)	Not significant	Moderate
Holen KJ 2002	15,178	Universal ultrasound	Selective ultrasound	-	Neonatal treatment with Frejka pillow	RR=1.12 (0.803, 1.562)	Not significant	Moderate
Rosendahl K. 1994	11,925	Universal ultrasound	Selective ultrasound	No ultrasound	Dysplasia within neonatal period	Universal vs. Selective RR=1.07 (0.752, 1.52)	Not significant	Moderate
Rosendahl K. 1994	11,925	Universal ultrasound	Selective ultrasound	No ultrasound	Dysplasia within neonatal period	Universal vs. No ultrasound RR=0.887 (0.629, 1.251)	Not significant	Moderate
Rosendahl K. 1994	11,925	Universal ultrasound	Selective ultrasound	No ultrasound	Dysplasia within neonatal period	Selective vs. No ultrasound RR=1.12 (0.823, 1.527)	Not significant	Moderate
Rosendahl K. 1994	11,925	Universal ultrasound	Selective ultrasound	No ultrasound	Treatment with a splint within 42.4 months	Universal vs. Selective RR=1.68 (1.282, 2.197)	Significant	Moderate
Rosendahl K. 1994	11,925	Universal ultrasound	Selective ultrasound	No ultrasound	Treatment with a splint within 42.4 months	Universal vs. No ultrasound RR=1.88 (1.410, 2.511)	Significant	Moderate
Rosendahl K. 1994	11,925	Universal ultrasound	Selective ultrasound	No ultrasound	Treatment with a splint within 42.4 months	Selective vs. No ultrasound RR=1.121 (0.823, 1.527)	Not significant	Moderate
Rosendahl K. 1994	11,925	Universal ultrasound	Selective ultrasound	No ultrasound	Abnormality at a mean age of 4.5 months (2.5-18)	Universal vs. Selective RR=0.675 (0.226, 2.012)	Not significant	Moderate
Rosendahl K. 1994	11,925	Universal ultrasound	Selective ultrasound	No ultrasound	Abnormality at a mean age of 4.5 months (2.5-18)	Universal vs. No ultrasound RR=0.543 (0.186, 1.587)	Not significant	Moderate
Rosendahl K. 1994	11,925	Universal ultrasound	Selective ultrasound	No ultrasound	Abnormality at a mean age of 4.5 months (2.5-18)	Selective vs. No ultrasound RR=0.805 (0.327, 1.979)	Not significant	Moderate
Rosendahl K. 1994	11,925	Universal ultrasound	Selective ultrasound	No ultrasound	Acetabular dysplasia at a mean age of 4.5 months (2.5-18)	Universal vs. Selective RR=0.810 (0.229, 2.867)	Not significant	Moderate

2. soovituse põhjendus: (toodud ainult inglise keeles, sest toortõlge eesti keelde võiks moonutada sisu):

If the risk factors of family and/or breech presentation are present, there is moderate evidence to support selective ultrasound screening between 2-6 weeks of age for infants who otherwise have a normal clinical hip examination or an AP (anterio-posterior) radiograph at 4 months of age. There were two studies of moderate strength that confirm significance for selective prospective screening by ultrasound in infants with history of possible clinical instability and/or risk factors: breech and family history to prevent late dislocations and need for surgery (Paton 2005, Paton 1999).

Of the 10 studies of low strength the various risk factors included were: breech, family history, sex, combination of sex and breech, combination of sex and family history, hip click, first born, swaddling, and talipes.

Breech literature included six studies all of low study strength. The results of these studies were meta-analyzed and the meta-analysis overwhelmingly supported breech presentation as a risk factor for neonatal instability. The literature terminology on breech is: breech at birth, breech delivery, and breech position at the third trimester; there is no literature to substantiate a particular duration of breech positioning as a risk factor.

Family history: four articles of low strength all showing statistical significance for family history as a risk factor for DDH (Bache 2002, Baronciani 1997; Jones 1989, Rosendahl 1996). There was one study which showed no statistical significance (Akman 2007).

