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Pediatric Pain Letter

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

Editorial Board

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Developmental changes in pain expression

Many aspects of pain perception and expression appear to be beyond our control. We may find it offensive when our colleagues refer to a patient with a "low pain threshold", because it is often presented as a moral judgement - an evidence of "weakness". However, it is clear that children's responses to painful stimuli vary tremendously, and that we can not assess pain accurately without understanding some of these factors.

Infants and children express pain differently at different ages, and this has contributed to the misconceptions about children's pain. We need to know whether age-related differences in pain reports and behaviours result from true developmental differences, or whether these represent reporting biases. Equally, there is an increasing, but still equivocal, body of literature on whether a tendency to have chronic or recurrent pain is learned and/or inherited by children. The commentaries in this issue address factors related to both of these issues.

Abstracts

Age-Related Differences in Children's Pain Expression

Fradet, C., McGrath, P. J., Kay, J., Adams, S., & Luke, B. (1990). A prospective survey of reactions to blood tests by children and adolescents. *Pain, 40,* 53-60.

Objective. To examine the effect of age, parents' prediction of distress, and previous needle experience on observed distress and self-reported pain in children undergoing venepuncture.

Design. Cross-sectional, prospective survey.

Setting. Children's hospital.

Participants. Of the 217 children requiring blood sampling recruited to participate, parents of 12 children refused and another 20 were excluded for various reasons (e.g., child was ill, parent did not speak English or French). The remaining 196 children were between 3 and 17 years old (mean age = 7.3 years; 55% males) and received blood sampling either by hand or arm venepuncture (n=171), or by finger prick (n=9).

Main Outcome Measures. Parents completed a questionnaire about the reason for blood work, number of blood tests in the previous 2 years, and experience with other needle procedures. Parents rated how they felt about the blood test, and how they felt their child would feel immediately before the needle using a 10 cm visual analogue scale (VAS; with anchors of "very calm, very relaxed" and "very upset, very distressed"). Children's behavioural distress during the procedure was coded using the Children's Hospital of Eastern Ontario Pain Scale (CHEOPS; McGrath et al., 1985). After the procedure, the nurse and parent provided ratings of pain during the procedure and how they thought the child felt prior to the procedure on the same VAS. Children older than 7 years were asked to rate how they felt before the procedure using the VAS and rated pain using the Oucher (Beyer, 1984), a poster depicting both a numerical scale with corresponding pictures.

Results. 43% of 3- to 6-year-olds reported no pain from venepuncture, 48% of children 7- to 17-year-olds reported no pain from venepuncture. Younger children had higher CHEOPS scores than older children, both before and after the procedure. Age was negatively correlated with Oucher scores before and during the procedure, with CHEOPS scores, and with nurses' ratings of pain and distress. In a hierarchical multiple regression, age predicted 14% of the variance on the index of observation scores. When predicting Oucher scores, age accounted for 10% of the variance.

Conclusions. The child's age and parents' predictions of how upset the child would feel before the blood test were significant predictors of observed distress and self-reported pain during venepuncture. Younger children exhibited more behavioural distress and reported greater levels of pain than older children. Previous experience with needles did not add significantly to the prediction of distress.

Lander, J., & Fowler-Kerry, S. (1991). Age differences in children's pain. *Perceptual and Motor Skills, 73,* 415-418.

Objective. To determine the relation between age and self-reported pain among school-aged children and adolescents during venepuncture.

Design. Cross-sectional, prospective survey

Setting. General hospital.

Participants. Of 223 consecutive referrals to the outpatient laboratory, 180 children (mean age = 11.8 years; 90 males) between 5 and 17 years old agreed to participate. The majority of parents who refused indicated that they did not have enough time to complete the study requirements; a smaller proportion were children who refused to participate.

Main Outcome Measures. Prior to venepuncture, children rated expected pain on a 10 cm VAS (with anchors "no pain" and "worst pain possible") and completed the State-Trait Anxiety Inventory (STAI; Speilberger et al., 1973). Following the procedure, children rated pain using the VAS and the Affective Pain Scale (McGrath et al., 1985).

Results. Children's age was negatively correlated with expected, actual, and affective ratings of pain, as well as with anxiety. Multiple regression showed that age, expected pain, and pain affect made significant contributions to the prediction of pain intensity. Younger children were more anxious, expected more pain, had greater pain intensity, and had greater affective pain than older children. Anxiety was lowest for children who had more than 10 or no previous venepunctures.

Conclusions. Pain ratings were highest among 5- to 7-year-old children, with their reported pain being, on average, twice as intense as that of older children. Anxiety was related to both age and amount of pain experienced, and was lowest among children with no previous venepuncture experience and among those with the greatest experience.

Goodenough, B., Kampel, L., Champion, G. D., Laubreaux, L., Nicholas, M. K., Ziegler, J. B., & McInerney, M. (1997). An investigation of the placebo effect and age-related factors in the report of needle pain from venipuncture in children. *Pain, 72*, 383-391.

Objective. To determine the effectiveness of a placebo cream in reducing the intensity of pain from venepuncture in children, and to assess the influence of age on reports of pain.

Design. Randomized, double-blind, placebo-controlled trial.

Setting. Children's hospital.

Participants. A convenience sample of 117 children (73 males) aged 3 to 17 years undergoing venepuncture.

Intervention. Prior to the procedure, children were randomly assigned, stratified by age (3-7 years (n = 36); 8-11 years (n = 45); and 12-17 years (n = 36)) to 1 of 3 treatment groups: placebo cream plus a suggestion that the cream might reduce pain; placebo cream with no explanation of purpose; and no cream.

