

# Pediatric Pain Letter

*Abstracts and Commentaries on Pain in Infants, Children and Adolescents*

## Editorial Board

### Editors and Publishers

Patrick J. McGrath Ph.D.  
G. Allen Finley M.D. FRCPC  
Dalhousie University & IWK Grace Health Centre  
Halifax, Nova Scotia, Canada

### Editorial Board Members

H. Abu-Saad, Maastricht, The Netherlands  
C. Berde, Boston, USA  
D. Champion, Sydney, Australia  
K. Craig, Vancouver, Canada  
J. Eland, Iowa City, USA  
C. Eccleston, Bath, UK  
M. Fitzgerald, London, UK  
G. Frager, Halifax, Canada  
S. Hertel, Copenhagen, Denmark  
C. Johnston, Montreal, Canada  
N. Morton, Glasgow, Scotland  
G. Olsson, Stockholm, Sweden  
J. Ritchie, Halifax, Canada  
N. Schechter, Hartford, USA  
A. Unruh, Halifax, Canada  
C. von Baeyer, Saskatoon, Canada

### Editorial Staff

Managing Editor: Jill Hatchette, [jhatchet@is.dal.ca](mailto:jhatchet@is.dal.ca)  
Copy Editor: Allan Hennigar, [ahennig@is.dal.ca](mailto:ahennig@is.dal.ca)  
Psychology Department, Dalhousie University, Halifax, NS  
B3H 4J1, Canada, tel (902) 494-1938, fax (902) 494-6585

## Subscriptions

One-year subscription is \$25 CDN in Canada, \$35 CDN or \$25 US in other countries. Payment can be made by cheque (payable to Dalhousie University - *Pediatric Pain Letter*), Visa, or MasterCard. Subscribe by sending payment and mailing address to the Managing Editor. The *Pediatric Pain Letter* is also distributed by AstraZeneca.

## Table of Contents

|  |    |
|--|----|
| Editorial  | 13 |
| Abstracts  |    |
| Gender differences in chronic pain in children and adolescents | 14 |
| Commentary   | 16 |
| Recent Articles  | 17 |
| Review Articles  | 22 |
| Film Review  | 23 |
| Announcements  | 23 |

## Editorial

Pediatric pain comes in two sexes. As anyone who has dealt with boys and girls know, there are important differences between them. However, it is important to note that, in general, there is more variability among individuals of either sex than there is between sexes. At this point in time, knowing whether a child is a boy or girl will not be of great use in determining much about their pain or its treatment.

However, research on pain and gender, which is the focus of the commentary by Dr. Hunfeld, is important because it is a beginning of our understanding of some contextual and biological factors in pediatric pain.

Unfortunately, much pediatric pain research does not include enough information about gender differences. At the very least, every study in pediatric pain should detail the numbers of males and females and should analyse all data separately for each sex. For clinical practice, we need to know if there are clinically meaningful differences between males and females.

# Abstracts

## *Gender differences in chronic pain in children and adolescents*

**Fearon, I., McGrath, P.J. & Achat, H. (1996) 'Boobos': the study of everyday pain among young children. *Pain*, 68, 55-62.**

**Objective.** To investigate the prevalence and nature of incidents of everyday pain and to determine the sex-related effects in children's responses to everyday pain.

**Design.** Observational study.

**Setting.** Day-care centres.

**Participants.** Fifty-six children (31 male; mean age=52 months, range 28-81).

**Main outcome measures.** An observational checklist (Dalhousie Everyday Pain Scale) was used to record: age and sex of subjects; location of pain (incident and body); behavioural context (i.e., activity level, emotional tone and personal control, number of participants); observer's perceived severity of hurt; subject's response (i.e. intensity of distress, intensity of anger, protective behaviours, social response); adult response.

**Results.** Girls responded to pain incidents with higher distress intensity scores ( $p=0.03$ ). They responded with verbal complaints, sobbing, crying, or screaming in a total of 82 incidents (57%), while boys responded similarly in only 65 incidents (42%). Adults responded to girls with physical comfort significantly more often than with boys (23% vs. 11%;  $p<0.05$ ). For 65% of all incidents no adult response was offered. Frequency of social response decreased with age ( $r=-0.10$ ;  $p<0.05$ ) and was primarily accounted for by help-seeking behaviours. Frequency of protective behaviours increased with age ( $r=0.09$ ;  $p=0.06$ ).

**Conclusions.** No age and sex differences in the incidence or severity of everyday pain were found. Girls engaged in distress responses more often and received more physical comfort from adult caregivers than boys. Girls may have a greater physiological sensitivity to pain or girls and boys may just have different response styles. It appears that girls received more physical comfort because their vocal response style was more effective in alerting the care-giver to the occurrence of a 'booboo.' This does not rule out the possibility that adults' responses were influenced by sex-stereotyped attitudes and that these attitudes served to reinforce a vocal style in girls.

**Gaffney, A. & Dunne, E.A. (1986). Developmental aspects of children's definitions of pain. *Pain*, 26, 105-117.**

**Objective.** To investigate if a developmental pattern could be identified in children's definitions of pain.

**Design.** Survey.

**Setting.** Classroom in a city and country town in Ireland.

**Participants.** Six-hundred and eighty children between 5 and 14 years were sorted into 3 age groups corresponding to the Piagetian stages of pre-operational (ages 5-7 years), concrete operational (ages 8-10 years) and formal operational thinking (ages 11-14 years).

**Main outcome measures.** Sentence completion protocol for which each child had to complete the sentence 'Pain is...'. Responses were scrutinized to derive coding categories. A random sample of 40 protocols were coded by two independent raters.

**Results.** Interrater agreement was 93%. There was significant linear increase with age in the number of themes used ( $p<0.001$ ). The youngest group focussed upon perceptually dominant, physical factors; slightly older children began to use physical analogies to describe pain and demonstrated a developing awareness of the psychological concomitants of pain (e.g., its ability to affect the mood of the sufferer); the oldest group gave definitions of pain which included physical and psychological components and viewed pain more actively (i.e. something which has to be dealt with, or borne stoically). Thirty themes were common to both genders (boys used 38 and girls used 36) and the pattern of emergence for each was similar (rank order correlation coefficient=0.66,  $p<0.001$ ), however, more girls ( $p<0.01$ ) defined pain as an unpleasant feeling or sensation. Themes only used by boys included: the immobilising effects of pain, attempts to conceal pain and uncertainty of duration. Themes only used by girls included: unpredictability of onset, malfunction and variety of causes.