One study compared treatment for dislocatable hips (at age less than one week) with no treatment for stable hips with positive family history (Cunningham 1984). The outcome was residual dysplasia at five months and was noted to be significant for the no treatment category. The authors further treated these patients from the no treatment category at age five months and compared them with the original cohort of Barlow positive patients treated at age less than one week. This time around, the outcome parameter was residual dysplasia at two years and was again noted to be significant. Other outcome measures included avascular necrosis at two years, which was not significant, and treatment failure, which was noted to be significant. This study did not have a true comparative group for analysis. There was a combination of dislocated and dislocatable hips in the Barlow positive category, which confounds the analysis.

The literature definitions of family history of DDH range from unspecified hip disorders to hip dislocation and from first degree relative (parents and siblings), to any relative (even if distant or vague) with hip problems or DDH (all other articles). Three articles listed family history, but did not specify the relationships or specific hip problems (Akman 2007, Baronciani 1997, Boo 1989).

One study compared ultrasound screening in infants who had risk factors alone with those who had "doubtful" clinical instability (Paton 2005). Rate of detection of dislocation as confirmed by ultrasound was 13/1000 (7 to 24) vs 87/ 1000 (57 to 126/1000) respectively.

There is no substantiation in the literature of the optimal age for imaging studies in these infants with risk factors (Burger 1990) One study performed hip radiographs at 4 months of age (Garvey 1992). Two studies (Khan 1992, Kian 1996 – Pubmed'is see viide puudub, ei leia ka Google't kasutades), performed ultrasound between 2-6 weeks of age.

Examination of other quoted risk factors was done. Evidence was not found to include foot abnormalities, gender, oligohydramnios, and torticollis as risk factors for DDH.

Risks and harms of recommendation: There is a potential risk of over diagnosis and treatment.

SUPPORTING EVIDENCE

QUALITY AND APPLICABILITY

Table 14. Quality and Applicability: Studies for Evaluation of Infants with Risk Factors for DDH

●: Domain free of flaws

○: Domain flaws present

◐: Moderate power

Study	Outcome	Prospective	Group Assignment	Blinding	Group Comparability	Treatment Integrity	Measurement	Investigator Bias	*Quality*	Participants	Intervention and Expertise	Compliance and Adherence	Analysis	*Applicability* Study	*Strength*
Burger BJ 1990	Dysplasia at 5 months	●	○	○	○	○	○	●	Low	●	○	●	○	Moderate	Low
Burger BJ 1990	Dysplasia at 2 years	●	○	○	○	○	○	●	Low	●	○	●	○	Moderate	Low
Burger BJ 1990	AVN after 2 years	●	○	○	○	○	○	●	Low	●	○	●	○	Moderate	Low
Burger BJ 1990	Negative predictive value of exam for dysplasia at 2 years	●	○	○	○	○	○	●	Low	●	○	●	○	Moderate	Low

Table 15. Quality and Applicability: Prognostic Studies for Evaluation of Infants with Risk Factors for DDH

●: Domain free of flaws

○: Domain flaws present

Study	Prognostic	Prospective	Analysis	Investigator Bias	Model	*Quality*	Patients	Analysis	Outcomes	*Applicability* Study	*Strength*
Akman A. 2007	Breech	●	○	●	○	Low	●	○	●	Moderate	Low
Akman A. 2007	Sex	●	○	●	○	Low	●	○	●	Moderate	Low
Akman A. 2007	First born	●	○	●	○	Low	●	○	●	Moderate	Low
Akman A. 2007	Sex & swaddling	●	○	●	○	Low	●	○	●	Moderate	Low
Akman A. 2007	Family history	●	○	●	○	Low	●	○	●	Moderate	Low
Bache CE. 2002	Breech	●	○	●	○	Low	●	○	●	Moderate	Low
Bache CE. 2002	Sex	●	○	●	○	Low	●	○	●	Moderate	Low
Bache CE. 2002	Sex & Breech	●	○	●	○	Low	●	○	●	Moderate	Low
Bache CE. 2002	Family history	●	○	●	○	Low	●	○	●	Moderate	Low
Bache CE. 2002	Sex & Family history	●	○	●	○	Low	●	○	●	Moderate	Low