Main Outcome Measures. Children provided ratings of pain using the Bieri et al. (1990) Faces Pain Scale prior to the procedure to measure current pain, prior to the procedure to measure expected pain, and after venepuncture to show how much the procedure hurt. Children rated anxiety using the anxiety scale from the Children's Anxiety and Pain Scale (CAPS; Kuttner & LePage, 1989) prior to venepuncture. After the procedure, children in the cream conditions were asked whether the cream had helped. Parents reported on previous needle experience and the reason for the current venepuncture. Body surface areas (BSA) were calculated for each child using height and weight. During the procedure, children's behavioural reactions were videotaped and later coded as either a looking at the needle or not looking at the needle.

Results. 83% of children who received cream with a suggestion that it might work reported believing that it did help as compared with only 33% of children receiving cream without suggestion. Pain ratings did not differ across treatment groups. Children receiving the cream plus suggestion were assigned significantly lower ratings of pain behaviour than children who received only the cream. Younger children reported more pain than older children. Hierarchical multiple regression analysis revealed that the best predictors of higher pain ratings were high ratings of expected pain and feeling anxious prior to venepuncture, having a low BSA, and being female. Age and BSA together accounted for 10.5% of the variance, and BSA rather than age was the more significant of the two variables in predicting pain scores.

Conclusions. The efficacy of placebo treatments for reducing needle pain may depend on the suggestion of a possible benefit rather than the treatment application itself. The significant effect of the placebo with suggestion on children's self-reported beliefs about efficacy may be related to demand characteristics from the experimenters.

Arts, S. E., Abu-Saad, H. H., Champion, G. D., Crawford, M. R., Fisher, R. J., Juniper, K. H., & Ziegler, J. B. (1994). Age-related response to lidocaine-prilocaine (EMLA) emulsion and effect of music distraction on the pain of intravenous cannulation. *Pediatrics, 93* (5), 797-801.

Objective. To compare the efficacy of EMLA to placebo and music distraction in reducing pain from venous cannulation. The effect of age on pain ratings was also examined.

Design. Randomized controlled trial.

Setting. Unspecified.

Participants. 180 children aged 4 to 16 years scheduled for surgery under general anesthesia participated (225 approached, 45 refused or were uncooperative in the operating room; 80 females, mean age = 9.7 years). About half had previous venous cannulation.

Interventions. Prior to the preoperative needle, children were randomly assigned to 1 of 3 interventions: 1) lidocaine-prilocaine emulsion (EMLA cream) or 2) a placebo cream applied 60 minuted prior to venous cannulation and covered with an occlusive dressing; or 3) appealing, distracting music via earphones beginning just prior to the procedure. Both children and experimenter were blind to which cream was used.

Main Outcome Measures. Following the procedure, children rated pain using the Bieri et al (1990) Faces Pain Scale and a Visual Analogue Toy (VAT; 20 cm wooden pole held vertically with toy Koala that "climbs" the pole to show how much pain; bottom of pole = no pain, top of pole = worst pain). Children's behavioural reaction during the procedure was coded using a 0-3 (nil, mild, moderate, severe) rating scale.

Results. 4- to 6-year-olds reported higher pain ratings and had higher pain behaviour scores than older children across intervention groups. Although the trend suggested that EMLA was more effective than placebo or music, no significant differences were noted on any of the rating scales for the 7- to 11-year-olds and the 12- to 16-year-olds. The youngest children receiving EMLA had lower pain scores than those receiving placebo cream or music.

Conclusions. 4- to 6-year-old children experienced the greatest benefit from EMLA cream during venous cannulation compared to older children. Music distraction was about as effective as placebo cream.

Commentary

In recent years, researchers have shifted their focus from generally describing the intensity of children's reactions to painful procedures, to more detailed explorations of factors that influence children's pain experiences. The influence of children's age on their reports of pain and their behaviour during painful procedures is an important factor to consider, as many myths about children's pain have centred around age (e.g., "Young children don't feel pain as much as adults do."). Further, as young children often experience difficulties expressing and communicating their pain, they are at risk for experiencing pain that goes unrecognized and mismanaged. Fortunately, several studies have either directly or indirectly examined the influence of age on children's pain experiences.

All five studies reviewed examined the impact of age on children's self-reports of pain. For example, Fradet et al. (1990) had children report about pain using the Oucher (Beyer, 1984), Lander and Fowler-Kerry (1991) used a 10 cm visual analogue scale, and Bournaki (1997)[1] assessed pain quality among children using a descriptive list of pain words. Goodenough et al. (1997) used the Bieri Faces Pain Scale, as did Arts et al. (1994), who also used a Visual Analogue Toy. Results showed that the younger children reported more pain than the older children in all five of these studies. Although the studies differed with respect to the range of age groups sampled, taken together, the results appear to indicate that children under the age of 7 years report more pain than 8- to 11-year-olds, who in turn, report more pain than children older than 12 years. Clearly, the consistency of this pattern across these studies is significant given the variety of types of self-report measures used.

In the past, these results have been interpreted as representing true developmental differences in children's perceptions and experiences of pain. Although this interpretation is certainly plausible, the higher ratings from younger children may represent a more general response bias in how young children self-report pain. For example, we have noted in our own research that younger children tend to respond at the extreme points on pain rating scales, perhaps signifying their limited cognitive capacity to make the discriminations of which older children are capable (Chambers & Craig, 1998). This observation has also been made by other researchers (Arts et al., 1994; Goodenough et al., 1997; Morton, 1997). The tendency to report at extremes would also result in elevated mean self-report ratings among younger children. Clearly, the assessment of age differences in children's self-reports of pain is a difficult task, and the ability of young children to provide reliable and valid self-reports of pain is an issue that deserves careful attention (Champion et al., 1998).

