



LAPSIPOTILAS HERÄÄMÖSSÄ

Susanna Niinimäki

Anestesia- ja leikkausosasto E2

Eksote Keskussairaala, Anestesia- ja leikkausosasto E2

AIHEINA



- lapsipotilaan postoperatiiviset erityispiirteet
- heräämöhoitajan kompetenssi?
- lapsi ja PONV
- lapsen kivun arvioinnista
- Perhe lapsen (ja hoitajan) tukena?



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18.3.2016

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Ikäkausittaisia erityispiirteitä



vauvalla tärkeintä perusturva ja perustarpeiden tyydytys



pikkulapsi (ad 3v) osaa jo pelätä asioita, unilelut tms. tärkeitä, kaipaa vanhempiaan



3-5v: vanhemmista erossa oleminen helpottuu, asioiden ymmärtäminen, kyselyikä

→ alttius sairaalahoidon ja toimenpiteen aiheuttamalle jälkioireilulle

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Eriksen: Psykososiaalisen kehityksen kriisit 3



alakouluikä: pelkoja sairastumisesta, kuolemasta,
ymmärtää syvällisemmin monia asioita



yläkouluikä: itsenäistyminen,
kyseenalaistaminen, vaihteleva tunne-elämä

Eräsoo: Psykososiaalisen kehityksen kriisit

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Heräämölapsen komplikaatioista



- hengitys ja ilmatiet
- PONV
- kipu
- agitaatio
- tärinä, hypotermia



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Hengitys



- pienet lapset hengittävät nenän kautta



- hengitystyön reservit, happireservit vähäiset, suhteessa suuri ventilaation tarve
- hengitysvajauksessa happeutumisen heikkenee nopeasti

Rosenberg ym. 2006; Collins & Everett 2010; Ungern-Stenberg 2014; Pawar 2016

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Hengitys



- hengitykseen liittyvät ongelmat yleisimpiä komplikaatioita, jopa 10-15%:lla lapsista
- hengitysvajaus, hypoksemia, laryngospasmi, bronkospasmi, stridor, voimakas yskä **heräämön riskejä!**
- laryngospasmi ja muut hengitysongelmat < 3-vuotiailla huomattavasti yleisempiä kuin isommilla

Collins & Everett 2010; Hanna & Mason 2012; Ungern-Sternberg 2014; Paver 2016

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Clinics Review Articles

ANESTHESIOLOGY CLINICS

Respiratory Complications in the Pediatric Postanesthesia Care Unit

Britta S. von Ungern-Sternberg, MD, PhD, DEAA, FANCA^{1,2,3,4*}

KEYWORDS

- Pediatric anesthesia • Respiratory complications • Risk factors
- Postanesthesia care unit • Recovery room

KEY POINTS

- Despite a good safety record, respiratory complications are a major cause of morbidity and mortality in pediatric anesthesia.
- 1 in 10 children present with 1 or more respiratory complications during their stay in the PACU.
- The risk factors can be divided into patient factors, surgical factors, and factors caused by anesthesia management.
- Rapid recognition of respiratory complications in the PACU and appropriate treatment strategies are essential to avoid hypoxia.

Anesthesiology Clin 32 (2014) 45–61

Patient

- Young age
- Recurrent wheezing
- Current/past asthma
- Wheezing during exercise
- Obstructive sleep apnea
- Obesity

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Clinics Review Articles

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Anesthesiology Clin 32 (2014) 45–61

Surgical Procedure

- Blood or secretions in the upper airway
 - Procedures with shared airway (eg, ear, nose, and throat, dental, respiratory medicine)
- ### Anesthesia/Recovery Management
- Less experienced PACU staff
 - Patient ratio in PACU

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Hengitys



- lisähappea herkästi, jos desaturoituu (< 90-95%)



- selvitettävä myös saturaation laskun syy
 - ilmatiet
 - hengityksen laatu, riittävyys
 - sedaatio
 - huono käyrä?