**Conclusions.** Knowledge of the themes used by children to define pain may be useful as a guide to communicating about pain with children of various ages. It should be noted that the perspectives on pain outlined above represent cognitive functioning under favourable conditions. It is likely that under the stress of illness, regression to earlier modes of thinking might occur, with an associated decrement in the child's ability to verbalise about pain.

Goodenough, B., Thomas, W., Champion, G.D., Perrott, D., Taplin, J.E., von Baeyer, C.L. & Ziegler, J.B. (1999). Unravelling age effects and sex differences in needle pain: ratings of sensory intensity and unpleasantness of venipuncture pain by children and their parents. *Pain*, 80, 179-190.

Previously abstracted in the *Pediatric Pain Letter*, Vol. 3, No. 4; p. 42.

Hogeweg, J.A., Kuis, W., Oostendorp, R.A. & Helders, P.J. (1996). The influence of site of stimulation, age, and gender on pain threshold in healthy children. *Physical Therapy*, 76, 1331-1339.

**Objective.** To determine whether Mechanical Pain Thresholds (MPTh) change with age in children and to investigate the influence of the site of the stimulation and gender on the magnitude of MPTh.

**Design.** Experimental study.

**Setting.** Room with a stable temperature of 18°C at a children's hospital in the Netherlands.

**Participants.** Sixty-nine schoolchildren (36 girls) with no known history of chronic illness divided into two age groups: 6 to 11 years old (n=38; mean age=9.4, SD=1.3) and 12 to 17 years old (n=31; mean age=14, SD=1.6).

**Main outcome measures.** MPTh's were determined by applying pressure three times on both sides of the body at the elbow, wrist, knee and ankle and paraspinally at C-6, T-1, T-3, T-6, T-10, L-1, L-3, L-5 with an algometer or pressure threshold metre. The children were asked to indicate when the pressure became painful.

**Results.** In the paraspinal region mean MPTh gradually increased rostrocaudally (C-6=2.5 kg/cm<sup>2</sup>; L-5=5.0 kg/cm<sup>2</sup>; p<0.001). MPTh levels for the 4 peripheral joints (elbow, wrist, knee and ankle) were higher than paraspinally, with the exception of the mean MPTh of the ankle, which was about the same level as that found at the lumbar paravertebral sites. The younger children showed consistently lower values than did older children (p=0.04) with mean paraspinal, not mean extremity, MPTh responsible for the difference (p=0.03). There was no interaction between gender and age, with respect to either mean paraspinal or mean extremity MPTh. Male subjects had higher MPTh's than female subjects except in the lumbar region where females' were higher, however, these differences were non-significant. Females in group 2 did show a significantly lower MPTh for the knee (p<0.05).

**Conclusions.** Although not significant, females had lower

MPTh's than males. Combined with the findings from a previous study where females showed a significantly lower level of pain-sensitivity using the same algometer in adults (mean age=27 years), the authors conclude that the results might indicate that MPTh differences between male and female subjects become more manifest after puberty.

Link Egger, H., Angold, A. & Costello, E.J. (1998). Headaches and psychopathology in children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 37(9), 951-958.

**Objective.** To assess the association between psychopathology and headaches.

**Design.** Longitudinal design with the initial interview, 1-year and 2-year follow-ups.

**Setting.** Public schools in the Southeastern United States.

**Participants.** The Student Information Management System was used to develop a representative sample of 9-13 year olds (n=4500) for the Great Smokey Mountains Study (Costello et al., 1996). Those scoring above a predetermined cutoff score of 20 on the Child Behavior Checklist and a 1-in-10 random sample of those scoring below the cutoff were recruited (n=1013).

**Main outcome measures.** The child and primary caretaker were separately interviewed about the child's psychiatric status and service use with the Child and Adolescent Psychiatric Assessment (CAPA) using DSM-III-R diagnoses (i.e. depression, anxiety disorder (AD), oppositional defiant disorder (ODD), conduct disorders (CD), attention-deficit hyperactivity disorder (ADHD)). Headaches were coded as present only if they lasted for at least 1 hour and occurred at least once a week during the preceding 3 months. Major headache parameters were: frequency, duration, the impact of headache on missing school and medication use.

**Results.** One hundred fifty-nine boys (10.4%) and 159 girls (10.2%) reported headaches according to the criteria. The prevalence of headaches increased with age (p=0.0002), with no significant gender difference. More children with at least one psychiatric diagnosis reported headaches than those without a psychiatric diagnosis (for girls, 30.6% vs. 9.3% (p=0.003); for boys, 13.1% vs. 9.2% (p=0.1)). Depressed girls reported a greater prevalence of headaches than girls who were not depressed (40.8% vs. 10.5%; p=0.02). For girls reporting headaches, those who were depressed had more frequent headaches (7 vs. 3 times/week; p=0.0001), missed school

more often because of headaches (70% vs. 13.7%;  $p=0.002$ ) and took headache medication more often (67% vs. 22.7%;  $p=0.01$ ) than non-depressed girls. Girls with an AD reported a greater prevalence of headaches than girls who were not anxious (34.1% vs. 10%;  $p=0.04$ ). Girls with headaches and an AD missed less school (4.9% vs. 19.3%;  $p=0.02$ ) and took less medication (10% vs. 27.9%;  $p=0.006$ ) than girls with headaches without an AD. Headaches were more prevalent in boys with CD than in boys without CD (19.2% vs. 9.4;  $p=0.03$ ). For boys reporting headaches, those with CD reported that their headaches significantly interfered with their lives more often than boys without CD (68.8% vs. 31.5%;  $p=0.03$ ).

**Conclusions.** The prevalence of headaches were similar for boys and girls. The association between headaches and internalizing disorders was specific to girls, whereas conduct disorders were significantly associated with headaches in boys. The study suggests that a distinct gender difference exists between boys and girls in the associations between headaches and psychopathology.