To supplement our knowledge of age differences in children's pain experiences, several of the studies reviewed also included behavioural measures of pain which would not be subject to any reporting biases. For example, Fradet et al. (1990) found higher scores using the Children's Hospital of Eastern Ontario Pain Scale (CHEOPS; McGrath et al., 1985) and Bournaki (1997) found higher Observed Child Distress Scale (OCDS; Jacobsen et al., 1990) scores among the younger children in comparison to the older children in their samples. Similarly, using a global behaviour assessment scale, both Arts et al. (1994) and Goodenough et al. (1997) found higher scores among younger children when compared to older children. Clearly, this behavioural evidence supports the notion that younger children may experience more pain than older children. However, with the exception of the study by Fradet et al. (1994), the measures used were not pain-specific, and hence the degree to which these results are specific to pain and not also to general anxiety or distress is not known. The study by Bournaki (1997) was the only one to include a physiological measure (i.e., heart rate). Results showed increased heart rate changes among the younger children as compared to the older children in the study; however, again, the degree to which this measure is indicative of pain rather than of general distress is not clear.

Of course, a child's age is only an approximation of the developmental level, and within any age group there can be considerable variability with respect to developmental level. The study by Goodenough et al. (1997) was the only one to further probe the basis for age-related differences in children's pain reports. They found that body surface area (BSA), an anatomical measure calculated from height and weight, was actually a better predictor of pain reports than chronological age. The authors stated that BSA provides a better, indirect measure than age, and suggested that developmental anatomical differences may form a component of the age-related response to pain.

In summary, although there is some support for age-related differences in children's experiences of pain, the results are not as clear cut as they might initially seem. Research needs to disentangle whether the age differences found among children's self-reports of pain can be attributed to true differences in experience, a reporting bias, or perhaps a bit of both. Future research examining

[1] See Vol. 2 No. 1 (p. 4) of the *Pediatric Pain Letter* for an abstract of this paper.

age differences in children's pain experiences should make use of reliable and well-validated self-report and behavioural measures of pain. In addition, previous research has focused on acute pain; our knowledge about children's age-related responses to longer term and chronic pains needs to be developed.

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References

Chambers, C.T. & Craig, K.D. (1998). Age differences in children's self-reports of pain: Difference in experience or reporting bias? Paper presented at the Annual Meeting of the Canadian Pain Society, Regina SK, Canada.

Champion, G.D., Goodenough,B., von Baeyer, C.L., & Thomas, W. (1998). Measurement of pain by self-report. In: G.A. Finley & P.J. McGrath (Eds.), *Measurement of Pain in Infants and Children* (pp. 123-160). Seattle: IASP Press.

Jacobsen, P. B., Manne, S. L., Gorfinkle, K., Chorr, O., Rapkin, B. & Redd, W. H. (1990). Analysis of child and parent behavior during painful medical procedures. Health Psychology, 9, 559-576.

McGrath, P. J., Johnson, B., Goodman, J. T., Schillinger, J., Dunn, J., & Chapman, J. (1985). A., CHEOPS: A Behavioral scale for rating postoperative pain in children. In: H. L. Fields et al., (Eds.), *Advances in Pain Research and Therapy* (Vol. 9, pp. 395-402), New York: Raven Press.

Morton, N.S. (1997). Pain assessment in children. *Paediatric Anaesthesia, 7*, 267-272.

Are Chronic and Recurrent Pain Problems Passed Down in Families?

Osborne, R. B., Hatcher, J. W., & Richtsmeier, A. J. (1989). The role of social modeling in unexplained pediatric pain. *Journal of Pediatric Psychology, 14*(1), 43-67.

Objective. To investigate the presence and nature of pain or illness behaviour models in children with recurrent unexplained pain and recurrent explained pain, secondary to sickle cell anemia.

Design. Retrospective survey.

Setting. Children's hospital.

Participants. 40 African American children, aged 6 to 16 years (mean age = 10 years; 19 males) attending an outpatient clinic with a primary complaint of pain and one parent of each child. 20 children had unexplained pain (e.g., from recurrent abdominal pain or chest pain with no organic
cause) and 20 children had explained pain secondary to sickle cell anemia.

Main Outcome Measures. Children's pain location (7 body areas), frequency, intensity as rated on a 7-point, multi-coloured "pain ladder" visual analogue scale, and environmental consequences (positive, neutral, or negative) were assessed during a structured interview. Children were also asked about the presence of a pain or illness behaviour model, and if present, characteristics of the model (location, frequency, intensity, and environmental consequences) were then assessed. Parents were asked a similar set of questions about their child's pain and presence of a pain model.

Results. Children with unexplained pain were significantly more likely than children in the explained pain group to identify a pain model ($\chi^2(1,N=40)=12.13$, $p<0.001$). Parents of children with unexplained pain were also more likely to identify a model for their child than were parents of children with explained pain. ($\chi^2(1,N=40)=20.40$, $p<0.001$). Children with unexplained pain and their parents identified the same model in 6 cases; the parent identified himself or herself as the model in 10 cases. 63% of children with unexplained pain who identified a model shared at least one pain location with their model. Positive correlations were found between the children's ratings of intensity and frequency of pain for themselves and their models, but not as rated by parents.

Conclusion. This study presented evidence to support a social learning theory of unexplained recurrent pain in children, as perceived by both children and their parents. Further research is necessary to determine which factors related to the models' behaviour are most salient to children with unexplained pain.

Rickard, K. (1988). The occurrence of maladaptive health-related behaviors and teacher-rated conduct problems in children of chronic low back pain patients. *Journal of Behavioral Medicine, 11(2),* 107-116.

Objective. To compare the pain behaviours, conduct problems, and school absence in children whose parents have chronic pain, children of parents with diabetes, and healthy controls.

Design. Case control.

Setting. Parents with chronic pain were recruited from chronic pain rehabilitation centres; healthy parents and parents with diabetes were recruited through an advertisement in a local newspaper.