Tabel jätkub järgmisel lehel

Table 15. Quality and Applicability: Prognostic Studies for Evaluation of Infants with Risk Factors for DDH

●: Domain free of flaws

○: Domain flaws present

Study	Prognostic	Prospective	Analysis	Investigator Bias	Model	*Quality*	Patients	Analysis	Outcomes	*Applicability* Study	*Strength*
Baronciani D. 1997	Breech	●	○	●	○	Low	●	○	●	Moderate	Low
Baronciani D. 1997	Sex	●	○	●	○	Low	●	○	●	Moderate	Low
Baronciani D. 1997	First born	●	○	●	○	Low	●	○	●	Moderate	Low
Baronciani D. 1997	Family history	●	○	●	○	Low	●	○	●	Moderate	Low
Boo NY. 1989	Breech	●	○	●	○	Low	●	○	●	Moderate	Low
Cunningham KT. 1984	Breech	●	○	●	○	Low	●	○	●	Moderate	Low
Cunningham KT. 1984	Click	●	○	●	○	Low	●	○	●	Moderate	Low
Goss PW. 2002	Breech	●	○	●	○	Low	●	○	●	Moderate	Low
Hinderaker T. 1994	Breech	○	○	●	●	Low	●	○	●	Moderate	Low
Hinderaker T. 1994	Breech (Vaginal)	○	○	●	●	Low	●	○	●	Moderate	Low
Hinderaker T. 1994	Breech (C. Section)	○	○	●	●	Low	●	○	●	Moderate	Low
Jones DA. 1989	Breech	●	○	●	○	Low	○	○	●	Moderate	Low
Jones DA. 1989	Click	●	○	●	○	Low	○	○	●	Moderate	Low
Jones DA. 1989	Family history	●	○	●	○	Low	○	○	●	Moderate	Low
Khan MR. 1992	Breech	●	○	●	○	Low	○	○	●	Moderate	Low
Khan MR. 1992	Sex	●	○	●	○	Low	○	○	●	Moderate	Low
Kian C. 1996	Breech	●	○	●	○	Low	○	○	●	Moderate	Low
Rosendahl K. 1996	Breech	●	○	●	●	Low	●	○	●	Moderate	Low
Rosendahl K. 1996	Sex	●	○	●	●	Low	●	○	●	Moderate	Low
Rosendahl K. 1996	Sex & Breech	●	○	●	●	Low	●	○	●	Moderate	Low
Rosendahl K. 1996	Family history	●	○	●	●	Low	●	○	●	Moderate	Low
Rosendahl K. 1996	Sex & Family history	●	○	●	●	Low	●	○	●	Moderate	Low
Rosendahl K. 1996	Family history: one 1st degree relative	●	○	●	●	Low	●	○	●	Moderate	Low
Rosendahl K. 1996	Family history: two 2nd degree relatives	●	○	●	●	Low	●	○	●	Moderate	Low

Table 16. Quality and Applicability for Evaluation of Infants with Risk Factors for DDH

