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Pediatric Pain Letter

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

Editorial Board

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Editorial

The Sourcebook of Pediatric Pain

As part of the ongoing efforts to disseminate information on pediatric pain by the Pediatric Pain Lab at Dalhousie University and the IWK Grace Health Centre, we are pleased to announce that the Mayday Foundation is sponsoring the development of the *Sourcebook of Pediatric Pain: procedures, policies and pamphlets*. An international editorial board is being assembled to help in directing the *Sourcebook*. The *Sourcebook* will be published on the World Wide Web and in a loose-leaf binder. The goal of the project is to develop a resource for programs or institutions which are planning policies and protocols for children's pain assessment and management. For each problem or treatment technique, several policies and protocols will be available, reflecting regional variations and different levels of expectation and available resources. Each submission will be peer reviewed and accompanied by a brief commentary by one of the reviewers. The *Sourcebook* will be operational in about six months. We will let you know the URL and ordering information then.

The *Sourcebook* will allow centres to share their protocols, and help those who are developing approaches to pediatric pain management. Policies by health centres or associations and pamphlets intended for parents and patients will also be included.

We need your help in acquiring copies of protocols, policies, and pamphlets on pediatric pain. If you would like to contribute, please request a Contributor's Form from Allan Hennigar at ahennig@is.dal.ca. We will send you all the material you need to have your protocol published in the *Sourcebook of Pediatric Pain*.

Suggestions about the *Sourcebook of Pediatric Pain* can be directed to Patrick McGrath or Allen Finley.

Abstracts

Medication for Migraine in Children

Hämäläinen, M. L., Hoppu, K., Valkeila, E. & Santavuori, P. (1997). Ibuprofen or acetaminophen for the acute treatment of migraine in children: A double-blind, randomized, placebo-controlled, crossover study. *Neurology*, *48*, 103-107.

Objective. To evaluate the efficacy of acetaminophen and ibuprofen for the treatment of migraine.
Design. Randomized, double-blind, placebo-controlled, three-way crossover trial.
Setting. Three pediatric hospitals.
Participants. 88 children diagnosed as having migraine according to International Headache Society (IHS) criteria (50% female; mean age=10.7 years; age range=4.0-15.8 years) who had at least two attacks per month lasting two hours or more and who were able to use a headache diary. Children with a chronic illness (e.g., renal disease, severe asthma), severe allergies, children who required other treatment for their headache, and those who received other daily oral medication were excluded.
Intervention. Single oral doses of 15 mg/kg acetaminophen, 10 mg/kg ibuprofen, or a placebo were used at home, in random order, to treat three migraine attacks per child.
Main Outcome Measures. Children and their parents chose between a 100 mm visual analogue scale (VAS) or a 5-point faces scale (based on their preference during the "run-in" period) with which the child assessed headache severity before treatment and at 30 and 60 minutes thereafter, continuing for each subsequent hour for up to five hours unless they fell asleep. For those who chose the faces scale, parents assessed the child's behaviour in a questionnaire about nausea, mobility, and pain complaints.
Results. Both VAS and faces ratings were transformed to indicate the grade of severity of migraine (e.g., face 1 or VAS $\leq$ 12=grade 1). The 26 children who had migraine with aura were older than those without (median age=12.3 vs. 10.4 years; p=0.007). Median migraine history was 34 months (range=2-145 months), and median duration of attack was 12 hours (range=2-72 hours). The 65 children who chose the faces scale were significantly younger than the 23 children who chose the VAS scale (median age=10.3 years; range=4.3-16.4 vs. median age=12.5; range=9.5-15.9; p=0.0002). Severe or moderate headaches ($\geq$3 on a 1 to 5 scale) were reduced by at least 2 grades after two hours twice as often with acetaminophen (95% CI=0.9-4.3) and three times as often with ibuprofen (95% CI=1.0-8.1) compared to placebo. Children improved twice as often with ibuprofen and acetaminophen, compared to with placebo. Ibuprofen was twice as likely as acetaminophen to abort migraine within two hours (95% CI=1.1-4.0).
Conclusions. Ibuprofen and acetaminophen are both effective and economical treatments for severe or moderate pediatric migraine. Acetaminophen was noted to have a faster onset but was less effective than ibuprofen. In this study, ibuprofen gave the best overall relief for pediatric migraine.

Hämäläinen, M. L., Hoppu, K., & Santavuori, P. R. (1997a). Oral dihydroergotamine for therapy-resistant migraine attacks in children. *Pediatric Neurology*. *16*(2), 114-117.

Objective. To evaluate the efficacy of oral dihydroergotamine (DHE) for the treatment of therapy-resistant migraine in children.
Design. Randomized, double-blind, placebo-controlled, four-way crossover trial.
Setting. Three pediatric hospitals.
Participants. 13 children (median age=10 years, 9 months) who had at least two migraine attacks per month, meeting the International Headache Society criteria for migraine. Most had previously completed a trial with acetaminophen and ibuprofen. Children with a chronic illness (e.g., renal disease, severe asthma), severe allergies, children who required other treatment for their headache, and those who received other daily oral medication were excluded from participation. Sixteen children initially agreed to participate in the study; three were excluded prior to data analysis (two took no test drugs and one was lost to follow-up).
Interventions. Single doses of DHE 20 µg/kg mesylate oral

solution 2mg/mL, or placebo with similar appearance were taken with water (or other liquid) to treat two attacks per child at onset of headache. Treatment order was random. If the first dose provided relief, a second dose could be taken after 1 hour. If neither treatment provided relief, after contact with investigator, the next migraine attack was treated with DHE 40 µg/kg and one with placebo.