Participants. 21 8- to 12-year-old children (mean age = 9.6 years; 9 males) whose fathers had chronic low back pain participated. 21 9- to 12-year-old children (mean age = 10.4 years) who had a parent with insulin-dependent diabetes mellitus served as a chronically ill control group. An additional 21 children (mean age = 9.8 years; 12 males) served as a healthy control group.

Main Outcome Measures. Teachers completed the Conners Teaching Rating Scale (Conners, 1969) and a

classroom behaviour monitoring form to keep track of physical complaints, avoidance behaviours, crying, and dependency behaviours over a 15-day period. Absences from school and visits to the school nurse within the past year were also recorded. Children completed the Child Health Locus of Control (Parcel & Meyer, 1978) questionnaire and responded to six hypothetical scenarios designed to evoke pain related behaviour. Parents of the children completed the Illness Behavior Questionnaire (Pillowsky & Spence, 1975), a 62-item yes/no checklist of illness symptoms and other problems related to illness.
Results. The children of chronic pain patients were reported to complain, cry, exhibit avoidance and dependency behaviours, be absent from school or seek the help of the school nurse by their teacher more frequently than children in the other groups. Also, pain-related responses were chosen more often by children of parents with chronic pain than by the children of diabetics or healthy controls.
Conclusions. Pain behaviour and abnormal illness behaviour of parents with chronic low back pain appeared to have been learned by, or incorporated into, their children's expression of pain, although the differences may be due to other variables not assessed. The authors suggested that children's development of behaviour patterns through modelling should be clearly identified so that later chronic pain behaviour can be eventually prevented or easily remediated.

Raphael, K. G., Dohrenwend, B. P. & Marbach, J. J. (1990). Illness and injury among children of temporomandibular pain and dysfunction syndrome (TMPDS) patients. *Pain, 40,*61-64.
Objective. To investigate whether patients with temporomandibular pain and dysfunction syndrome (TMPDS) report more illnesses and injuries in their children than do healthy parents.
Design. Longitudinal case-control survey.
Setting. Hospital pain management unit.
Participants. Data from a previous study that used 151 female patients with TPMDS and 139 healthy controls were screened to determine whether participants had children. 31 patients with TPMDS and 47 controls had children, and all but six control participants took part in the study. No information about the age or gender distribution of children was provided.
Main Outcome Measures. Participants were interviewed during 10 monthly sessions by telephone and answered questions from The PERI Life Events Scale (Dohrenwend et al., 1978), which provided information on life events and previous illnesses/injuries experienced by participants or individuals important to them (e. g., a spouse or child). Anxiety, sadness, and self-esteem were assessed using a 27-item measure of psychological distress.
Results. No difference was found between groups in injury frequency in their children. Patients reported significantly more illnesses in their children than did matched controls, even after for statistically controlling for the higher levels of distress reported by the parents with chronic pain; no difference was noted in frequency of illness in spouses.
Conclusions. These data lend partial support to theories suggesting familial transmission of vulnerability to pain and illness, but they may also be related to parental emotional distress.

Mikail, S. F. & von Baeyer, C. L. (1990). Pain, somatic focus, and emotional adjustment in children of chronic headache sufferers and controls. *Social Science and Medicine, 31*(1), 51-59.
Objective. To compare the incidence of children's pain related illness, children's behavioural disturbance, and family functioning between families of chronic headache sufferers and pain-free controls.
Design. Case-control.
Setting. University hospital.
Participants. 24 chronic headache sufferers and their children aged 9 to 17 years, and 30 adults recruited from a general optometry practice and their children.
Main Outcome Measures. The Personality Inventory for Children (PIC; Wirt et al., 1984) Short Form, the Family Environment Scale (FES; Moos & Moos, 1981), the Symptom Checklist 90 (SCL-90; Maruta et al., 1981), and the West Haven-Yale Multidimensional Pain Inventory (WHYMPI; Kerns et al., 1985) were completed by parents.
Results. Compared to children of illness-free parents, children of headache sufferers scored significantly higher on the somatic concerns and internalizing/somatic symptoms subscales of the PIC. They also reported significantly more headaches per month, and had lower ratings of social skills, higher maladjustment, and more antisocial and acting out behaviours as rated by the PIC. Across groups, significant positive correlations were found between parents' symptom severity (SCL-90) and children's psychological adjustment (PIC). Parents' ratings of pain severity (WHYMPI) were negatively correlated with family level of expressiveness and active-recreational orientation, and positively correlated with family organization (FES). Mean FES subscale scores did not differ significantly between the headache and illness-free groups.
Conclusions. This study provides evidence that, compared to children of illness-free parents, children of parents with

chronic headaches exhibit more somatic concerns, report more headaches, and exhibit more psychological maladjustment. The family functioning of the two groups did not differ, suggesting that the relation between parental chronic pain and children's psychological adjustment may not be related to their perception of the family environment.

Goodman, J. E., McGrath, P. J. & Forward, S. P. (1997). Aggregation of pain complaints and pain-related disability and handicap in a community sample of families. In T. S. Jensen, J. A. Turner & Z. Wiesenfeld-Hallin (Eds.) ***Progress in Pain Research and Management*** **(Vol. 8, pp. 673-682). Seattle: IASP Press.**

Objective. To determine, prospectively, the degree of concordance in the number, severity, and functional impact of pain incidents among children and their parents during a 7-day period.

Design. Prospective survey.

Setting. Metropolitan Halifax, Canada.

Participants. Data were obtained from an epidemiological survey of pain complaints of 693 families (total number of participants = 2202) with at least one child between the ages of 8 and 18 years currently living in the home. For the present study, data from 663 mothers (mean age=40.8 years, SD= 5.6), 483 fathers (mean age=42.6 years, SD=3.6), 401 daughters (mean age=13.5 years, SD=3.7) and 292 sons (mean age=13.3 years, SD= 3.6) were analysed.