## Commentary

It is well-known that prevalence rates, for instance, of headaches (Bille; 1981, Sillanpää, 1983; Passchier et al., 1985), abdominal pain (Perquin et al., in press) and back pain (Brattberg, 1994) are higher in girls than in boys, particularly older girls (of approximately 10 years or older). As pain is both a sensory and emotional experience, it is important to know which component shows this gender difference in particular. Emotional experiences and, in addition, age, cognitive level, social environment and biology can have moderating effects on the gender differences in the pain that is experienced. The referred studies were chosen to elaborate more on these gender differences, to find out if and why certain components of pain are specific to being a boy or a girl.

Gaffney et al. (1986) showed the cognitive developmental aspects of children's definitions of pain. Although boys and girls used only slightly different themes in defining pain, the themes on which they differed suggest that sex-stereotyped attitudes are already present at a young age, as girls described their pain significantly more often as an unpleasant feeling or sensation. Only boys mentioned the immobilising effects of pain, whereas only girls mentioned the unpredictability of the onset of pain and the uncertainty about its cause. In line with these findings, Fearon et al. (1996) observed for everyday pain that girls engaged more often in distress responses, but they found no

sex differences in the severity of everyday pain. Nevertheless, girls received more physical comfort from adult caregivers which may induce them to express pain for secondary gain. In addition, Goodenough et al. (1999) found no sex differences in the sensory intensity of needle pain, however, sex differences emerged concerning the affective evaluation of pain. From approximately 8-years of age, children (especially girls) gave significantly higher ratings of unpleasantness than sensory intensity of needle pain. In our not (yet) published prospective studies on chronic pain in children and adolescents, we also found in the younger age group no gender differences in pain intensity or frequency. Gender differences only emerged in adolescents (12-18 years) with girls reporting significantly more intense and more frequent pain. Hogeweg et al. (1996) were among the few who conducted an experiment in healthy children on the biological mechanisms behind the gender differences in the experience of pain; they found lower pain thresholds in girls than in boys. Although the differences were not significant, they suggest that, based on adult studies, the lower pain threshold may become more manifest after puberty.

The interesting gender difference in the study of Link Egger et al. (1998) concerning the relationship between headaches and internalizing psychopathology in girls and externalizing psychopathology in boys with headaches calls for further study, including other pain types, such as pain of the limbs, abdomen or back. Again, pain in girls was predominantly more associated with the affective domain and in boys with the functional status.

It is striking that although chronic pain is more prevalent in females, the genesis of gender differences in pain in children and adolescents rarely has been the primary focus of research. An exploration of the interaction of physiological differences between boys and girls, including hormonal and neurobiological differences, genetic differences and differing effects of environmental factors, including stress, trauma, family disruption and familial psychopathology, could lead to a more comprehensive understanding of how and why pain differs with gender. It is also important to know more about the development of gender differences in pain experience at an earlier age to prevent disability in adults (McGrath, 1998).

One may wonder if behavioural interventions regarding chronic pain in girls should have a different focus than those in boys. The previous studies suggest that girls benefit more from treatments which help them cope



with the emotional factors and consequences of their pain, while techniques which are focussed on behaviour might be more effective for boys.

Joke A.M. Hunfeld, PhD  
Institute Medical Psychology and Psychotherapy  
Department of General Practice  
Erasmus University Rotterdam  
The Netherlands

#### References

- Bille, B. (1981). Migraine in childhood and its prognosis. *Cephalgia*, 1, 71-75.
- Brattberg, G. (1994). The incidence of back pain and headache among Swedish school children. *Quality of Life Research*, 3(1), S27-31.
- McGrath, P.A. (1998). Girls' and boys' differing response to pain starts early in their lives.- in Medical News & Perspectives. *JAMA*, 23/30, 280, 1035-1036.
- Passchier, J. & Orlebeke, J.F. (1985). Headaches and stress in school children: an epidemiological study. *Cephalgia*, 5, 167-176.
- Perquin, C.W., Hazebroek-Kampschreur, A.A.J.M, Hunfeld, J.A.M. et al. (In press). Pain in children and adolescents: a common experience. *Pain*.
- Sillanpää, M. (1983). Prevalence of headache in prepuberty. *Headache*, 23, 10-14.

**Editorial note.** A more extensive review of pain, disability, health utilization and gender in children is available in Unruh and Campbell (1999) from *Chronic and Recurrent Pain in Children and Adolescents* (Eds. McGrath, P.J. & Finley, G.A. Seattle: IASP Press.)

## Recent Articles

**Ballantyne, M., Stevens, B., McAllister, M., Dionne, K. & Jack, A. (1999). Validation of the Premature Infant Pain Profile in the clinical setting. *The Clinical Journal of Pain*, 15, 297-303.**

**Objective.** To determine the construct validity and the inter- and intrarater reliability of the Premature Infant Pain Profile (PIPP) with naturally occurring pain in a clinical setting.

**Design.** Randomized, crossover study.

**Setting.** Level III NICU at a university-affiliated children's teaching hospital.

**Participants.** Convenience sample of 43 neonates stratified into four gestational age groups (<28 weeks, n=9; 28-32 weeks, n=12; 32-36 week, n=10; >36 weeks, n=12).

**Main outcome measures.** Two raters at bedside used the

PIPP (a 7-indicator composite measure that includes behavioural, physiologic and contextual indicators) to independently and simultaneously score the neonates' responses in real time during three 45 second long events (baseline, non-pain, pain). Behavioural responses were videotaped and physiological responses were computer recorded. Two independent expert raters who were blind to the events assessed the neonates' responses using the videotapes and, to determine intrarater reliability, reassessed a random selection of 10 neonates 2 weeks later.

**Results.** For the baseline, non-pain and pain events the mean PIPP scores were 4.9 (SD=1.0), 9.0 (SD=0.8) and 11.0 (SD=1.3). For the 2 videotape raters the 2 youngest age groups had lower pain event scores ( $p < 0.045$ ) and for one rater there was a significant difference in the baseline scores for the <28 and >36 weeks groups ( $p=0.04$ ). A significant main effect was detected for events which differentiated pain from baseline and no pain events ( $p=0.0001$ ). Using individual indicators and total pain scores for all raters, interrater reliability analysis yielded intraclass correlation coefficients of 0.93-0.96. Intrarater reliability for individual event scores was also good (intraclass correlation coefficients >0.94).