Main Outcome Measures. Intensity of each headache was rated by children on a 5-point scale (5=severe, 3-4=moderate, 2=mild, 1=no pain) before treatment, and after treatment at 30 and 60 minutes, and then hourly up to five hours, unless the child fell asleep. Nausea, mobility, and complaints of pain were assessed by questionnaire. Efficacy was defined as a reduction of a severe or moderate pain headache (i.e., ratings ≥ grade 3) by at least 2 grades on the scale after two hours.

Results. Data analyses were limited by differences of headache recurrence in subjects, differences in administration, lack of information on dosing, and the small number of subjects. Five participants out of seven reported being pain-free after DHE administration, although two had a recurrence of headache in a few hours. No children were pain-free after placebo. Nausea and vomiting were reported as side effects by four subjects.

Conclusion. Although DHE may be useful in the treatment of migraine for some children, a pharmacokinetic study and then a larger, controlled clinical trial should be conducted before concluding on the drug's efficacy.

Hämäläinen, M. L., Hoppu, K. & Santavuori, P. (1997b). Sumatriptan for migraine attacks in children: A randomized placebo-controlled study. *Neurology, 48,* 1100-1103.

Objective. To examine the effectiveness of oral sumatriptan for treatment of migraine in children.

Design. Randomized, double-blind, placebo-controlled, two-way crossover trial.

Setting. Three pediatric hospitals.

Participants. 31 8- to 16-year-old children (median age=12.3 years) who had at least two migraines per month, as diagnosed using International Headache Society criteria, who had not benefitted from other medications, were recruited to participate. Children with a chronic illness (e.g., renal disease, severe asthma), severe allergies, children who required other treatment for their headache, and those who received other daily oral medication were excluded from participation. Complete data were available for 23 children; the remaining children were excluded from final analysis for a variety of reasons, mostly related to non-compliance with the drug protocol.

Interventions. Single oral doses of 50 mg of sumatriptan for body surface area of 0.75m^2 to 1.5m^2 or 100 mg for body surface area of 1.5m^2 or more, and placebo were provided for each child. Each child received, in random order, sumatriptan or placebo to treat two migraine attacks per child at home.

Main Outcome Measures. Headache severity was measured using a 100 mm visual analogue scale before treatment and every 30 minutes for up to five hours. Pain relief at each time point was measured using pain intensity difference which is the pain intensity before taking the drug minus pain intensity at assessment time. Overall pain relief was measured by summing these difference scores and multiplying the total by the number of hours since the previous assessment.

Results. Two hours following sumatriptan, 7 of the 23 children reached a 50% reduction in pain intensity. Two hours following placebo, 5 of the 23 children reported the same reduction. The pain was alleviated completely in five children after sumatriptan and in two after placebo. There were no significant differences in dose, age, gender, stage of puberty, duration of migraine history, or severity, length, or frequency of migraine between children who did and did not improve with sumatriptan. Median summed difference scores increased identically for the first 2 hours, but at 4 hours the median summed difference was 2.4 times higher for the sumatriptan, however this difference was not statistically significant. The seven children who responded favourably to sumatriptan had higher difference scores than those who took placebo.

Conclusions. In the present study, 22% of the children were pain free and 30% obtained some relief from sumatriptan. The authors suggested that the failure of sumatriptan to provide relief for children's migraine may be accounted for by hormonal changes of puberty, differences in MAO-A activity, or the receptor site for sumatriptan in children. They recommended against the use of sumatriptan in this age group.

Battistella, P. A., Ruffilli, R., Cernetti, R., Pettenazzo, A., Baldin, L., Bertoli, S., & Zacchello, F. (1993). A placebo-controlled crossover trial using trazodone in pediatric migraine. *Headache, 33,* 36-39.

Objective. To investigate the effect of trazodone on the frequency and duration of pediatric migraine.

Design. Double-blind, placebo-controlled two-way crossover trial.
Setting. Unspecified.
Participants. 40 children (18 females; mean age=12 years, range=7-18 years) who fulfilled the International Headache Society criteria for migraine without aura symptoms, who had migraine for at least six months, and who experienced at least three attacks per months were recruited. Children were assigned to two groups, and were matched on age, sex, frequency of migraine and the number of years since onset of migraine. Of these 40 children, five withdrew either because of onset of another disease, or drug administration errors.
Interventions. Participants received 1 mg/kg/day of trazodone divided into three equal doses in the form of oral drops for a 12-week period, or placebo, administered three times daily for a 12-week period. Initial treatment and placebo administration were separated by a 4-week washout period.
Main Outcome Measures. For six months prior to and during the 32 study weeks, participants kept a diary of the frequency, intensity, and duration of their migraines, and related interference with daily activities. The effectiveness of trazodone was measured using attack frequency per month and the duration of attack.
Results. No significant differences existed between the two groups prior to treatment or during the washout period between treatments on any measures. During the first treatment phase, no difference was observed in the frequency of attacks. Both groups showed significant decreases in attack frequency over the course of treatment. Both groups also showed significant decreases in attack duration over the course of the first treatment period, but the children who received trazodone had significantly shorter attack durations than the placebo group. Following the crossover phase, children who then received trazodone had significantly lower attack frequencies than the placebo group. Similar results were obtained for attack duration.
Conclusions. Trazodone was found to significantly decrease both the frequency and the duration of pediatric migraine compared to placebo. These results suggest that trazodone is an effective prophylactic agent for pediatric migraine.