Main Outcome Measures. Participants were sent a 10-page pain diary in which they were asked to record the location, suspected cause, duration, intensity, and functional impact of each episode of pain they experienced during a 7-day period. Three outcome variables were computed: (1) total number of pain incidents; (2) total number of clinically severe pain incidents, defined as an episode given an intensity rating of at least the 3rd face on the Bieri, et al. (1990) Faces Pain Scale and which lasted at least 3 hours in duration; and (3) disabling pain incidents, defined as incidents with a mean Functional Disability Inventory (Walker & Greene, 1991) rating which equalled or exceeded 1 SD above the mean.

Results. Mothers reported significantly more pain incidents than did fathers ($_{t\,1,1840}$=2.24, p<.05) and daughters reported significantly more pain incidents than did sons ($_{t\,1,1840}$=3.21, P<.01). Logistic regression analyses were performed to determine the influence of child gender, child age, and parental pain on the child's relative risk for: (1) having a total number of incidents that exceeded the 75th percentile for their family category (i.e., 4 incidents for mothers, fathers, and children); (2) having a total number of clinically severe incidents that exceeded the 75th percentile (i.e., 2 incidents for mothers; 1 for fathers and children); and (3) having any disabling incidents. Sons were at less risk than daughters for total number of incidents, clinically severe incidents, but not for disabling incidents. Similarly, the relative risk generally increased with age. Children whose parents reported a large number of pain incidents were at increased risk for also reporting a large number of pain incidents [*RR*=1.81 (95%CI=1.47-2.23) for mothers; *RR*=2.12 (95%CI=1.64-2.73) for fathers]. Children whose parents reported a large number of clinically severe incidents were at increased risk for also reporting a large number of clinically severe incidents [*RR*=1.66 (95%CI=1.31-2.11) for mothers; *RR*=2.74 (95%CI=2.01-3.74)]. Children with parents who reported disabling pain incidents were at increased risk for also reporting disabling incidents [*RR*=2.49 (95%CI=1.81-3.43) for mothers; *RR*=2.02 (95%CI=1.31-3.10) the location, suspected cause, duration, and intensity of each episode for fathers].

Conclusions. Children whose parents report more incidents of pain, more severe pain, and more disabling pain are at an increased risk of reporting pain and disability. It may be that parents who frequently report pain have provided their children with many more opportunities to learn pain behaviour compared to pain-free parents.

Commentary

Adults and children diagnosed with recurrent pain problems often report an increased prevalence of relatives with pain problems. For instance, children with recurrent unexplained pain were significantly more likely to identify a pain model ("someone you knew who has pain or hurts a lot") than children whose pain was secondary to sickle cell anemia (Osborne, Hatcher & Richtsmeier, 1989). The majority of pain models identified were family members, and 10 out of 20 were parents. However, identified organic pathology is not always a distinguishing factor; other researchers have found that children with recurrent abdominal pain *with or without* a known organic cause report higher levels of familial pain problems than a healthy control group (Walker, Garber, & Greene, 1993[2]).

The largest volume of research on pain within families has focused on the children of adults diagnosed with chronic pain syndromes. Rickard (1988) found that, in comparison with children of diabetic patients and children of healthy controls, the children of chronic low back pain

[2] see Vol. 1 No. 1 (p. 9) of the *Pediatric Pain Letter*, for an abstract of this paper.

patients were more likely to complain about physical symptoms, and manifest behaviours suggesting avoidance and dependency. In addition, this group reported more days absent from school and more visits to the nurse. Temporomandibular pain and dysfunction syndrome (TMPDS) patients reported more illnesses among their children than did parents without pain (Raphael, Dohrenwend, & Marbach, 1990), and parents who experienced headaches reported more somatic concerns among their children than did healthy controls (Mikail & von Baeyer, 1990). Finally, Jamison and Walker (1992) reported that, according to parents, abdominal pain was more frequent in children of pain patients than children of healthy controls. Goodman, McGrath, and Forward (1997) have demonstrated that the relation between parent and child pain problems holds true in a community sample of families. Parental somatic symptoms appear to make it more likely that child symptoms will persist once they have appeared. In a prospective study of children referred for the treatment of recurrent abdominal pain, fathers who reported higher levels of physical symptoms at an initial interview had children who reported more symptoms at a later date (Walker, Garber & Greene, 1994[3]). The influence of mothers' physical complaints interacted with child gender and the occurrence of life stressors: mothers' reports of their own somatic symptoms were related to persistent child symptoms, but only for boys in families with high levels of negative life events.

The literature as a whole is inconsistent with respect to the relative influence of mothers and fathers. In contrast to Walker et al. (1994), Jamison and Walker (1992) found that children were perceived to have more headaches when mothers, rather than fathers, suffered from pain problems. As is typical of research in this area, the studies reviewed here vary in their inclusion of gender as a variable of interest, and in their findings. The topic is further complicated by different base rates of pain in men and women. Hopefully, future investigations will clarify gender effects.

Many of the studies above asked an individual with a chronic or recurrent pain problem to report on the pain experience of relatives by completing a self-report interview or questionnaire. However, just as a depressed individual is likely to recall a preponderance of negative life events, individuals who are in pain may be primed to remember pain complaints and interpret ambiguous episodes as painful. Accordingly, the results of the studies by Rickard (1988), Walker et al. (1994), and Goodman et al. (1997) are particularly compelling as the outcome measures were completed by children rather than a parent identified as a pain patient. Knowledge would be further advanced by the inclusion of more diverse assessment methods, including direct observation of parent and child behaviour, and objective markers such as utilization of medical services and work/school attendance. A preliminary step in this direction was taken by Rickard (1988) who had teachers complete a classroom behaviour monitoring form and supply data on the number of school absences and visits to the school nurse. Finally, the cross-sectional nature of much of the existing research also limits current understanding. Longitudinal designs, such as the Walker et al. (1994) study, have the potential to specify the transient and enduring effects of parental influence, and to identify other risk factors and buffers in the long-term development of clinical pain syndromes.