**Conclusions.** The PIPP is a valid and reliable measure for assessing procedural pain in term and preterm infants in a clinical setting. Further study is required to evaluate its use assessing non-acute and post-operative pain and with very low-birth-weight neonates.

**Bruni, O., Galli, F. & Guidetti, V. (1999) Sleep hygiene and migraine in children and adolescents. *Cephalgia*, 19(S25), 57- 59.**

**Objective.** To evaluate the effect of the modification of bad sleep habits on the frequency, duration and severity of headaches in children and adolescents.

**Design.** Randomized trial.

**Setting.** University clinic

**Participants.** A clinical sample of 164 (89 male; mean age=10.3 years, SD=1.7) migraine patients were selected from a previous study and compared to a control group of 893 healthy children (433 male; mean age=10.6 years, SD=1.3). Based on the presence of at least two criteria of poor sleep hygiene, 70 subjects from the migraine group were randomly assigned to an intervention group (Group A; n=35; 20 males; mean=9.3 years, SD=1.3) which received instructions on improving sleep hygiene and a control group (Group B; n=35; 18 males; mean age=10.1 years, SD=1.6) which received no instructions.

**Main Outcome Measures.** The migraine and control group were surveyed on the presence of several items for defining poor sleep habits: bedtime later than 11 pm, wake-up later than 8 am, nap during the daytime, irregular schedule (bedtime and wake-up time varying by more than 1 hour on school days), cola, tea, coffee, chocolate late in the afternoon or evening and the need to take drugs or drink fluids to facilitate sleep. Diagnosis of headache was defined through a structured questionnaire according to the International Headache Society criteria. Migraine children underwent diagnostic procedures, filled out a headache diary and were compared to the control group.

**Results.** When children with migraine were compared with controls, more of them: fell asleep later (16% vs. 7% respectively;  $p < 0.001$ ); woke up later (3.5% vs. 0.2%;  $p < 0.0001$ ); napped during the day (7.4% vs. 3.3%;  $p < 0.005$ ); had shorter duration of night sleep (558 vs. 565 minutes;  $p < 0.05$ ); had irregular bedtime (10.6% vs. 5.8%;  $p < 0.05$ ) and wakeup (9.2% vs. 1.7%;  $p < 0.0001$ ) schedules. After application of sleep hygiene guidelines, the mean duration of migraine attacks was significantly reduced in Group A at first observation, 3 months and 6 months (234, 78 and 65 minutes respectively) whereas Group B only showed an initial nonsignificant reduction. The frequency of Group A subjects with more than one attack per week was 35% at first, 15% at 3 months, 11% at 6 months. There was no significant change in group B. No difference was found in the severity of migraine attacks between the two groups.

**Conclusions.** Better sleep habits may have a role in relieving migraine attacks. The nature of the relationship between sleep disturbances and headache is unknown. Although better sleep can mean a lower frequency and duration of migraine attacks, the severity of the attacks seemed to be independent of bad sleep habits. It is possible that the severity may be related to sleep disorders. The informed clinician should be concerned about sleep-state organization in all children who present with physical or psychological disorders.

**Buchanan, B. J., Hoagland, J. & Fischer, P. R. (1999). Pseudoephedrine and air travel-associated ear pain in children. Archives of Pediatric & Adolescent Medicine, 153, 466-468.**

**Objective.** To compare the effect of pseudoephedrine to placebo on air travel-related ear pain in children.

**Design.** Randomized double-blind placebo-control trial.

**Setting.** University student housing and medical centre,

pediatricians' offices, day care centres and a travel agency in Utah, USA.

**Participants.** Fifty children (age range 0.5-6 years) who were to be travelling via airplane were recruited (100 flights occurred during the study; 9 were excluded due to unsuccessful treatment administration). Children taking antihistamines and/or decongestants during the 24 hours prior to flying were not included for study.

**Intervention.** Parents of participants were given two randomly assigned syringes (placebo or pseudoephedrine). They were administered to the child orally 30-60 minutes prior to flight ascent and 30-60 minutes prior to flight descent. Pseudoephedrine was administered at doses of one mg/kg in a six mg/kg syrup.

**Main Outcome Measures.** Questionnaires were administered to collect information regarding the children's past history of air travel-related ear pain, children's ear pain during the two weeks prior to flight and runny nose and earache during the 24 hours prior to flight. Parental observations were also collected regarding their children's ear pain, drowsiness and excitability during ascent and descent for each flight. These parental observations were ranked on a four point scale from none to severe.

**Results.** Children were observed to experience ear pain on 14% of flights. Of the children experiencing ear pain, 31% had ear pain during ascent and 85% during descent. No differences in reported decreases in pain were observed in children in the pseudoephedrine group compared to the placebo group during ascent (4% experimental group vs. 5% placebo group) or descent (12% experimental group vs. 13% placebo group). The rates of reported child excitability at takeoff and landing were not significantly different between groups. Children's reported level of drowsiness during ascent differed significantly between groups (60% vs. 20% placebo,  $p < 0.01$ ). The level of reported drowsiness in children did not differ between groups at descent (47% vs. 36% placebo). Nine flight questionnaires were excluded from analysis due to unsuccessful treatment administration.

**Conclusions.** The data from this randomized placebo-control trial suggest that pseudoephedrine administration did not lead to a significant reduction in flight-related ear pain in children. Pseudoephedrine did however appear to cause an increase in drowsiness in children during flight ascent compared to controls.

**Cohen, L.L., Blount, R.L., Cohen, R.J., Schaen, E.R. & Zaff, J.F. (1999). Comparative study of distraction versus topical anesthesia for pediatric pain management during immunizations. *Health Psychology, 18*, 591-598.**

**Objective.** To evaluate the effect of distraction, eutectic mixture of local anesthetics (EMLA) and typical care in reducing child distress and pain and increasing child coping during immunization.

**Design.** Within subjects, repeated measures.

**Setting.** School health clinic.

**Participants.** Thirty-nine 4<sup>th</sup> grade children (23 girls; mean age=9.9 years, SD=0.51) receiving Hepatitis-B vaccination.