Symon, D. N. K. & Russell, G. (1995). Double blind placebo controlled trial of pizotifen syrup in the treatment of abdominal migraine. *Archives of Disease in Childhood, 2,* 48-50.

Objective. To assess the efficacy of pizotifen syrup for treatment of abdominal migraine in children.
Design. Double-blind, placebo-controlled, two-way crossover trial.
Setting. Pediatric clinic of general hospital.
Participants. 14 children aged 5 to 13 years with a history of recurrent, discrete episodes of abdominal pain which was present for at least six months and occurred at least twice per month for two hours in duration. The pain did not radiate, was not suggestive of structural disease, and was accompanied by pallor. All children had one first degree, or two second degree relatives with either migraine or recurrent "throbbing" headaches.
Interventions. Children were given syrup containing 0.25 mg pizotifen/ 5 ml or a placebo syrup for two periods of two months. Initial doses consisted of 5 ml twice per day; those without relief after one month were prescribed an additional 5 ml per day. Assignment to receive pizotifen or placebo first was random.
Main Outcome Measures. Parents recorded the duration of each migraine and rated the severity of the migraine as mild, moderate, or severe.
Results. During the active treatment phase, children experienced fewer migraines, and those occurring were shorter and less severe than during the placebo period. A large majority of children (11/14) preferred the pizotifen syrup over the placebo.
Conclusions. Effective prophylaxis for abdominal migraine in children can be achieved with pizotifen syrup. Few unpleasant side effects were reported.

Commentary

Migraine is a common and disabling condition in children. Because migraine attacks may be severe and frequent, in spite of regular life habits and avoidance of possible trigger factors, the child may need medication against the attacks.

Symptomatic treatment means therapy that aims to terminate or decrease the symptoms of the migraine attack. In adults, several drugs have been shown to abort or relieve migraine attacks (Goadsby & Olesen, 1996). Metoclopramide has been used to prevent vomiting and improve gastric motility, but there are no controlled trials on its use in children.

In children, oral acetaminophen 15 mg/kg and ibuprofen 10 mg/kg were well tolerated and effective as treatments for migraine attacks (Hämäläinen, Hoppu, Valkeila, & Santavuori, 1997). In more than half of the children with moderate or severe migraine attacks, a single dose of ibuprofen alleviated the pain in two hours, and

most of them became pain-free. Almost as many benefitted from acetaminophen. Acetaminophen had a more rapid onset than ibuprofen, but ibuprofen was twice as likely as acetaminophen to abort migraine within two hours.

In 12 children with therapy-resistant migraine, oral dihydroergotamine (DHE) drops showed some effect, but the difference between DHE and placebo was not statistically significant (Hämäläinen, Hoppu, & Santavuori, 1997a). Headache recurred in two of the five pain-free children after DHE.

In 23 children with therapy-resistant migraine, most of the endpoints may have favoured oral sumatriptan against placebo (Hämäläinen, Hoppu, & Santavuori, 1997b), but the response rates at two hours were lower than those demonstrated in adult studies. Response rates to sumatriptan increased from two to four hours but did not reach statistical significance. There was no recurrence of symptoms after sumatriptan. When sumatriptan was injected subcutaneously into 50 young people aged 6-18 years to treat their migraine attacks, 80% (72% girls, 96% boys) obtained partial relief (Linder, 1996), but this was not a controlled study.

For aborting migraine attacks, oral acetaminophen and ibuprofen are effective and can be easily swallowed in a liquid form. Even higher doses of ibuprofen should be investigated. More data on the pharmacokinetics, pharmacodynamics, efficacy, and safety of both DHE and sumatriptan in children are needed, before their use can be recommended.

Prophylactic treatment is used to prevent migraine attacks. Several drugs, including propranolol, clonidine, papaverine, pizotifen, flunarizine, and nimodipine, have been investigated in controlled, clinical trials in childhood migraine, but none of these prophylactic treatments have proved very efficacious, and no single drug is clearly superior when its potential side-effects are considered (Hermann, Kim, & Blanchard, 1995). The results obtained with propranolol are inconsistent. Flunarizine has shown effect, but its use has been questioned because of side effects. Valproate has been effective in migraine prophylaxis in adults, but there are no controlled studies in children. Two recent trials have investigated trazodone, an antidepressant, in children with migraine without aura (Battistella et al., 1993) and pizotifen, a serotonin antagonist, in children with "abdominal migraine" (Symon & Russell, 1995), however, abdominal migraine is not generally recognized as a migraine entity. Both amitriptyline and imipramine are used as prophylaxis for migraine in children, but they have not been studied in controlled designs (Igarashi, May, & Golden, 1992).