Researchers have named many mechanisms as determinants of the familial tendency to experience recurrent and chronic pain, including genes and environmental factors. Consensus indicates an important genetic component for certain types of migraines. The notion of a more general pain sensitivity or "pain-proneness" is supported by the finding that mice can be bred for a high or low analgesic response to stress (Sternberg & Liebeskind, 1995).

Several psychological mechanisms may contribute to the familial transmission of pain. The presence of a parent with chronic pain is associated with elevated rates of various adjustment problems in spouses and children, and the general distress evident in these families may contribute to second-generation pain problems. However, learning processes are also likely to play a central role in the developmental trajectory of recurrent pain. Just as modeling increases pain tolerance in adults, pain behaviours and maladaptive coping styles may be learned by example. Parents may provide direct instruction on the meaning of pain and the appropriate response. Finally, there is evidence that children are sensitive to positive and negative reinforcement of pain behaviour. In families where mothers and children report more encouragement for illness behaviour, somatic symptoms are more frequent (Walker & Zeman, 1992). In a related vein, Osborne et al. (1989) noted that children with recurrent unexplained pain are able to identify more positive consequences of their pain than children with recurrent explained pain secondary to sickle cell anemia.

In summary, the literature presents convergent evidence that chronic and recurrent pain in children may be inherited and/or learned from parents and other family

[3] see Vol. 1 No. 1 (p. 9) of the *Pediatric Pain Letter*, for an abstract of this paper.

members. Consequently, when treating a child with a pain problem, clinicians need to assess the family's pain history and be alert to meaningful family patterns. Future research may benefit from distinguishing between an increased rate of pain *symptoms* (more frequent episodes of pain, relative to the general population) and the presence of clinical pain *syndromes* (pain that is frequent and severe enough to interfere with school and/or other important childhood activities). As well, "pathways to pain" are likely to be complex and multidetermined with different factors operating for different children. It will be important to explore the complex relations between familial pain and illness and factors that may contribute to children's pain problems (for instance, see Walker, Garber, & Greene, 1993).

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References

Jamison, R. N., & Walker, L. S. (1992). Illness behavior in children of chronic pain patients. *International Journal of Psychiatry in Medicine, 22, 329-342.*

Sternberg, W.F., & Liebeskind, J .C. (1995). The analgesic response to stress: Genetic and gender considerations. *European Journal of Anesthesia, S10,* 14-7.

Walker, L.S., Garber, J., & Greene, J. W. (1993). Psychosocial correlates of recurrent childhood pain: A comparison of pediatric patients with recurrent abdominal pain, organic illness, and psychiatric disorders. *Journal of Abnormal Psychology,* 102, 248-258.

Walker, L.S., Garber, J., & Greene, J. W. (1994). Somatic complaints in pediatric patients: A prospective study of the role of negative life events, child social and academic competence, and parental somatic symptoms. *Journal of Consulting and Clinical Psychology, 62,* 1213-1221.

Walker, L. S., & Zeman, J. L. (1992). Parental response to child illness behavior. *Journal of Pediatric Psychology, 17,* 49-71.

Recent Articles

Lilley, C. M., Craig, K. D., & Grunau, R. E. (1997). The expression of pain in infants and toddlers: developmental changes in facial action. *Pain (72),* 161-170.

Objective. To assess age-related variations in facial action during immunization in infants.

Design. Crossectional survey.

Setting. Four child health clinics operated by the Vancouver Health Department.

Participants. 75 infants at 2-, 4-, 6-, 12- and 18 months old (n=15 per age group) due to receive required immunization injection(s) - (DPT, Hib, MMR). 49 infants received the combined injection of DPT and Hib while 26 received the separate injections.

Main Outcome Measures. Facial behaviours were coded from videotape using the Neonatal Facial Coding System (NFCS; Grunau & Craig, 1987) and the Baby Facial Action Coding System (Baby FACS; Oster & Rosenstein, 1993) during baseline, injection, and recovery periods. Parents completed the Infant Characteristics Questionnaire (Bates, 1992) and a scale measuring temperament. Parent soothing behaviour was also coded from videotape.

Results. The relation between age and temperament was not significant ($p>0.5$) and analgesic effects of acetaminophen given prior to vaccine were not significant ($p>0.20$). Using principle components analysis, both the NFCS variable and the Baby FACS variable produced single factor solutions. The single factor solution for the NFSC had an eigenvalue of 2.88 and the single factor solution for the Baby FACS had an eigenvalue of 4.29. Summary scores were calculated for each coding system. A significant main effect for age was found for NFCS recovery scores with 4-month-old infants having significantly lower pain summary scores than the other age groups ($p<0.05$). For Baby FACS scores, a main effect for age was significant for both baseline and injection events ($p<0.005$), with summary scores significantly higher for 2-month-olds compared to the other age groups ($p<0.001$). Analyses of single facial actions revealed that 6- and 18-month-old infants had significantly higher scores on the NFCS Deepened nasolabial furrow than 4-month-olds ($p<0.005$) and 18-month old infants had significantly higher scores for NFCS Brow bulge than 4-month old infants ($p<0.005$). By examining the frequency of soothing interventions by parents, chi-square tests identified a significant variation with age for Cradling ($p<0.0001$; most frequently with young infants) and Holding upright ($p<0.01$; most frequently with 12-month old infants). However, use of soothing interventions was not significantly related to temperament.