●: Domain free of flaws
○: Domain flaws present
◐: Moderate power

Study	Outcome	Prospective	Group Assignment	Blinding	Group Comparability	Treatment Integrity	Measurement	Investigator Bias	*Quality*	Participants	Intervention and Expertise	Compliance and Adherence	Analysis	*Applicability* Study	*Strength*
Bond C. 1997	Average alpha angle <60 degrees at 3 months	●	○	○	○	○	●	○	Low	●	○	●	●	Moderate	Low
Bond C. 1997	Femoral head coverage <50% at 3 months	●	○	○	○	○	●	○	Low	●	○	●	●	Moderate	Low
Paton R. 1999	Ultrasound detected dislocation before 6 months of age	●	○	○	○	●	○	○	Low	●	●	●	●	High	Moderate
Paton R. 2005	Ultrasound detected instability at 2-9 weeks	●	●	○	○	●	●	○	Moderate	●	○	●	○	Moderate	Moderate
Paton R. 2005	Dislocation and type-3 dysplasia at 2-9 weeks	●	●	○	○	●	●	○	Moderate	●	○	●	○	Moderate	Moderate
Paton R. 2005	Ultrasound detected instability at 2-9 weeks	●	●	○	○	●	●	○	Moderate	●	○	●	○	Moderate	Moderate

Table 17. Quality and Applicability for Evaluation of Infants with Risk Factors for DDH

●: Domain free of flaws
○: Domain flaws present
◐: Moderate power

Study	Outcome	Prospective	Group Assignment	Blinding	Group Comparability	Treatment Integrity	Measurement	Investigator Bias	*Quality*	Participants	Intervention and Expertise	Compliance and Adherence	Analysis	*Applicability* Study	*Strength*
Garvey M. 1992	Moderate radiographic acetabular dysplasia at 15 months	●	○	○	○	○	●	●	Low	●	○	●	●	Moderate	Low
Garvey M. 1992	Severe radiographic acetabular dysplasia at 15 months	●	○	○	○	○	●	●	Low	●	○	●	●	Moderate	Low

RESULTS

Table 18. Evaluation of Infants with Risk Factors for DDH

Study	N	Group 1	Group 2	Outcome	Results	Significance	Study strength
Burger BJ. 1990	729	Barlow doubtful	Barlow doubtful, family history negative	Dysplasia at 5 months	RR=5.00 (2.676, 9.374)	Significant	Low
Burger BJ. 1990	729	Barlow doubtful	Barlow doubtful, family history negative	Dysplasia at 2 years	RR=3.92 (1.447, 10.625)	Significant	Low
Burger BJ. 1990	729	Barlow doubtful	Barlow doubtful, family history negative	AVN after 2 years	RR=4.46 (0.089, 223.54)	Not significant	Low
Burger BJ. 1990	1,281	Barlow negative, family history positive	Barlow doubtful, family history negative	Dysplasia at 5 months	RR=5.07 (3.065, 8.377)	Significant	Low
Burger BJ. 1990	1,281	Barlow negative, family history positive	Barlow doubtful, family history negative	Dysplasia at 2 years	RR=4.57 (2.162, 9.652)	Significant	Low
Burger BJ. 1990	1,281	Barlow negative, family history positive	Barlow doubtful, family history negative	AVN after 2 years	RR=2.61 (0.107, 63.972)	Not significant	Low

Table 19. Evaluation of Infants with Risk Factors for DDH (Accuracy of Physical Exam)

Study	N	Group	Outcome	Results	Significance	Study strength
Burger BJ 1990	14,264	Universal Barlow screening	Sensitivity of exam for dysplasia at 2 years	9.81%	N/A	Low
Burger BJ 1990	14,264	Universal Barlow screening	Specificity of exam for dysplasia at 2 years	99.22%	N/A	Low
Burger BJ 1990	14,264	Universal Barlow screening	Positive predictive value of exam for dysplasia at 2 years	22.1%	N/A	Low
Burger BJ 1990	14,264	Universal Barlow screening	Negative predictive value of exam for dysplasia at 2 years	98.0%	N/A	Low

Vahepealsed tabelid (tabel 20-31) käsitlevad DDH riskitegurite kohta tehtud uuringuid. Kuna see otseselt ei olnud kliinilise küsimuse sisu, siis neid siia eraldi ei toonud.