**Intervention.** Children were exposed to 3 experimental conditions, one for each immunization shot they received. In the typical care condition the nurse was instructed to interact with the child in the manner she would under normal circumstances. In the distraction condition, the child viewed a movie while the nurse made comments designed to encourage the child to continue attending to the movie throughout the immunization procedure. In the EMLA condition, children received 2 g of cream 1 hour prior to immunization. Upon the child return, the nurse carried out the immunization in a manner similar to the typical care condition.

**Main Outcome Measures.** The Child-Adult Medical Procedure Interaction Scale-Revised (CAMPIS-R) assessed child (attention to movie, non-verbal pain responses) and nurse (distraction efforts) behaviours. Visual analogue scales (VAS) anchored by "not upset" and "very upset" were administered to the children prior to the shot ("how upset *will you be* during the shot?") and after the shot ("how upset *were you* during the shot?"). Following each immunization, nurse ratings of personal upset, child upset and child pain were completed with VAS's. In addition, heart rate was taken as a physiological measure. Finally, following the series of shots, the children were interviewed in order to determine consumer satisfaction with the 3 conditions in reducing their fear, anxiety and pain.

**Results.** Children displayed more coping in the distraction condition than either the EMLA condition or the typical care condition ( $p$ 's=0.000). Less child distress was demonstrated in the distraction condition than the EMLA condition ( $p$ =0.012). More coping promotion strategies were employed by the nurse in the distraction condition than the EMLA or typical care conditions ( $p$ 's<0.004). There were no differences across conditions for child or nurse's reports of distress and pain, or for child's heart rate. Children reported that EMLA and distraction provided the

most fear reduction (39% and 36% respectively), however 52% of the children chose distraction as the method they most liked.

**Conclusions.** Findings provide further evidence that nurse coaching and distraction are effective in reducing child fear and increasing child coping during painful medical procedures. Moreover, children seem to prefer distraction techniques to EMLA cream or typical care and the provision of distraction strategies is more cost efficient than EMLA.

**Holliday, M.A., Pinckert, T.L., Kiernan, S.C., Kunos, I., Angelus, P. & Keszler, M. (1999). Dorsal penile nerve block vs. topical placebo for circumcisions in low-birth-weight neonates. *Archives of Pediatrics & Adolescent Medicine, 153*, 476-480.**

**Objective.** To investigate the efficacy and safety of dorsal penile nerve block (DPNB) and eutectic mixture of local anesthetics (EMLA) for pain associated with circumcision in low-birth-weight infants.

**Design.** Randomized, blinded, controlled trial.

**Setting.** Intensive care nursery in a university medical centre.

**Participants.** Fifty neonates (1600-2500 g at time of circumcision) were randomly assigned to DPNB ( $n$ =19; mean birth weight=1728 g, SD=534; mean post-conceptual age=36 weeks, SD=1.9), EMLA ( $n$ =12) or control ( $n$ =19; mean birth weight=1733 g, SD=533; mean postconceptional age=35.5 weeks, SD=1.6) conditions. Those neonates with congenital abnormalities were excluded from the study.

**Intervention.** Neonates received either: subcutaneous injection of 1% lidocaine hydrochloride (DPNB) and topical placebo (acid mantle cream); topical EMLA; or topical placebo alone (control).

**Main Outcome Measures.** An observational behavioural scale based on 8 state variables (e.g. sleep state, cry, facial expression, torso movement, soothability, response to distress, need for tactile stimulation and environmental noise) and interventions required to soothe the neonate (e.g. vocalization, touch, pacifier) were rated on a 6-point scale. Physiological variables were also assessed (e.g. heart rate, respiratory rate, blood pressure, oxygen saturation) at 5 minutes before, during and 5 and 20 minutes following circumcision.

**Results.** The EMLA condition was dropped after 2 infants experienced redness and blistering of the foreskin. Blood pressure increased in both groups (DPNB and control)

during circumcision ( $p < 0.001$ ) and persisted 5 minutes after circumcision. Behavioural scores increased significantly in the control group both during and after circumcision ( $p < 0.001$ ) but were stable in the DPNB group during circumcision and increased from baseline after circumcision ( $p < 0.001$ ). The control group showed elevated crying both during and following circumcision while the DPNB group's scores returned to baseline following circumcision (differences were particularly evident during foreskin clamping ( $p < 0.001$ )).

**Conclusions.** In this limited sample DPNB was a safe (no complications with DPNB) and effective anesthetic agent for pain control during circumcision. The erythematous reaction seen in EMLA group neonates may indicate individual differences in skin sensitivity within this age group. Further research should focus on replication with an increased sample size and the use of an oral analgesic for pain control following the diminished effect of DPNB.

**Kain, Z.N., Wang, S.M., Mayes, L.C., Caramico, L.A. & Hofstadter, M.B. (1994). Distress during the induction of anesthesia and postoperative behavioural outcomes. *Anesthesia & Analgesia*, 88(10), 1042-1047.**

**Objective.** Prediction of negative behavioural changes following general anesthesia and surgery from pre-surgery anxiety.

**Design.** Short-term longitudinal.

**Setting.** Children's hospital.

**Participants.** Ninety-one children (age range 1-7 years) were recruited who either did (60% male; mean age=5.3 years, SD=1.9) or did not (67% male; mean age 4.7 years) participate in a preoperative preparation program. Exclusion criteria were a recent major life stress, chronic illness, premature birth or developmental delay.

**Main Outcome Measures.** Anxiety was measured during induction of general anesthesia using the Modified Yale Preoperative Anxiety Scale (MYPAS). Behaviour problems were assessed using the Post-Hospitalization Behaviour Questionnaire (PHBQ) on days 1, 2, 3, 7 and 14.

**Results.** More anxious children (upper 50% of MYPAS) had 3.5 times the risk for negative behaviours after surgery ( $p = 0.0001$ ) than less anxious children (lower 50%). The number of reported problems reduced with time after surgery ( $p = 0.0001$ ). The number of reported negative behaviours was affected by type of surgery with more negative behaviours reported following genitourinary surgeries than pressure-equalizing surgeries ( $p = 0.006$ ). Correlation between child anxiety at mask introduction and

excitement score on arrival in the PACU was 0.42 ( $p = 0.004$ ).