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Laryngospasmi



- hoito aloitettava **heti havaitessa**
 - **100% happi ylipaineella**
 - lievässä spasmissa lidokaiini 1mg/kg?
- tiukassa spasmissa:
 - propofoli 1-3 mg/kg
 - suksinylikoliini 0,5-2mg/kg. **TAI** käytössä oleva non-depolarisoiva relaksantti
 - atropiini varalla!

LASKE ANNOKSET VALMIIKSI JO OTTAESSASI LAPSEN VASTAAN

Rosenberg ym. 2006; Ungem-Sternberg 2014; Pawar 2016

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Hemodynamiikka



- mitä pienempi lapsi, sen tärkeämpää on seurata EKG:n lisäksi myös verenpainetta



- jos lapsi on sydämeltään terve, verenkiertokomplikaatiot ovat harvinaisia ja useimmiten seurausta hypoksemiasta
- HR reaktiivinen esim. kipuun, ahdistukseen, pelkoon.... mutta myös esim. hypovolemiaan!

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PONV



- PONV on oikea ja yleinen ongelma lapsilla
 - > 3-vuotiaat lapset
 - > 30 min leikkaus
 - anamneesissa tai vanhempien anamneesissa PONV
 - matkapahoinvointi
 - KNK-kirurgia, karsastuskirurgia ja yleiskirurgia
 - nielun ärsytys, opioidit, verenvuoto mahalaukuun

Callins & Everett 2010; Hanna & Masón 2012; Ungem-Stenberg 2014; Höhrne 2014; Fwaw 2016

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Pediatric Anesthesia

Pediatric Anesthesia 2016 1100-1610

ORIGINAL ARTICLE

Postoperative pain, nausea and vomiting following adenotonsillectomy – a long-term follow-up

Dana Stanke¹, Ric Bergeson¹, Kylie Davies¹, Mary Hegarty¹ & Britta S. von Ungem-Stenberg^{1,2}

¹ Department of Anaesthesia and Pain Management, Princess Margaret Hospital for Children, Park, WA, Australia
² School of Medicine and Pharmacology, The University of Western Australia, Perth, WA, Australia

Keywords: adenotonsillectomy, pain assessment, nausea and vomiting, adenotonsillectomy, completion

Correspondence: Britta S. von Ungem-Stenberg, Department of Anaesthesia and Pain Management, Princess Margaret Hospital for Children, Park Road, Perth, WA 6008, Australia (Email: britta.vonungem@health.wa.gov.au)

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doi:10.1111/pan.12136

Summary

Background: Adenotonsillectomy is a common paediatric surgical procedure. Our knowledge of the recovery profile, parental understanding, and expectations is limited. We aimed to assess the incidence of pain, nausea, and vomiting in children undergoing adenotonsillectomy on postoperative day 1 and 7. We also wished to evaluate parental understanding regarding discharge instructions as well as parental expectations and experience of their child's recovery.

Methods: We enrolled 180 children (0–16 years) undergoing elective adenotonsillectomy. On day 1 and 7, parents were questioned about their child's level of pain, nausea/vomiting and their understanding regarding postoperative instructions.

Results: Hundred children (median, 4.68 years) were recruited. 12% of patients rated their child's pain as VAS > 5 on day 1, dropping to 30% by day 7. Almost 10% of patients experienced nausea on day 1, dropping to 11.4% by day 7. A smaller trend was observed for postoperative vomiting. Most parents, 80%, agreed that postoperative instructions were clear. However, knowledge regarding when to seek emergency medical advice was found to be lacking. On day 7, only 44% of parents reported that their child's recovery met their expectations.

Conclusion: Adenotonsillectomy is associated with significant pain and PONV, persisting into the seventh postoperative day. Parental education and information seems inadequate and needs to be improved.

- n=100, ikä 0-16v
- T&A:n jälkeen PONV jopa 3-7 vrk
 - 3.POPina 33% pahoinvointia
 - 3.POPina 52% kipuVAS ≥ 5
- muissa vastaavissa tutkimuksissa tilastollinen yhteys kivun ja PONVin välillä
 - tehokas kivunhoito vähentää PONV:ta?