When prophylaxis for migraine is considered, it would be wise, because of the inconsistency of the results, to tell the parents and the child, if old enough to understand, about the side-effects of alternative drugs and ask them which they would prefer.

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Arthritis Pain in Children and Adolescents

Lavigne, J. V., Ross, C. K., Berry, S. L., Hayford, J. R. & Pachman, L. M. (1992). Evaluation of a psychological treatment package for treating pain in juvenile rheumatoid arthritis. *Arthritis Care and Research, 5*, 101-110.

Objective. To investigate the effectiveness of behavioural interventions for children who experience high levels of pain from juvenile rheumatoid arthritis (JRA).
Design. Randomized, multiple-baseline trial.
Setting. Rheumatology clinic of a children's hospital.
Participants. 78 children and adolescents diagnosed with either JRA or spondyloarthropathy between the ages of 6 and 17 years were randomly selected from an outpatient rheumatology clinic to participate. Ten refused. The remaining 68 were asked to keep a 28-day pain diary where they rated their highest level of pain three times daily on a 10 cm visual analogue scale (VAS). Twelve children did not return diaries. Of the remaining 56 children, 21 met eligibility criteria of mean pain rating > 4 on the VAS, or 10% of ratings > 5. Of these 21, 12 declined to participate and 1 suffered an accidental injury and was unable to participate. The remaining 8 children (7 females; age

range=9-17) were randomly assigned to receive immediate or delayed treatment.
Interventions. Participants received six biweekly sessions of training in behavioural interventions for pain reduction; the first session was 90 minutes in length, the remaining five were 60 minutes. Parents were typically involved for a brief period during each session. Sessions included training in progressive muscle relaxation, electromyogram biofeedback, thermal biofeedback, and guided imagery. Suggestions were also provided to parents to reduce reinforcement of pain and pain-related disability
Main Outcome Measures. Pain diaries were completed by each child and one parent immediately following treatment and six months following treatment. Parents were asked to report whether their child exhibited pain behaviours found on the Pediatric Pain Behavior Questionnaire (PPBQ) when the child was in pain. They were also asked to complete a behavioural checklist (Child Behavior Checklist). Overall pain during physical therapy sessions was rated by each child's physical therapist.
Results. A clinically significant improvement (i.e., a 25% reduction in pain ratings) from baseline to posttreatment was noted for four of the children, but this difference was not statistically significant. Generally, this improvement was maintained during the 6-month follow-up period.
Conclusions. These results suggest modest support for the effectiveness of psychological interventions for managing pain in children with JRA. Further investigation is needed to clarify whether the noted trends could be statistically supported by using a larger sample size and an adequate experimental design.

Walco, G. A., Varni, J. W., & Ilowite, N. T. (1992). Cognitive-behavioral pain management in children with juvenile rheumatoid arthritis. *Pediatrics, 89*(6), 1075-79.

Objective. To assess the effectiveness of cognitive-behavioural pain management techniques in reducing pain intensity and increasing adaptive functioning in children with juvenile rheumatoid arthritis (JRA).
Design. Before-after trial.
Setting. Rheumatology clinic of a children's hospital.
Participants. Parents of 58 English-speaking children with JRA attending the clinic over a 30-month period were approached to participate. Parents of 26 children gave consent; 13 children (5 boys) aged 4.5 to 16.9 years completed treatment. Complete data sets were available for 10 children at the 6-month follow-up and for 8 children at the 12-month follow-up.
Interventions. Children completed eight weekly, individual sessions on self-regulation (Varni, 1981) which were adapted for developmental level, pain experience, interests, and abilities. Techniques taught included: progressive muscle relaxation, meditative breathing, and guided imagery for pain distraction and to alter pain perception.
Main Outcome Measures. A 10 cm visual analogue scale (VAS) anchored with happy and sad faces (children) or "no pain" and "severe pain" (parents) was completed twice daily (am/pm) over a 4-week baseline period and for a 14-day period at 6 and 12 months post-treatment. VAS ratings were also made during acute pain episodes and after using pain management techniques for these episodes throughout treatment, and during sessions (if pain was present). The Child Activities of Daily Living Index (CADLI; based on Fries et al., 1980) was completed at baseline, and at 6- and 12-month follow-ups.
Results. Children's mean VAS ratings during acute pain at clinic sessions and at home (mean=5.13, SD=2.25; mean=4.04, SD=1.97) were significantly lower than those taken after training in pain management techniques (mean=1.14, SD=1.81; mean=0.77, SD=0.82). At 6-month follow-up, children's VAS ratings were significantly lower for am and pm ratings (mean=0.20, SD=0.74; mean=0.40, SD=0.92) compared to baseline (mean=3.1, SD=3.44; mean=2.7, SD=3.19). Children's 12-month VAS ratings for am and pm (mean=1.8, SD=2.65; mean=1.48, SD=2.40) were also significantly lower than at baseline. Parents' VAS ratings were significantly correlated with children's ratings at baseline (r=0.71), 6-month (r=0.91), and 12-month follow-up (r=0.84). Scores on the CADLI improved over 6 and 12 months, although small numbers prevented statistical analysis.
Conclusions. Preliminary evidence for the short and long-term effectiveness of cognitive-behavioural treatment of pain from JRA is provided. The high drop out rate (50% at baseline or early in treatment) limits the generalizability of the results, and the potential utility of this form of treatment. Some measures of family functioning and child interest in treatment were lower for drop-outs, suggesting results may only apply to highly motivated children from well-functioning families