Conclusions. Age-related differences in pain behaviour were observed using two separate facial action coding systems during immunization.

Kaufman, K. L., Cromer, B., Daleiden, E. L., Zaron-Aqua, A., Aqua, K., Greeley, T. & Li, B. U. (1997). Recurrent abdominal pain in adolescents: Psychosocial correlates of organic and nonorganic pain. *Children's Health Care, 26(1),* 15-30.

Objective. To determine whether measures of psychological factors and family functioning can differentiate among adolescents with nonorganic recurrent abdominal pain (RAP), organic bowel disease (OBD), and healthy controls.

Design. Case control.
Setting. Gastroenterology Clinic.
Participants. Adolescents with nonorganic RAP (n=24, 9 males, mean age=13.8 years), organic bowel disease (OBD, n=25, 13 males, mean age=15.3 years), and healthy siblings of patients from the Gastroenterology Clinic (n=19, 7 males, mean age=14.1 years).
Main Outcome Measures. Adolescents completed the State-Trait Anxiety Inventory for Children (STAIC; Spielberger, 1973), the Family Environment Scale (FES; Moos & Moos, 1981), the Nowicki-Strickland Locus of Control Scale (Nowicki & Strickland, 1973), the Social Readjustment Rating Scale (Holmes & Rahe, 1967), and the Children's Psychosomatic Symptom Checklist (Wisniewski, et al., 1988). The mothers completed the FES, the Social Readjustment Rating Scale, the State-Trait Personality Inventory (STPI; Spielberger et al., 1979), the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983) and a parent questionnaire concerning impact of abdominal pain on daily functioning, and their medical and family histories.
Results. Adolescents with nonorganic RAP reported a significantly higher frequency of symptoms than either children with OBD or healthy controls. However, the three diagnostic groups did not differ significantly on adolescent or maternal ratings of anxiety, locus of control, life events, family environment, or behaviour problems.
Conclusions. The psychological measures did not significantly differentiate adolescents with nonorganic RAP from those with organic OBD or healthy controls. However, these null findings do not suggest that psychosocial factors related to RAP should not be examined; rather, future investigations should adopt prospective designs, examine other psychosocial dimensions, and include controls for factors related to family involvement in a medical setting.

Review Articles

The *Pediatric Pain Letter* will briefly note recent review articles:

Bursch, B., Walco, G. A., & Zeltzer, L. K. (1998). Clinical assessment and management of chronic pain and pain-associated disability syndrome, *Developmental and Behavioral Pediatrics, 19*(1), 45-53.

Zeltzer, L. K., Bursch, B., & Walco, G. A. (1997). Pain responsiveness and chronic pain: A psychobiologic perspective, *Developmental and Behavioral Pediatrics, 18*(6), 413-422.

Zelzter, L. K., Bush, J. P., Chen, E., & Riveral, A. (1997). A psychobiologic approach to pediatric pain: Part I. History, physiology, and assessment, *Current Problems in Pediatrics, 27*(6), 225-253.

Zelzter, L. K., Bush, J. P., Chen, E., & Riveral, A. (1997). A psychobiologic approach to pediatric pain: Part II. Prevention and treatment, *Current Problems in Pediatrics, 27*(7), 264-284.

These four articles are wide ranging reviews of issues relevant to pediatric pain management written by experienced clinician-scientists. Although there is some overlap among the articles, all are worth a careful read.

Book Review

Twycross, A., Moriarty, A., & Betts, T. (1998). *Paediatric pain management: A multidisciplinary approach*, Abingdon, UK: Radcliffe Medical Press, £17.50 paperback, 176 pages, ISBN 1-85775-246-5

This book offers a broad overview of the current practices in pediatric pain management. Included are, among others, chapters specific to perceptions about pain, pain assessment, and possible treatments. Also included is a chapter specific
to the role of clinical psychology and one on the future of pediatric pain management.

There are few texts concerned with pediatric pain and even fewer expressly aimed at the practitioner. On first glance, this book was promising as the contents seemed relevant to practitioners and there is much mention of the importance of multidisciplinary team involvement in treatment and assessment.

Unfortunately, I was disappointed by what followed. Although a multidisciplinary team approach is suggested, no mention is made of who the team should include and the variety of different roles these individuals would undertake. For example, very little mention is made of physiotherapy and the approach to pain nursing is a surprisingly traditional one. Of particular concern on reading this text was the worrying lack of evidence offered for the treatments mentioned and endorsed. Readers are given no guidance on how to review further the evidence for treatments, some of which are more controversial than suggested in this book.

A positive aspect is the inclusion and emphasis on psychological interventions. Several important and

complex issues are raised but are inevitably simplified in discussion. Also very welcome was the coverage of assessment of pain in the pre-verbal child. This should provide a good starting point for pain teams to discuss clinical assessment procedures.

I would have liked to have seen multidisciplinarity taken more seriously and more comprehensive coverage of the evidence base for the assessment and treatment of chronic pain in children. I fear that this book is too general for many readers. It may serve as an introduction to the field, but readers are encouraged to read further from this starting point.

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Announcements

Meetings

September 24 -27, 1998: *2nd Biennial International Forum on Pediatric Pain*, White Point Beach Resort, White Point, Nova Scotia, Canada. The topic for the meeting will be chronic and recurrent pain, and it will again be a focussed, research-based conference, with many distinguished international faculty including Tony Dickenson (UK), Sunny Anand (USA), Anna Taddio (Canada), Gunnar Olsson (Sweden), Bo Larsson (Sweden), Neil Schechter (USA), Navil Sethna (USA), Lynn Walker (USA), and Patrick McGrath (Canada). Registration is limited to 120. Further information is available on the world wide web. See: http://is.dal.ca/~pedpain/pedpain.html.
Contact: Conventional Wisdom via email at katefin@chebucto.ns.ca; fax (902) 423-5232; or tel (902) 453-4664. Mailing address: Conventional Wisdom, 6496 Liverpool St., Halifax, NS, B3L 1Y4, Canada.