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PONV ehkäisy



- TIVA
- multimodaalinen kivunhoito
- riittävä nesteytys
- riittävä profylaktinen antiemeettilääkitys riskien perusteella



esim, Höhrne 2014

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Antiemetit lapsilla



- käytännössä samat valmisteet lasten annoksilla kuin aikuisilla
 - droperidolia ei suositella <2-vuotiaille
 - lapsille ja nuorille toisen linjan lääkkeenä
- esim. dexametasoni ja/tai setroni jo anestesian aikana



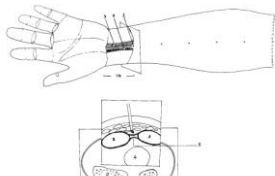
esim. Collins & Everett 2010; Hanna & Mason 2012; Hermans ym. 2012; Höhnle 2014

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P6 eli neiguan-piste



Ward SM & Kim NZ 2002



http://topajo.fi/hoito/koko/akupunktio-ja-akupainant/

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Anesthesiology 2002, 97:299-304

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P6 Acupoint Injections Are as Effective as Droperidol in Controlling Early Postoperative Nausea and Vomiting in Children



Shu-Ming Wang, M.D.,* Zhen N. Kain, M.D.†

Background: P6 acupoint injections in adults is reported to be an effective preventive treatment for postoperative nausea and vomiting (PONV). It is not clear, however, whether this technique is effective as a preventive treatment for PONV in children.

Methods: Children undergoing ambulatory and surgery were randomized to four groups (A) intravenous saline + bilateral P6 acupoint injections (n = 50), (B) intravenous droperidol + bilateral P6 acupoint injections (n = 50), (C) intravenous saline + bilateral sham point injections (n = 50), (D) intravenous saline + bilateral P6 sham injections (n = 50). The percentage incidence of PONV was recorded as an endpoint. The incidence of postoperative nausea and vomiting (PONV) was evaluated by parents who were not aware of their child's assignment. Incidence of nausea in the PACU was significantly lower in the acupoint group as compared with the sham point group (12.0% vs. 34%, P = 0.02) and P6 sham group (13.0% vs. 34%, P = 0.03), but not as compared with the droperidol group (12.0% vs. 16%, P = ns). Similarly, nausea in the recovery group had a significantly lower incidence of vomiting in the PACU as compared with the sham point group (12.0% vs. 10%, P = 0.001) and P6 sham group (13.0% vs. 14%, P = 0.03), but not as compared with the droperidol group (12.0% vs. 16%, P = ns). The combined incidence of early PONV was also lower in the acupoint group as compared with the sham point group (P = 0.001) and P6 sham group (P = 0.001), but not as compared with the droperidol group (12.0% vs. 16%, P = ns). Finally, significantly fewer subjects in the acupoint group required intravenous analgesics in an initial rescue therapy (P = 0.02). At 24 h after surgery, however, the incidence of late PONV was similar among the four study groups (P = ns).

*Conclusion: In children, P6 acupoint injections are as effective as droperidol in controlling early postoperative nausea and vomiting.

- n=187, ikä 7-16v, yleisanestesia, PÄIKI -toimenpide
- randomoitu kaksoissokkotutkimus
- akupunktio-, droperidoli-, kontrolliryhmät
- droperidoliryhmään verrattuna tehossa ei eroa pahoinvoinnissa ja oksentamisessa (p=0.18, p=ns), mutta kontrolliryhmiin nähden akupunktioyöryhmässä vähemmän phv ja oksentelua (p=0.002 ja 0.029)

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ORIGINAL RESEARCH

METAANALYSIS OF ACUSTIMULATION EFFECTS ON POSTOPERATIVE NAUSEA AND VOMITING IN CHILDREN

Linda S. Dune, PhD, RN,^{1*} and Shyang-Yun Pamela K. Shiao, PhD, RN²

Objective: Using metaanalysis, we sought to determine acustimulation (AS) effects on postoperative nausea and vomiting (PONV) in children.