Varni, J. W., Thompson Wilcox, K., Hanson, V. & Brik, R. (1988). Chronic musculoskeletal pain and functional status in juvenile rheumatoid arthritis: An empirical model. *Pain, 32*, 1-7.

Objective. To test an empirical model aimed to predict functional status from psychological and disease-related

variables for children with juvenile rheumatoid arthritis (JRA) and chronic musculoskeletal pain.
Design. Case series.
Setting. Rheumatology clinic of a children's hospital.
Patients. 23 children with JRA (18 females; mean age=9.5 years; age range=5-15.2 years) and their mothers, from English-speaking families, who were receiving treatment at the rheumatology clinic. 22% of children had pauciarticular JRA, 48% had polyarticular JRA, 26% had systemic onset JRA, and 1 had an unspecified rheumatologic disorder. A large majority (91%) were using a prescribed medication. Ethnicity of the sample was: 57% Caucasian; 22% Hispanic; 17% African-American; and 4% Asian-American. Marital status was: 83% married; 9% divorced; 4% separated; and 4% single. Average annual family income was between $10,000 and $30,000 (US dollars).
Main Outcome Measures. A checklist designed to assess sociodemographic characteristics, the Varni/Thompson Pediatric Pain Questionnaire, the Child Behavior Checklist, the Child Activities of Daily Living Index, and the Family Environment Scale were completed by the mothers in a standardized order. The Varni/Thompson Pediatric Pain Questionnaire was also completed by the children. The Disease Activity Index, designed specifically for this study to provide a global assessment of disease activity, was completed by the pediatric rheumatologist. Using a 10 cm visual analogue scale, the physician, the mother, and the child rated present pain and the mother and the child rated worst pain for the previous week.
Results. There were no significant correlations between the 4 measures of functional status (activities of daily living (ADL), social and school functioning, and activities involvement). Multiple regression analysis was used to evaluate the effects of family psychosocial environment, worst and present pain intensity, child psychological adjustment, and disease activity on the four measures of child functional status. With worst pain intensity as predictor variable, R^2 values were: 0.57 for ADL; 0.34 for social functioning; 0.32 for activities involvement; and 0.23 for school functioning. With present pain intensity as predictor variable, R^2 values were: 0.49; 0.09; 0.20; and 0.22 respectively.
Conclusions. The empirical model was most powerful in predicting variance in the children's ADL with weaker relationships for the other three measures of functional status. The results suggest that these four aspects of functional status in children with JRA are variably influenced by complex interactions between psychological adjustment, chronic musculoskeletal pain, and disease activity.

Commentary

Chronic pain in children remains an area which is underresearched, both in terms of pain assessment and interventions, particularly in comparison to the extensive literature on adult chronic pain (Varni, 1996). Chronic pain has been shown to be a costly and disabling problem, and past research suggests it is uncommon for children to "grow out" of chronic pain syndromes (Oster, 1972; Christensen & Mortensen, 1975). Thus, an excellent opportunity to prevent or reduce adult chronic pain syndromes may be during childhood (Varni, Walco, & Katz, 1989).

Musculoskeletal pain is among the most common types of chronic pediatric pain. One relatively defined source of ongoing joint pain is juvenile rheumatoid arthritis (JRA), an autoimmune disorder characterized by inflammation of organs, joints, and other parts of the body that occur before or at age 16 years (Jaworski, 1994). Using multiple regression analyses, Varni and his colleagues (Varni, Thompson, & Hanson, 1987; Thompson, Varni & Hanson, 1987) developed an empirical model to statistically predict pain perception in children with JRA, including child psychological adjustment, family psychosocial environment, and disease parameters as predictor variables. This model statistically predicted 72% of the variance in child perception and report of worst pain for the previous week among 23 children. Varni et al., (1988) then adapted this model by adding worst pain for the previous week as a predictor variable into the regression analysis. The model accounted for 57% of the variance in activities of daily living.

Although of great value from an assessment standpoint, to date, no investigators have implemented treatment strategies based on these hierarchical models. Indeed, very few studies have systematically explored the efficacy of psychological techniques for arthritis pain in children. The following studies represent an exhaustive review of interventions in this area.

The first study by Lavigne, Ross, Berry, Hayford, & Pachman (1992) evaluated a psychological treatment package for eight children who were experiencing moderate to high levels of pain associated with JRA. The intervention consisted of progressive muscle relaxation exercises with electromyogram and thermal biofeedback for the child. A significant effect was found in the direction of decreased pain among treated children. The observed improvement from post treatment to 6-month follow-up was especially notable.