Table 32. Evaluation of Infants with Risk Factors for DDH (Ultrasound for Babies with Positive Risk Factors but Normal Physical Exam)

Study	N	Group 1	Group 2	Outcome	Results	Significance	Study Strength
Bond C. 1997	101 (hips)	Clicking hips	Non-clicking hips	Average alpha angle <60 degrees at 3 months	RR=0.609 (0.012, 30.096)	Not significant	Low
Bond C. 1997	101 (hips)	Clicking hips	Non-clicking hips	Femoral head coverage <50% at 3 months	RR=0.609 (0.012, 30.096)	Not significant	Low
Paton R. 1999	1,107	Positive risk factors only	Clinical instability	Ultrasound detected dislocation before 6 months of age	RR=0.153 (0.076, 0.308)	Significant	Moderate
Paton R. 1999	818	Breech	Clinical instability	Ultrasound detected dislocation before 6 months of age	RR=0.194 (0.092, 0.409)	Significant	Moderate
Paton R. 1999	344	Family history	Clinical instability	Ultrasound detected dislocation before 6 months of age	RR=0.197 (0.027, 1.427)	Not significant	Moderate
Paton R. 1999	426	Foot abnormality	Clinical instability	Ultrasound detected dislocation before 6 months of age	RR=0.082 (0.011, 0.597)	Significant	Moderate
Paton R. 2005	2,578	Positive risk factors only	Clinical instability	Ultrasound detected instability at 2-9 weeks	RR=2.130 (1.329, 3.413)	Significant	Moderate
Paton R. 2005	3,462	Breech	Clinical instability	Dislocation and type-3 dysplasia at 2-9 weeks	RR=1.501 (1.026, 2.196)	Significant	Moderate
Paton R. 2005	2,346	Family history	Clinical instability	Ultrasound detected instability at 2-9 weeks	RR=2.735 (1.568, 4.770)	Significant	Moderate
Paton R. 2005	2,553	Foot deformity	Clinical instability	Ultrasound detected instability at 2-9 weeks	RR=1.221 (0.672, 2.220)	Not significant	Moderate

U.S. Preventive Task Force koostas oma raporti Screening for developmental dysplasia of the hip: recommendation statement **2006. aastal** (soovitused avaldatud ka ajakirjas Am Fam Physician 2006 ja Pediatrics 2006 ning kirjanduse süstemaatilise ülevaate tulemused ajakirjas Pediatrics 2006)

Nende raporti järeldus oli, et tõendusmaterjal on ebapiisav, et soovitada rutiinset sõeltestimist puusaliigeste arengulise düsplaasia suhtes. *(„The US Preventive Services Task Force (USPSTF) concludes that evidence is insufficient to recommend routine screening for developmental dysplasia of the hip (DDH) in infants as a means to prevent adverse outcomes").*

Selgituseks toovad nad järgmist: *„The pathophysiology and natural history of DDH are poorly understood. There is evidence that screening leads to earlier identification; however, 60% to 80% of the hips of newborns identified as abnormal or as suspicious for DDH by physical examination and >90% of those identified by ultrasound in the newborn period resolve spontaneously and require no intervention. There is poor evidence (poor-quality studies) of the effectiveness of both surgical and nonsurgical interventions; avascular necrosis of the hip (AVN) is reported in 0% to 60% of children who are treated for DDH. Thus, the USPSTF was unable to assess the balance of benefits and harms of screening for DDH but was concerned about the potential harms associated with treatment of infants identified by routine screening."*

2011. a sõnastas oma soovitused Euroopa lasteradioogide puusaliigese arengulise düsplaasia rakkerühm (European Society of Pediatric Radiology's Task force Group on DDH). Nende soovitused käsitlevad UH-uuringu metoodikat, tulemuste standardiseeritud esitamist ning sõeltestimise strateegiat. Soovitused põhinevad teaduskirjanduse oportunistlikul (mitte süstemaatilisel) ülevaatel. Nende soovitus sõeltestimise osas on: *in areas with a high prevalence of late DDH, we recommend selective ultrasound screening, given a high quality ultrasound screening can be provided. If selective screening has no effect on the prevalence of late cases, universal screening should be considered.*