**Conclusions.** Anxious children reported more problem behaviours following surgery than non-anxious children. However, the number of reported problem behaviours diminished over time and was variable among types of surgeries. It is suggested that parents be advised on the increased likelihood of problem behaviours for children identified as anxious.

**Ljungman, G., Kreuger, A., Andréasson, S., Gordh, T. & Sörensen, S. (2000). Midazolam nasal spray reduces procedural anxiety in children. *Pediatrics*, 105, 73- 78.**

**Objective.** To determine if administration of intranasal midazolam before needle insertion in a subcutaneously implanted central venous port could reduce anxiety, discomfort, pain and procedure problems. Tolerability and side effects were also investigated.

**Design.** Randomised, double-blind, placebo-controlled, cross-over study.

**Setting.** Regional pediatric oncology centre in Sweden.

**Participants.** Children with cancer and their parents were recruited and randomly sorted into 2 groups based on order of treatment applied: midazolam-placebo-placebo (MPP) or placebo-midazolam-placebo (PMP). Participation dropped off during the course of the study: 43 for the first step, 31 for the second and 17 for the third. For further analysis the data from the first 2 steps was sorted into placebo (P) ( $n = 36$ ; 20 females; median age=5.2, range 0.8-17.9 years; median weight 29.2 kg; median dose=0.025 ml/kg) and midazolam (M) ( $n = 38$ ; 21 females; median age=4.9, range 0.8-17.9 years; median weight 28.2 kg; median dose=0.027 ml/kg) groups. Inclusion criteria for the child were: older than 6 months; would need to have a needle inserted 3 times; and did not frequently need sedation for previous needle insertions.

**Intervention.** All children received EMLA patch 1-2 hours before needle insertion. Either placebo (citric acid 7.65 mg/ml in saline, pH 2.22) or midazolam (same as that used for IV administration, pH 3.3) was administered with a graded pump device providing 0.1 ml per puff. Active ingredient dosage was 0.2 mg/kg body weight with 10 puffs containing the maximum dose.

**Main Outcome Measures.** Effects and side effects (severity assessed with a 100 mm visual analogue scale (VAS)) were monitored for at least an hour after sedation using a ward conscious sedation chart. Nurses, parents and children evaluated the sedation and procedure using



a questionnaire with 7 items: 1 scored dichotomously (“...prefer this medication before next procedure?”) and 6 scored using a 100 mm VAS (calming effect (anxiety), needle discomfort, needle pain, procedure problems, spray discomfort and well-being after needle). Children  $\leq 7$  years completed it with the help of a nurse who did not witness the procedure. Based on nurses’ appraisals of previous needle insertions each child’s fear/anxiety of the procedure was classified into 1 of 3 categories (none, some or much).

**Results.** All children were able to respond to questions during the procedure. Reported side effects were: nasal discomfort (17-M, 15-P), crying (10-M, 3-P), bad taste (3-M, 4-P), split vision (3-M, 0-P) and dizziness (2-M, 0-P). Median side effect severity was 62.5 for the M group and 76 for the P group. Nasal discomfort was the primary reason for dropouts (8 of 43). For the M group: parents and nurses reported reduced anxiety ( $p < 0.001$ ), discomfort ( $p < 0.001$ ), pain ( $p = 0.039$ ) and procedure problems ( $p < 0.001$ ) and more of them would prefer the same medication before the next procedure ( $p < 0.001$ ); children only reported reduced anxiety ( $p = 0.002$ ) and procedure problems ( $p = 0.014$ ). Anxiety/fear of the procedure decreased with age ( $p = 0.024$ ). Differences between M and P groups were most significant for children in the ‘much fear/anxiety’ category.

**Conclusions.** Results indicate nasal midazolam spray helps reduce children’s anxiety about needle insertion and may be applicable to other minor procedures. Nasal discomfort may limit its use, especially in younger children for whom rectal and oral routes may be alternatives.

**Mikkelsen, M. (1999). One-year outcome of pre-adolescents with Fibromyalgia. *The Journal of Rheumatology*, 26(3), 674-682.**

**Objective.** The description of incidence and symptoms consistent with Fibromyalgia (FM) and the identification of physical and psychological factors that may relate to the persistence of FM.

**Design.** Population based blinded follow-up.

**Setting.** Schools in southern Finland.

**Participants.** Children diagnosed with FM ( $n = 22$ ; 19 female) from a population of 1756 (895 female; mean age = 10.8 years, range 8-13). Participants were originally selected on the basis of a questionnaire identifying individuals with widespread pain. The diagnosis of FM was confirmed by personal examination according to the 1990 American College of Rheumatology FM criteria.

**Main Outcome Measures.** The location and frequency of

pain were assessed by a structures questionnaire, as well as other symptoms such as a headache, depression and sleeping problems. The existence of the 10 Yunus minor criteria was assessed. In addition, measures were collected for hypermobility (Beighton’s method), depression (Children’s Depression Inventory; CDI) and problem behaviours (Child Behaviour Checklist (CBCL) and Teacher Report Form (TRF)). Pain was assessed using a tender point palpation and pain threshold measurement was done using Fisher dolorimeter.

**Results.** The prevalence of FM was 2.1% for females and 0.3% for males. Hyper mobility was found in only 1 child. 86% of the children with FM met the Yunus minor criteria. 10 of 22 children had possible depression scores according to the CDI. Problem behaviours were identified in 20% using the CBCL and 25% using the TRF. Other symptoms reported at least once per week included 73% with headache, 68% reported abdominal pain and 95% reported being tired. At 1 year follow-up 16 children were followed. Only 4 of 16 showed persistent FM and 2 children had widespread pain. Other symptoms at follow-up included headache (58%), abdominal pain (68%) and tiredness (84%). The depression scores (CDI) revealed 38% with possible depression, two of which had persistent FM, 1 with regional pain and 1 with widespread pain. The children with persistent FM had the lowest pain threshold at follow-up. One child with persistent FM had the highest sleep score at follow-up.

**Conclusions.** The prevalence rates for FM were similar to reports in Mexico and Italy but lower than Israel. While pain symptoms persisted for 56% of the children, FM persisted in a minority of cases.