Methods: Metaanalyses were performed on various acupoint AS effects including acupressure, acupuncture, laser acupuncture, and electrical stimulation (ETS) on PONV in children. Online databases were searched for randomized controlled trials (RCTs) from 1966 through May 2005. In addition, the reference list of reviewed papers were scanned for additional trials. The identified RCTs were evaluated for methodological quality using the Quality Reporting of Meta-analyses (QUOROM) guidelines, and results were pooled using the fixed-effects model.

Results: Twelve RCTs were pooled for the outcomes of 24-hour PONV including 12 trials for vomiting and two trials for nausea. Compared with the control groups, all AS modalities reduced vomiting (RR = 0.69, 95% CI: 0.59-0.80, *P* < .0001) and nausea (RR = 0.59, 95% CI: 0.46-0.76, *P* < .0001). Acupressure (two

trials) and acupuncture (six trials) modalities were effective in reducing vomiting (*P* < .005); however, ETS (two trials) did not show significant effects in reducing the vomiting (*P* = .119) in children. Compared with the controls, medications (three trials) reduced vomiting (RR = 0.42, 95% CI: 0.22-0.7, *P* = .0056). There were no differences between the medication and AS treatments (three trials) in reducing vomiting (RR = 1.25, 95% CI: 0.54-2.93, *P* = .6025).

Conclusions: This metaanalysis demonstrated that acupressure and acupuncture are effective treatment modalities to reduce postoperative vomiting in children. Acupuncture treatment is as effective as medications to reduce vomiting in children. Acupressure had the greatest impact on reducing vomiting when compared with acupressure and ETS in children.

Key words: Metaanalyses, acupuncture, acupressure, nausea, vomiting, children, pediatrics
(*Anesthesiology* 2006; 23:14-20). © Elsevier Inc. 2006)

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REGULAR ARTICLE

Child behaviour after anaesthesia: associated risk factors

M Karling, M Bäckström, H Stenlund, C B Hogdahl

¹Division of Anaesthesia, University of Umeå, Sweden
²Department of Public Health and Clinical Medicine, University of Umeå, Sweden
³Pain Medicine and Child and Adolescent Psychiatry, University of Umeå, Sweden

Abstract

Aim: To identify hospital care factors which are associated with problematic behaviour in children after hospitalization.

Methods: A cohort of 140 children aged 2–11 was studied in connection with elective procedures which included anaesthesia. Data collected: sociodemographic, type of procedure, anaesthesia induction technique and premedication. Staff and parents assessed child anxiety at induction of anaesthesia, pain, anxiety and nausea in recovery room and hospital ward. Parents assessed their child's pain and nausea and the behaviour measured with the Post Hospital Behavioural Questionnaire two weeks after hospitalization.

Results: One third (34.4%) of the children developed at least one problematic behaviour, measured by the PHQB subscale. Multiple logistic regression identified the following risk factors: age < 6, pain at home but not at hospital, nausea, child anxiety at anaesthesia induction, postoperative nausea, postoperative delirium, previous hospitalizations, being in a one-adult family and having some previous problematic behaviour. Moderate-to-severe pain at home, but not at hospital, was associated with the greatest risk (OR 6.59 [2.33–17.6]). Previous anaesthesia, midazolam use in premedication and being in a one-adult family were protective factors.

Conclusion: Pain at home but not in hospital is a strong risk factor for the onset or worsening of problematic behaviour after childhood hospitalizations, which included anaesthesia. Further interventions are suggested to prevent this by improving pain treatment at home.

Acta Paediatrica/Acta Paediatrica 2007; 96: 740–747

Acta Paediatrica ISSN 0803-5223



Childs Review Article

Preoperative Anxiety Management, Emergence Delirium, and Postoperative Behavior

Richard J. Bannitt, MD¹, Arnold Lerman, MD, MSc, MD, PhD^{2,3,4*}

KEY POINTS

- Preoperative anxiety is of utmost importance for children undergoing surgery.
- Preoperative educational materials, parental presence at induction of anaesthesia (PPA), distraction, and pharmacologic interventions are effective anxiolytics.
- Emergence delirium (ED) resuscitated with the newer inhaled anaesthetics, sevoflurane and desflurane, as a nuisance and potentially serious sequela in young children in the recovery room.
- Research and investigation into the treatments of ED was stymied by the absence of a validated scale for ED until the Pediatric Anaesthesia Emergence Delirium (PAED) scale was published.
- Candidate factors for ED have not yet been elucidated, but several etiologies have been described to attenuate ED, including propofol infusion and use of α₂-agonists, opioids, and others.

