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Digital technology distraction for acute pain in children: a meta-analysis

M. Gates, PhD, L. Hartling, PhD, J. Shulhan-Kilroy, MSc, T. MacGregor, MA, S. Guitard, MSc, A. Wingert, MPH, R. Featherstone, MLIS, B. Vandermeer, MSc, N. Poonai, MD, MSc, J. Kircher, MD, S. Perry, MN, T. Graham, MD, MSc, S. Scott, PhD, S. Ali, MD CM, University of Alberta, Edmonton, AB

Introduction: Digital distraction is being integrated into pediatric pain care, but its efficacy is currently unknown. We conducted a systematic review to determine the effect of digital technology distraction on pain and distress for children experiencing acutely painful conditions or medical procedures. **Methods:** We searched eight online databases (MEDLINE, Embase, Cochrane Library, CINAHL, PsycINFO, IEEE Xplore, Ei Compendex, Web of Science), grey literature sources, scanned reference lists, and contacted experts for quantitative studies where digital technologies were used as distraction for acutely painful conditions or procedures in children. Study selection was performed by two independent reviewers with consensus. One reviewer extracted relevant study data and another verified it for accuracy. Appraisal of risk of bias within studies and the certainty of the body of evidence were performed independently in duplicate, with the final appraisal determined by consensus. The primary outcomes of interest were child pain and distress. **Results:** Of 3247 unique records identified by the search, we included 106 studies (n = 7820) that reported on digital technology distractors (e.g., virtual reality; videogames) used during common procedures (e.g., venipuncture, minor dental procedures, burn treatments). We located no studies reporting on painful conditions. For painful procedures, digital distraction resulted in a modest but clinically important reduction in self-reported pain (SMD -0.48, 95% CI -0.66 to -0.29, 46 RCTs, n = 3200), observer-reported pain (SMD -0.68, 95% CI -0.91 to -0.45, 17 RCTs, n = 1199), behavioural pain (SMD -0.57, 95% CI -0.94 to -0.19, 19 RCTs, n = 1173), self-reported distress (SMD -0.49, 95% CI -0.70 to -0.27, 19 RCTs, n = 1818), observer-reported distress (SMD -0.47, 95% CI -0.77 to -0.17, 10 RCTs, n = 826), and behavioural distress (SMD -0.35, 95% CI -0.59 to -0.12, 17 RCTs, n = 1264) compared to usual care. Few studies directly compared different distractors or provided subgroup data to inform applicability. **Conclusion:** Digital distraction provides modest pain and distress reduction for children undergoing painful procedures; its superiority over non-digital distractors is not established. Healthcare providers and parents should strongly consider using distractions as a pain-reduction strategy for children and teens during common painful procedures (e.g., needle pokes, dental fillings). Context, child preference, and availability should inform the choice of distractor.

Keywords: digital technology, distraction, pain

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Pain free laceration repairs using intra-nasal ketamine: DosINK 2 clinical trial

S. Rached-Dastous, MD, E. D. Trottier, MD, Y. Finkelstein, BSc, MD, B. Bailey, BSc, MD, MSc, C. Marquis, MSc, BPharm, D. Lebel, MSc, M. Desjardins, MD, SickKids Hospital, Toronto, ON

Introduction: Lacerations are common in children presenting to the emergency department (ED). They are often uncooperative when sutures are needed and may require procedural sedation. Few studies have evaluated intranasal (IN) ketamine for procedural sedation in children, with doses from 3 to 9 mg/kg used mostly for dental procedures. In a previous dose escalation trial, DosINK-1, 6 mg/kg was found to be the optimal IN ketamine dose for procedural sedation for sutures in children. In this trial, we aim to further evaluate the efficacy of this dose. **Methods:** We conducted a multicentre single-arm clinical trial. A convenience sample of 30 uncooperative children between 1 and 12 years (10 to 30 kg) with no cardiac or kidney disease, active respiratory infection, prior administration of opioid or sedative agents received 6 mg/kg of IN ketamine using an atomizer for their laceration repair with sutures in the ED. The primary outcome was defined as the proportion (95% CI) of patients who achieved an adequate procedural sedation evaluated with the PERC/PECARN consensus criteria. **Results:** Thirty patients were recruited from April 2018 to November 2019 in 2 pediatric ED. The median age was 3.2 (interquartile range(IQR), 1.9 to 4.7) years-old with laceration of more than 2 cm in 20 (67%) patients and in the face in 21 (70%) cases. Sedation was effective in 18 out of 30 children 60% (95%CI, 45 to 80), was suboptimal in 6 patients (20%) with a procedure completed with minimal difficulties, and unsuccessful in the remaining 6 (20%), all without serious adverse event. Similarly, 21/30 (70%) physicians were willing to reuse IN ketamine at the same doses and 25 parents (83%) would agree to the same sedation in the future. Median time to return to baseline status was 58 min (IQR, 33 to 73). One patient desaturated during the procedure and required transitory oxygen and repositioning. After the procedure, 1 (3%) patient had headache, 1 (3%) patient had nausea, and 2 (7%) patients vomited. **Conclusion:** A single dose of 6 mg/kg of IN Ketamine for laceration repair with sutures in uncooperative children is safe and facilitated the procedure in 60% (95%CI, 45 to 80) of patients, was suboptimal in 20% and unsuccessful in 20% of patients. As seen with IV ketamine, an available additional dose of IN ketamine for some children if needed could potentially increase proportion of successful sedation. However, the safety and efficacy of repeated doses needs to be addressed.

Keywords: intranasal ketamine, pediatrics, procedural sedation

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Emergency department use by pregnant women: a population-based study within a universal healthcare system

C. Varner, MD, MSc, A. Park, MSc, D. Little, BSc, J. Ray, MD, MSc, Mount Sinai Hospital - University of Toronto, Toronto, ON

Introduction: Emergency Department (ED) utilization during pregnancy may be common, but data specific to universal healthcare systems like Canada are lacking, where pregnancy care is supposed to be standardized. The objective of this study was to quantify and characterize ED utilization among all Ontarian women who had a recognized pregnancy, including by trimester and within 42 days after pregnancy, and further stratified by pregnancy outcome. **Methods:** Utilizing provincial administrative health databases, this retrospective population-based cohort study included all recognized pregnancies in Ontario conceived between April 1, 2002 and March 31, 2017. Peri-pregnancy ED utilization was defined as any ED visit from 0-42 weeks' gestation, or within 42 days after the end of pregnancy. Modified Poisson regression was used to generate relative risks (RR) and 95% confidence intervals (CI) for the outcome of any peri-pregnancy ED utilization in association with maternal characteristics. **Results:** Peri-pregnancy ED utilization occurred among 1,075,991 of 2,728,236 recognized pregnancies (39.4%), including among 35.8% of livebirths, 47.3% of stillbirths, 73.7% of miscarriages, and 84.8% of threatened abortions. There were 22,802 (0.84%) ectopic

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