**van Dijk, M., de Boer, J.B., Koot, H.M., Tibboel, D., Passchier, J. & Duivenvoorden, H.J. (2000). The reliability and validity of the COMFORT scale as a postoperative pain instrument in 0 to 3-year-old infants. *Pain*, 84, 367-377.**

**Objective.** To determine the reliability and validity of the COMFORT scale as a postoperative pain measure in 0 to 3 year old infants.

**Design.** Survey.

**Setting.** Children’s hospital.

**Participants.** Infants ( $n = 158$ ; 94 males; 0-4 weeks,  $n = 56$ ; 1-6 months,  $n = 47$ ; 7-12 months,  $n = 23$ ; 1-3 years,  $n = 32$ ) who were admitted for superficial ( $n = 8$ ), abdominal ( $n = 120$ ) or thoracic surgery ( $n = 30$ ) because of either congenital anomalies ( $n = 128$ ) or acquired diseases ( $n = 30$ ). Sixty-two required mechanical ventilation after

surgery ( $\geq 36$  hours,  $n=43$ ). Inclusion criteria were a gestational age of at least 35 weeks and body weight  $\geq 1500$  g. Children using medications such as muscle relaxants were excluded due to the potential effects on behavioural assessment.

**Main Outcome Measures.** Pain was assessed at 3, 6 and 9 hours after surgery using the COMFORT scale which is comprised of eight items (6 behavioural descriptions (Alertness, Calmness, Muscle tone, Movement, Facial tension, Respiratory response/crying) and 2 physiological items (Heart rate (HR) and mean arterial pressure (MAP))), each with 5 response categories. A visual analogue scale (VAS) was used to rate pain before and after the COMFORT scale.

**Results.** Interrater reliability (Kappa coefficient) for the COMFORT scale ranged from 0.63 for facial tension to 0.93 for heart rate and mean arterial pressure (MAP) except for respiratory response (0.54). Statistical analysis indicated that the COMFORT data was best represented by 3 variables: COMFORT 'behavioural' (loadings from the behavioural items), HR and MAP. COMFORT 'behavioural' correlated well with VAS before (0.64-0.73) and VAS after (0.79-0.83). Correlations between the COMFORT 'behavioural' scale and other variables at the three assessments (to determine congruent validity) were high for VAS (0.89-0.96), moderate for MAP (0.29-0.39) and low for HR (0.13-0.24). The internal consistency reliability was high at all 3 assessments (0.90-0.92). Stability over time was high for MAP and HR (0.89 and 0.82) and moderate for COMFORT 'behaviour' and VAS (0.59 and 0.58). Correlations between MAP and heart rate were low (0.05-0.25). HR and VAS correlated significantly only at 6 hours (0.24) and MAP and VAS correlations were moderate but significant at all 3 times (0.29-0.39).

**Conclusions.** The low interrater reliability for respiratory response may be due to subjective interpretations. The lower stability of the COMFORT 'behavioural' and the VAS could be the result of infants experiencing pain at different intervals. HR and MAP appear to have limited validity as measures of postoperative pain. Congruent validity of the COMFORT 'behavioural' may be inflated since the same nurse assessed the VAS and the COMFORT. These findings support the use of the COMFORT 'behavioural' scale to assess postoperative pain, however, the generalisability of these results is limited due to the age skewness of the sample. Further testing with a variety of surgical patients, judges and hospital settings is warranted.

## Review Articles

The *Pediatric Pain Letter* briefly notes the following recent review articles:

American Academy of Pediatrics, Committee on Fetus and Newborn, Committee on Drugs, Section on Anesthesiology and Section on Surgery & the Canadian Paediatric Society, Fetus and Newborn Committee (2000). Prevention and management of pain and stress in the neonate. *Pediatrics*, 105(2), 454-461.

This paper is an important policy statement by the American Academy of Pediatrics and the Canadian Pediatric Society on the prevention and management of pain in neonates. This policy statement provides no new data, but puts the stamp of authority on the last decade of research. In spite of the usual disclaimer, this statement outlines the minimum standard of care in neonatal pain control. Every unit caring for neonates should require this document be read by all those working there and the practices of each unit should be judged against this policy statement.

Krauss, B. & Green, S.M. (2000). Sedation and analgesia for procedures in children. *New England Journal of Medicine*, 342(13), 938-945.

This article takes a relatively well-balanced, if superficial, approach to the problems of procedural sedation in children. There is appropriate discussion of the sedation continuum and the requirements for safe monitoring. The importance of proper training and experience of medical staff is emphasized. Specific drugs and dosages are described, but it would be dangerous to use this article as the only instruction on techniques for procedure pain management. In addition, many anesthesiologists would argue with the characterization of ketamine as universally safe and qualitatively different from other general anesthetic drugs. Another significant oversight is the lack of any mention whatsoever of the importance of non-pharmacological adjunctive techniques.

Nolan, J., Chalkiadis, G.A., Low, J., Olesch, C.A. & Brown, T.C.K. (2000). Anaesthesia and pain management in cerebral palsy. *Anaesthesia*, 55(1), 32-41.

This is an excellent review which covers the medical, social and psychological issues involved in anaesthetic care of children with cerebral palsy. The (admittedly limited) scientific evidence is presented, along with careful clinical observations. Even experienced paediatric anaesthesiologists will find items to think about in the article, and it will be a valuable resource for the anaesthesiologist who doesn't deal with these children

frequently. Highly recommended.

Palermo, T.M. (2000). Impact of recurrent and chronic pain on child and family daily functioning: a critical review of the literature. *Journal of Developmental & Behavioural Pediatrics*, 21(1), 58-69.

This is a very important review highlighting the limited data on the impact of pediatric pain on child and family functioning.

## Film Review

**Audiovisual Centre University of Amsterdam (1998).** *POCIS-SCALE Pain-observation-scale for Young Children*. Address: Meibergdreef 15, 1105 AZ Amsterdam, Netherlands, tel +31 20 5664692, web-site <http://www.avc.uva.nl>.

This film is pleasant to watch, professionally produced and easy to follow. The viewer is given a basic introduction to pain assessment in very young children, made aware of some of the many difficulties in measuring pain in this group and warned of possible consequences of inadequate pain management. For example, suggestions that an observer attempt to be unobtrusive and that pain be assessed several times daily are beneficial.