Anesthesiology Clin 32 (2014) 1–23

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Agitaatio, delirium

- inhalaatioanestesia
 - nopea herääminen, voimakas stimulaatio?
- ikä, kehitystaso
 - eniten 2-5-vuotiailla?
- preoperatiiviset psyykkiset tekijät
 - preoperatiivinen ahdistus
 - aiemmat ikävät kokemukset
 - ahdistuneet vanhemmat
- kipu, PONV?

- midazolam, propofoli
- preoperatiivinen psyykkinen valmistelu
 - rehellisyys, ikätasoisuus, neutraalisuus
 - anestesiatiimin tapaaminen edeltävästi?
- vanhempien läsnäolo?
 - käytännössä edellyttää rauhallisia vanhempia...
- **tyyni, rauhallinen hoitaja!**



mm. Manninen ym. 2004; Karling ym. 2007; Collins & Everett 2010; Costi ym. 2014; Bannitt & Lerman 2014; Pawar 2016

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Agitaatio ja lapsen delirium



- levottomuus, itku/huuto, aggressiivisuus, potkiminen, disorientaatio, kommunikointomuutos...
- ilmenee usein heti tulovaiheessa, voi kestää jopa tunnin ajan
 - voi jättää myös jälkioireita
- kivun ja PONVin arviointi, hoito

edim. Marwonen ym. 2004

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Lapsen postoperatiivinen kipu



- tärkein ja paras mittari on **lapsen oma kokemus**
 - psykologia! → odotukset reippaudesta tai rohkeudesta
 - kehitysaste, aiemmat kokemukset ja kommunikaatio-osaaminen
- vitaalien muutokset *voivat* viitata kipuun
 - etenkin yhdistettynä käyttäytymisessä ja kokemuksessa tapahtuviin muutoksiin
- itku, ilmeet, kehon liikkeet ja asennot, jäykkyys, hiljaisuus, lohduuttomuus
 - huomioitava olosuhteet; nälkä, ahdistuneisuus, pelko, ero vanhemmista...

edim. Merkel ym. 2000; Marwonen ym. 2004

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Table 1. FLACC Pain Assessment Tool

Categories	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging, or talking to; distractable	Difficult to console or comfort

Each of the 5 categories, (F) face, (L) legs, (A) activity, (C) cry, (C) consolability, is scored from 0 to 2, which results in a total score between 0 and 10.
Abbreviation: FLACC, face, legs, activity, cry, and consolability.

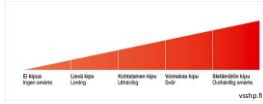
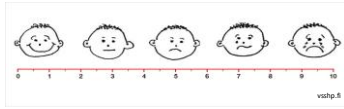
Merkel S, Voepel-Lewis T, Shaywitz J, et al: The FLACC: A behavioral scale for scoring postoperative pain in young children. *Pediatric Nursing* 23:293-297, 1997

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≥ 3-vuotias ymmärtää jo jonkin kipumittarin



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JOURNAL OF PERI-ANESTHESIA NURSING

Use of Picture Communication Aids to Assess Pain Location in Pediatric Postoperative Patients

Phyllis J. Meakin, RN, CPNP, Ann Douglas Hinkle, PhD, RN, CNRN, Clinical Clinical Educator, RN, CDEP/FA, Denver Children's Hospital, PhD, RN

- n= 27, 3-9 -vuotiaita
- kipuarvioiteja 160
- lapset määrittivät kivun muualle kuin toimenpidealueelle yli 40%:ssa omista arvioistaan
 - esim. kanyyli, muut tarkkailulaitteet
 - diskrepanssi hoitajien arvioihin nähden