August 22 -27, 1999: *9th World Congress on Pain, Vienna, Austria, the triennial scientific meeting of the International Association for the Study of Pain.* The Congress is open to those working in or interested in any aspect of acute pain, chronic pain, or cancer pain, including research and treatment and features world leading experts in each field. Contact the IASP, 909 NE 43rd St., Suite 306, Seattle, WA, 98105, USA, tel (206) 547-6409; fax (206) 547-1703, email: IASP@locke.hs.washington.edu ; world wide web: http://www.halcyon.com/iasp

Publications

New Pain Journals: Two new English language pain journals have recently begun publication from Europe. Although most articles are about adult pain, there are articles on pediatric pain. The *European Journal of Pain* is the journal of the European Federation of Chapters of the International Association for the Study of Pain. The Editor-in-Chief is Ulf Lindbloom of Sweden. The Journal office can be reached by mail c/o *European Journal of Pain*, W. B. Saunders Co. Ltd. 24-28 Oval Road, London, NW17DX, UK. In the first issue there was a review and a commentary of "psychosomatic" pain in children (Alfvén, R. G. J. (1997). Psychosomatic pain in children: a psychomuscular tension reaction?, *European Journal of Pain*, *1*, 5-15.). *Acute Pain: International Journal of Acute Pain Management* is published by Saldatore Ltd. in the UK and has Stephan Schug as the Editor-in-Chief. The journal office can be reached by mail: Acute Pain - Saldatore Ltd., Millars Three, Southmill Road, Bishop's Stortford, CM23 3DH, UK. (email: acupain@dial.pipex.com). In the second issue there was a review on pre-emptive analgesia for children (Lloyd-Thomas, A. R. (1998). Pre-emptive analgesia - relevant to children? *Acute Pain: International Journal of Acute Pain Management*, *1*, 20-26.). These journals will provide further opportunity to disseminate new information about pediatric pain to a broader audience of researchers and clinicians.

Currently Available from IASP Press: *Measurement of Pain in Infants and Children, Progress in Pain Research and Management, Volume 10*, G. A. Finley & P. J. McGrath (Eds.), IASP Press, Seattle, 1998, 290 pages, $67.00 US funds ($43.55 US for IASP members; hardbound). ISBN 0-931092-20-5. This book brings together some of the most productive investigators from Europe, North America, and Australia to share their understanding of different approaches to the field. Basic and clinical science are represented, as are different disciplines of clinical practice in psychology, nursing, and medicine. To receive detailed information about ordering this book, contact IASP Press, 909 NE 43rd St., Suite 306, Seattle, WA, 98105, USA. Fax (206) 547-1703.

Positions Available

Clinical Psychologist: A full-time clinical psychologist for a new adolescent service at the Pain Management Unit of the Royal National Hospital for Rheumatic Diseases in Bath, England, BA1 1RL. The applicant

should be highly motivated, confident, and able to play a leading role in the team. Experience with adolescents and families is essential. The successful applicant will enjoy teaching and research, have a proven ability to communicate effectively and thrive on team work. An assistant psychologist to support the team is also required. The Pain Management Unit is a specialist centre for the management and rehabilitation of people with chronic pain and complex disability. We are an integrated team of 15 pain clinicians and researchers. The unit is run in collaboration with the University of Bath. All of our clinical activity is evidence-based and research is a key part of all team members work. Contact: Margaret Wasem, Personnel Officer, tel: 01225 473423 for job description and application forms. You can contact Dr. Chris Eccleston, tel: 01225 473427, email: c.eccleston@bath.ac.uk or visit our website at http://www.bath.ac.uk/Centre/PMU/home.html for informal information.

Other

Special Interest Groups Within the IASP: The IASP has a number of Special Interest Groups (SIG) to provide participating members with an opportunity for intensive, in-depth discussion in certain areas of interest. Membership in SIGs is open only to IASP members. Members wishing to join a SIG should indicate their preference on the annual membership renewal form or contact the IASP main office directly (email: IASP@locke.hs.washington.edu).

The SIG on Pain in Childhood includes members from many different disciplines who are interested in research and clinical management of pain in neonates, infants, children, and adolescents. In addition, basic science researchers studying developmental aspects of pain in animal models are welcomed. The SIG sponsors the International Symposium on Pediatric Pain every three years (next in June, 2000 in London, England). The Executive and Council of the SIG on Pain in Childhood are listed below, and any of them would be happy to provide further information. *Executive*: Eeva-Liisa Manuksela, MD, Helsinki, Finland (President); Patricia McGrath, Ph.D., London, Canada (Past President); Charles Berde, MD, Ph.D., Boston, USA (President Elect); Ann Goldman, MD, London, England (Secretary); David Cohen, MD, Philadelphia, USA (Treasurer). *Council*: Allen Finley, MD, Halifax, Canada; Maria Fitzgerald, Ph.D., London, England; Leora Kuttner, Ph.D., Vancouver, Canada; Neil McIntosh, MBBS, Edinburgh, Scotland; Gunnar Olsson, MD, Ph.D., Stokholm, Sweden; Maureen Pomietto, MN, RNC, Seattle, USA; Barbara Shapiro, MD, Wayne, USA.

Short announcements on pediatric pain will be published gratis.

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 Julie Goodman, Managing Editor, Pediatric Pain Letter, Psychology Department, Dalhousie University, Halifax, Nova Scotia, B3H 4J1; email jgoodman@is2.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.

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