Several shortcomings, however, must be noted. Although the film appears to be aimed at providing guidelines for use of the POCIS, important information regarding applicability in various clinical situations is lacking. The film does not indicate the type of surgical pain for which the scale's use would be appropriate. The impression the viewer is left with is that the POCIS is suitable for all surgeries, although the children depicted in the film appear to have undergone minor surgery. No mention is made of how to adapt the scale, or whether it is even a valid measure of pain when children have had major surgery or are heavily sedated. This is critical, as scores for 3 of the 7 items are based upon child movement and these circumstances might leave some children immobile. Without adaptation, these children would, according to the instructions provided, receive low scores that would result in them being judged as having little or no pain.

The film also implies this scale should be considered more valid than child, parent, or observer reports. No evidence of this is provided and no indication of what should be done if they conflict. Likewise, although the POCIS is described as a measure of postoperative pain, the

film does suggest it can be used for examinations. Again, no mention is made of how to adapt the scale for this very different situation.

Perhaps the most discouraging aspect of the film is that it drifts into the area of pain management. Specifically, the film takes a leap from pain assessment to recommendations of intervention approaches that are appropriate at various levels of pain, as determined by the POCIS score. For example, it is suggested that children scoring 1-2 need only be given "comfort", with no reference to possible individual differences. These recommendations are definitely beyond the scope of the apparent purpose of the film and it is highly inappropriate to advocate that clinicians make treatment decisions solely on the basis of one instrument.

Overall, this film is a good brief introduction to pain assessment in young children and might be useful as an introduction to a more in-depth presentation or seminar on the topic. As a practical guide to assessment, however, the film is lacking in depth and information. It presents a simplistic overview of assessment, does not provide adequate information concerning use of the POCIS in differing situations and implies that use of this scale should supersede both clinical judgement and self-report. Presentation of this film, in isolation, to audiences without clinical training in pain management should be done with caution.

Lynn Breau, M.Sc.  
 Doctoral Candidate in Clinical Psychology  
 Pediatric Pain Research Lab  
 IWK Grace Health Centre and Dalhousie University  
 Halifax, Nova Scotia  
 Canada

## Announcements

### Meetings

**June 18-21, 2000: ISPP2000, The 5<sup>th</sup> International Symposium on Paediatric Pain, London, United Kingdom.** The theme of the 2000 Symposium will be *From Basic Research to Clinical Care*. For further information contact Meeting Makers, Jordan Hill Campus, 76 Southbrae Drive, Glasgow G13 1PP, Scotland UK, tel +44 (0) 141-434-1500, fax +44 (0) 141-434-1519, email

[ispp2000@meetingmakers.co.uk](mailto:ispp2000@meetingmakers.co.uk), or visit the web-site at <http://www.ich.ucl.ac.uk/pain2000>.

**September 3-7, 2000:** *Headache World 2000, London, UK.* Organized in association with the British Association for the Study of Headache. For further information contact the Headache World 2000 Congress Secretariat at MediTech Media Ltd., 125 High Holborn, London, WC1V 6QA, UK, tel +44 (0) 171 404 7151, fax +44 (0) 171 404 6946, email [secretariat@headache2000.com](mailto:secretariat@headache2000.com), or visit the web-site at <http://www.headache2000.com>.

**September 28-October 1, 2000:** *3<sup>rd</sup> Biennial International Forum on Pediatric Pain, White Point Beach Resort, Nova Scotia, Canada.* The topic of the meeting will be acute and procedural pain. For further information contact Kate Finlayson of Conventional Wisdom, tel 902-453-4664, fax 902-423-5232, or email [katefin@chebucto.ns.ca](mailto:katefin@chebucto.ns.ca).

**October 28 & 29, 2000:** *Inaugural Meeting of Asian Society of Paediatric Anaesthesiologists, Kandang Kerbau Women's and Children's Hospital, Singapore.* The meeting is open to all working in pediatric anesthesia or interested in any aspect of pediatric anesthesia. The scientific program will include plenary sessions and symposia on various topics in the field (e.g., regionals, pharmacology, acute resuscitation, etc.). For further information, please contact Dr. Choo Shu May, fax +65-291-2661 or email [aspa@kkh.com.sg](mailto:aspa@kkh.com.sg).

**November 15-18, 2000:** *6<sup>th</sup> International Congress of Behavioural Medicine, Carlton Crest Hotel, Brisbane, Australia.* For further information, contact the Congress Secretariat: PO Box 1280, Milton, QLD, 4064, Australia, tel +61 (0) 7-3858-5410, fax +61 (0) 7-3858-5510, web-site <http://www.icbm2000.conf.au>.

## A valuable resource

*The Blood & Marrow Transplant Newsletter* is a valuable resource for all families and patients (adult and child) that face a bone marrow or stem cell transplant. Pain is only one of the many important issues that this newsletter deals with. Reach the newsletter at: 2900 Skokie Valley Road, Highland Park IL 60035, USA, tel 847-433-3313, fax 847-433-4599, toll-free 888-597-7674, email [help@mmtnews.org](mailto:help@mmtnews.org), web-site [www.bmtnews.org](http://www.bmtnews.org).

*Short announcements on pediatric pain events will be published free of charge.*

## If you would like to participate

Your participation in abstracting and writing commentaries for the *Pediatric Pain Letter* is welcomed. Please send submissions according to the specifications outlined in our Author's Kit. An Author's Kit can be obtained from Jill Hatchette, Managing Editor, *Pediatric Pain Letter*, Psychology Department, Dalhousie University, Halifax, Nova Scotia, B3H 4J1; email [jhatchet@is.dal.ca](mailto:jhatchet@is.dal.ca); requests can be made in writing or by email. Abstracts and commentaries on any aspect of pain in infants, children and/or adolescents are appropriate. We will attempt to use abstracts and commentaries but the editors reserve the right to edit or reject contributions.

---

Supported by an  
educational grant from

AstraZeneca 

World Leader  
in Local Anesthetics

---

**Assistants for this issue:** Amy Atwell, Alyson Currie, Bruce Dick, Andrea Gregory and Michael Houlihan.