A second study conducted by Walco, Varni, & Illowite

(1992) evaluated the benefits of cognitive-behavioural pain management in 13 children with JRA. The intervention program consisted of cognitive-behavioural techniques aimed at reducing pain intensity and enhancing adaptive functioning. The results indicated both short- and long-term gains, as children rated their pain as significantly lower and showed improvements in activities of daily living at both 6- and 12-month follow-ups.

There are several inherent methodological difficulties associated with research in this area. JRA is a relatively rare disorder, limiting the pool of potential subjects in any given setting. Multisite studies should be considered to remedy this problem. Once children are recruited, attrition problems often arise leading to small sample size. Therefore, it is important to gather data on courses of patient attrition (e.g., distance to hospital, perceived value of program, and difficulty with transportation) which have the potential to bias treatment effects. Once factors are identified, various methods may be implemented to reduce drop-out (e.g., incentive programs).

Research on the efficacy of psychological interventions for JRA pain is limited by confounding effects of medication. This problem is compounded by the heterogeneity of the JRA population, lack of a standardized medical regimen, and children's idiosyncratic responses to medication. Though controlling for medication is possible in theory, in reality one cannot separate its effects.

Despite difficulties in recruiting subjects and the problems of attrition, the need for more controlled studies that evaluate pain management in children with chronic pain conditions is essential. Only through demonstrated outcomes will these modalities become more widely accepted and thus reduce the suffering of children and adolescents with chronic musculoskeletal pain.

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Varni, J.W., Walco, G.W., & Katz, E.R. (1989). Assessment and management of chronic and recurrent pain in children with chronic diseases. *Pediatrician, 16*, 56-63.

Recent Articles

Bédard, G. B. V., Reid, G. J., McGrath, P. J. & Chambers, C. T. (1997). Coping and self-medication in a community sample of junior high school students. *Pain Research and Management, 2*(3), 151-156.

Objective. To compare differences in pain, coping strategies, and self-medication in a sample of adolescents who reported frequently engaging in catastrophizing compared to those who did not.
Design. Survey.
Setting. Three junior high schools (i.e., Grades 7, 8, and 9) in Halifax, Canada.
Participants. Data were collected from 651(301 or 46.2% males) of 862 students who were approached to participate. Of the students who did not participate, 136 did not return parental permission forms, parents of 40 students refused, and 35 were absent from school on the survey day. Data from three students were excluded because the research team questioned the validity of their responses. Participants' mean age was 13 years (SD=0.93 years)
Main Outcome Measures. Participants completed a questionnaire that examined how often any of 39 coping strategies were used by the students. The Pain Coping Questionnaire (PCQ; Reid et al., in press) was used to assesses the use of coping strategies for pain. Students were given a coping appraisal that rated their perceived ability to alter their pain. Pain ratings were taken for the frequency and intensity of pain due to: headache, stomach

pain, ear and/or throat pain, muscle and/or joint and/or back pain, and menstrual pain for females. Students reported on how often and what type of medication they used for a number of self-medicating behaviours.

Results. Cut off scores were established for the Catastrophizing scale of the PCQ by using the upper (>2.20 on the scale, n=244) and lower tertile (< 1.60 on the scale, n=239) of the students' scores. Data from the remaining 165 students were not analysed. The high catastrophizing group reported higher levels of pain intensity and frequency for all five types of pain. Female students had higher catastrophizing scores than male students. Students in Grade 9 (40.2%) reported higher catastrophizing scores than those in Grade 7 (31.1%) and Grade 8 (28.7%). High catastrophizers tended to report using positive self-statements, problem solving, social support seeking, information seeking, and externalization strategies more often to deal with their pain. Low catastrophizers tended to use behavioural and cognitive distraction strategies more to deal with pain, reported less difficulty dealing with pain, and reported finding it easier to control their emotions when they were in pain. High catastrophizers reported using over-the-counter (OTC) pain medications more often and tended to start taking OTC medications at higher pain intensities than did low catastrophizers. No significant differences were found between groups for perceived ability to control pain or for age when participants began self-medicating.

Conclusions. Individuals who report using coping strategies which can be classified as catastrophizing may use OTC medications more frequently due to higher reported pain intensity and more frequent bouts of pain. High catastrophizers may tend to use medications mainly when other pain management strategies have failed. Gender and age differences in catastrophizing may exist because females may experience more pain and because pain is more frequent at different ages.

Schanberg, L. E., Lefebvre, J. C, Keefe, F. J., Kredich, D. W. & Gil, K. M. (1997). Pain coping and the pain experience in children with juvenile chronic arthritis. *Pain, 73*, 181-189.

Objective. To describe the present pain experience and the pain coping strategies used by children with juvenile chronic arthritis (JCA) and to examine pain coping strategies and coping efficacy as a predictor of pain intensity and location.

Design. Survey.

Setting. Pediatric rheumatology clinic, university medical centre.

Patients. 56 consecutive children seen during a routine rheumatology clinic appointment with JCA (36 female; age range=6-20 years; mean age=12.4 years; 95% Caucasian, 5% African-American). The mean disease duration was 60 months and the mean age of onset was 7.2 years.