Children undergoing surgical procedures may have difficulty communicating their pain and identifying communication tools. Postoperative children may provide a standard communication strategy for postoperative children and pediatric nurse practice communication. The study purpose was to (1) determine if nonverbal communication tools were an effective way to assess pain location among identification of pain location using with use of ASK picture communication aids. A convenience sample of postoperative children ages 3 to 9 years were recruited for a retrospective analysis of their reported pain location using ASK picture communication aids. The study included 27 children (aged 3 to 9 years) who had undergone surgery for elective inguinal hernia repair and were aged 3 to 9 years. The children's pain location was assessed using ASK picture communication aids and compared with the children's pain location. Results did not consistently show pain location of pain and when discussed the original site was more accurately reported on the location of pain. These findings were assessed through completion of a 30-item questionnaire survey. Discrepancies were identified with the use of ASK picture communication aids.

Journal of PeriAnesthesia Nursing, 26(6): 395-404

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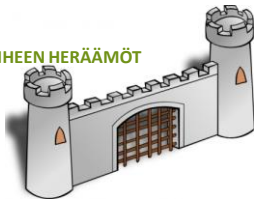
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KUINKA MONI TEISTÄ OTTAA / OTTAAISI VANHEMMAN HERÄÄMÖÖN LAPSEN LUOKSE OMALLA TYÖPAIKALLAAN?


PL. PÄIKI-YKSIKÖIDEN II-VAIHEEN HERÄÄMÖT



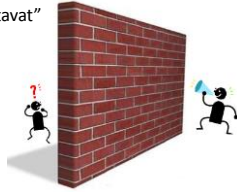
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"Vanhemmat eivät voi tulla heräämööön, koska..." 

- "...muiden potilaiden intimeettisuoja kärsii"
- "...heräämössä tilanteet muuttuvat nopeasti"
- "...vanhemmat pyörtyvät / vaativat tukea / ovat tiellä"
- "...vahtivat hoitajia tai kyseenalaistavat"
- "...ei ole tilaa tai istuimia"
- "...ei ole ollut tapana"



esim. Fina ym. 1997; Jackson ym. 1997; Smykowski & Rodriguez, 2003; Houle ym. 2015

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Lapsen ja vanhempien kannalta...

- turvallisuuden tunne
- vähemmän itkuja ja levottomuutta (Fina ym. 1997)
- ei eroa vanhemmista muutenkin pelottavassa tilanteessa
- negatiivisten jälkioireiden väheneminen (Lardner ym. 2010)

- vanhempien ahdistus vähenee → ei siirry lapseen
- vanhemmat kokevat positiivisena

- vanhemmat tuntevat lapsensa
 - kivun arviointi?, kivun erottaminen yleisestä ahdistuksesta, kommunikaatio



esim. Halli ym. 1995; Fina ym. 1997; Kammerling ym. 2008; Burke ym. 2009; Houle ym. 2015

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Hoitajien näkökulmasta...



- saattaa jopa helpottaa hoitajien työtä
- ei näyttöä esim. pitkittyneestä heräämöajasta tai vanhempien aiheuttamista ongelmista
- tutkittu enemmän aikuispotilaiden näkökulmasta; tulokset hyvin myönteisiä!



esim. Halli ym. 1995; Jackson ym. 1997; Smykowski & Rodriguez, 2003; Houle ym. 2015

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Vanhemmat voisivat tulla lapsen luo, kun...



- ...vanhemmat on etukäteen valmisteltu ja ohjattu
- ...lapsi on **riittävästi** hereillä ja pitää **ilmatiensä** hyvin auki
- ...lapsi on vitaletoiminnoiltaan stabiili

- hyödyt esille erityisesti alle kouluikäisillä lapsilla?
- pitää olla vapaaehtoista vanhemmille ja lapselle
- lisäksi huomioitava mm.

- intimitteettisuojajärjestelyt
- tilaratkaisut, istuimet
- vanhempien kulkureitit
- koko henkilökunnan sitoutuminen



edim. Halli ym. 1995; Fina ym. 1997; Kamerling ym. 2008; Houle ym. 2015

Nurstoons



Lähteet



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