Main Outcome Measures. Children completed the Coping Strategies Questionnaire - Children's Version (CSC-C; Gil et al., 1991); both total and individual factor scores were computed. Current pain was assessed using the Oucher (Beyer et al., 1992) and a 100-mm vertical visual analogue scale anchored with "no pain" and "pain as bad as it could be". Children were also asked to colour a body map showing the location and distribution of their pain. Physicians made ratings of disease severity using the Disease Acitive Index (see Varni et al., 1987).

Results. Correlational analyses showed that the children who scored higher on the Pain Control and Rational Thinking factors of the CSQ-C had lower ratings of pain intensity and also reported pain in fewer body locations. Hierarchical regression analyses showed that disease activity and scores on the Pain Control and Rational Thinking factors of the CSQ-C each accounted for a unique and statistically significant proportion of the variance when attempting to predict the measure of pain location and both measures of pain intensity. ***Conclusions.*** These findings suggest that pain continues to be a significant component of JCA. Coping and disease severity explain a substantial proportion of the variance in pain intensity. Behavioural and cognitive therapy interventions designed to improve pain coping efficacy could be useful adjuncts in treating pain in patients with juvenile chronic arthritis.

Bruni, O., Fabrizi, P., Ottaviano, S., Cortesi, F., Giannotti, V. G. & Guidetti, V. (1997). Prevalence of sleep disorders in childhood and adolescence with headache: A case-control study. *Cephalalgia, 17*, 492-498.

Objective. To determine the prevalence of sleep disorders in children with tension-type headache and migraines.

Design. Case control.

Setting. Headache clinic of a university hospital.

Participants. 322 consecutive children were clinically evaluated for inclusion in the study during a physical examination. Of these, 39 were excluded who either did not meet migraine criteria, had epilepsy, or had brain tumours. Of the remaining 283 participants (139 females,

mean age=10.1 years, age range=5.0-14.3 years), 164 children had migraine and 119 children had tension-type headache. A group of 893 children (451 females; mean age=9.9 years; age range=6.5-14.1 years), recruited from 3 local schools, who had previously participated in an epidemiologic survey of headache served as controls. The age and sex distributions of controls were comparable to those of the children with headache.

Main Outcome Measures. The parents of the participating children filled out a retrospective questionnaire designed to collect clinical and historical data about the children as well as about the children's sleep habits and sleep disorders, demographic data, and birth and medical history of the child. Additional questions regarding sleeping habits and sleep disorders in the children were designed to detect individual differences in sleep disorders.

Results. Children with migraine had a higher prevalence of prenatal/birth complications and prematurity, sleep disturbances during infancy, 3-month colic, food allergy, family history of sleep disturbances, and headache than controls. Children with tension-type headache had a higher rate of respiratory allergy, and family history of sleep disturbance than controls. Children with migraine had higher rates of sleep disturbance in infancy, 3-month colic, and family history of headache than children in the tension-type headache group. Headache groups did not differ from each other on measures of sleep duration, latency to falling asleep, bedtime problems, night awakenings, nightmares, and daytime sleepiness. Nocturnal symptoms (breathing difficulties, snoring, sleep apnea, frightening dreams) were more prevalent in migraine sufferers than in tension headache sufferers. Children who have nocturnal migraine reported more sleep disorders than children who reported daytime attacks. No differences were reported between good and poor sleepers regarding the frequency or length of headaches or headache pain intensity. Parents of children in the headache groups reported significantly poorer sleep quality than parents of control children.

Conclusions. Results suggest the existence of a strong relation between headache and sleep disorders in children, particularly in children who have migraine. A link may exist between developmental problems related to birth complications and headache. These findings add support to the hypothesis that headaches and sleep disorders may share a common locus of origin, possibly because they are modulated by the same neurotransmitters.

Porter, F. L., Wolf, C. M., Gold, J., Lotsoff, D. & Miller, J. P. (1997). Pain and pain management in newborn infants: A survey of physicians and nurses. *Pediatrics*, *100*(4), 626-632.

Objective. To examine nurses' and physicians' beliefs and self-reported behaviours in regards to managing procedural pain in newborns.

Design. Survey.

Setting. Level II and level III hospital nurseries.

Participants. 327 nurses (37 ± 8 years old; 318 female; 287 Caucasian; 11 ± 8 years experience) and 47 physicians (35 ± 6 years old; 18 females; 38 Caucasian) completed the questionnaires (80% overall response rate).

Main Outcome Measures. Participants were asked to rate the painfulness of 12 frequently performed procedures (e.g., endotracheal intubation, circumcision, lumbar puncture, heel stick, etc.) using a 0-4 numerical rating scale (i.e., 0=not painful, 4=very painful). They were asked to rate how often each procedure is performed with pharmacologic and comfort (nonpharmacologic) measures and how often each procedure should be performed with pharmacologic and comfort measures using a 0-4 numerical rating scale (i.e., 0=never, 4=always). They were also asked to compare the intensity of adult and infant pain.

Results. 9 of the 12 procedures were rated as at least moderately painful (i.e., rating $\geq$ 2). Both physicians and nurses reported that pharmacologic and comfort measures were not being used frequently, even for the most painful procedures, and that pharmacologic and comfort measures should be used more frequently (note: nurses reported that comfort measures should be used more frequently than did physicians). Regarding perceived intensity of infant versus adult pain, 59% of physicians and 64% of nurses rated it as the same; 27% of the total group reported that infants feel more intense pain; and about 10% reported that infants feel less pain. Infant and procedural pain beliefs correlated with pain management preferences.

Conclusions. Nurses and physicians believed that infants experience moderate to severe procedural pain which is the same or more intense than adult pain, however, they indicated that current pain management practices are inadequate. Further research is required to identify and overcome barriers to more consistent and effective pain management.

Bille, B. (1997). A 40-year follow-up of school children with migraine. *Cephalalgia*. *17*, 488-491.

Objective. To study the course, characteristics, and long-term prognosis of childhood migraine to adulthood.
Design. Longitudinal epidemiologic survey, 40-year follow-up.
Setting. Schools in Uppsala, Sweden.
Participants. In the initial prevalence study in 1955 (beginning of the longitudinal study), all 9000 school children (age range=7-15 years) in Uppsala, Sweden, were assessed for migraine. Of the 293 children with migraine, 73 children (32 boys, age range=7-13 years) were randomly selected for long-term follow-up. They had at least one migraine attack per month, lasting at least one hour, causing the child to disrupt activities. Average age of onset was 6.01 years (SD=2.29). By the 40-year follow-up, all (age range=47-53 years) but two were contacted (two female participants had died).
Main Outcome Measures. Follow-up evaluations were conducted previously by telephone or personal interviews after 6, 16, 22, and 30 years. Evaluations for the current follow-up were also conducted by telephone and personal interviews.
Results. 23% reported being free of migraine attacks. Males had a better prognosis than females (34% males migraine free, 15% females migraine free; $X^2(1)=3.92$, $p<0.05$). 29% had migraine attacks at least once per year during the 40-year period. 22% continued to have migraine, but had experienced at least one migraine-free period of two years duration or longer. Thus, 51% still reported migraine attacks. 48% reported having migraine attacks with aura during their lifetime. However, previous follow-up records had up to 80% reporting migraine with aura. 52% reported never having migraines with aura; however, previous records indicate that only 21% had never had aura. 23% reported having occasional migraine equivalents, such as scintillating scotomata without headache. 60% reported experiencing tension-type headaches, sometimes related to migraine attacks. Of 41 females who had been through pregnancies, 85% were migraine-free or had improved during their pregnancies. Of 61 participants who had children, 52% of their children had developed migraine-type, recurrent headaches. There was no difference in risk associated with being a father or mother on having a child also with migraine.
Conclusions. Migraine attacks in adulthood appear to become less frequent with increasing age. More than half of the original children with migraine continued to have migraine at 50 years of age. Many had difficulty recalling previous aura symptoms (41%), suggesting recall bias. Intensity of individual attacks was similar to that experienced in childhood.

Announcements

Meetings

May 28-30, 1998: *Canadian Pain Society 1998 Annual Conference*, Hotel Saskatchewan - Radisson Plaza, Regina Saskatchewan, Canada. "Canadian Achievements in a Global Context". Featuring keynote speakers Dr. Harold Merskey and Dr. Patrick Wall, along with plenary sessions by Dr. T. Coderre, Dr. K. Kluch, Dr. K. Craig, and Dr. D. Cassidy. For more information contact: Dr. Gordon J. G. Asmundson, Chair Scientific Programme Committee, tel (306) 766-5384; fax (306) 766-5530; email: gasmundson@reginahealth.sk.ca, or on the world wide web see: http://www.usask.ca/~vonbaeye/cps-98/

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), and Patrick McGrath (Canada). Registration is limited to 120 participants. 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.

Teaching Module: The Network Project Teaching Module on the Management of Cancer Pain in Children. Prepared by John J. Collins, Charles B. Berde, and Maura E. Byrnes, these educational materials contain a comprehensive lecture with references and over 50 colour slides. Cost: $225.00 (US dollars, make cheque payable to "The

Network Project, CC5112/F7062"). For further information contact the Network Project, Memorial Sloan-Kettering Cancer Center, Box 421, 1275 New York Ave, New York, NY, 10021, USA. Tel: (212) 583-3042; Fax: (212) 230-1953.

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.

Now Available: We are currently offering *Pediatric Pain Letter* binders for sale to protect your 5 issues of Volume 1. Each 1½ inch binder comes with a subject and author index for Volume 1 to allow easy referencing, for a cost of $10.00 CDN in Canada and $10.00 US in all other countries (includes shipping). To order, send payment to Pediatric Pain Letter, Attention: Beth Currie-Special Binder Offer, Psychology Department, Dalhousie University, Halifax, NS, B3H 4J1, Canada. Orders can also be sent via fax (902-494-6585) or email (bcurrie@is.dal.ca). Cheque (payable to Dalhousie University), Visa, or MasterCard (include expiry date for credit card orders) accepted.

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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