

# Pediatric Pain Letter

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

## A New Tool Against Pain

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### Introduction

Advances in clinical practice and research in pediatric pain have come quickly in the last decade. Research on pediatric pain is now common and is widely dispersed in scientific and clinical journals. This dispersion of research is positive because pediatric pain is now in the mainstream literature. However, there is no focal point where clinicians and researchers can find the latest literature in a readily accessible format. The Pediatric Pain Letter will fill that need by helping clinicians and researchers use the scientific literature more effectively in their efforts to relieve unnecessary pain.

Quarterly, the Pediatric Pain Letter will review the literature in pain on infants, children and adolescents by presenting series of structured abstracts accompanied by critical commentaries. We will also review current articles. For example, in this issue, we present three themes: parents' management of postoperative pain, psychological factors in recurrent abdominal pain and fibromyalgia. There is also a section for announcements and book reviews.

The Pediatric Pain Letter uses structured abstracts to give readers standard information on each article which makes the methodological strengths and weaknesses more obvious. We will follow the format used by JAMA (Haynes, Mulrow, Huth, Altman & Gardner, 1990). Commentaries will be written by

the editors, members of the editorial board, and others. All commentaries will be signed. Abstracting is done by a panel of contributors who are acknowledged at the end of each issue.

The Pediatric Pain letter is published by the editors, Patrick J. McGrath and G. Allen Finley, and is part of the dissemination efforts of the Pediatric Pain Research Laboratory at Dalhousie University/IWK-Grace Health Centre in Halifax, Canada. The Editors are assisted by an international editorial board listed on our masthead.

## Reference

Haynes, R. B., Mulrow, C. D., Huth, E. J., Altman, D. G., & Gardner, M. J. (1990). More informative abstracts revisited. *Annals of Internal Medicine*, 113, 69-76.

## Abstracts

### *Parents' Management of Postoperative Pain*

Bennett-Branson, S. M. & Craig, K. D. (1993). Postoperative pain in children: developmental and family influences on spontaneous coping strategies. *Canadian Journal of Behavioural Science*, 25(3), 355-383.

**Objective.** To examine coping behaviours of children following day surgery.

**Design.** Survey.

**Setting.** Children's hospital and 3 community hospitals.

**Participants.** 60 (17 boys) healthy children who had undergone day surgery. Children were divided into two age groups: 7-9 years (mean age = 97.8 months) and 10-16 years (mean age = 157.0 months). Parent interviews were obtained from 57 mothers and 3 fathers.

**Main Outcome Measures.** Children were asked to: describe their pain; make pain intensity ratings using a 10 cm VAS (anchors: 'no hurt' and 'hurt as bad as it can be'); rate their coping and catastrophizing; rate their coping effectiveness; rate affective distress and anxiety; and describe how they learned about coping with pain. Parents were asked to: estimate the level of their child's pain and emotional distress; report on what and how coping may have been learned by their child; rate their own anxiety; and recall what they told their child about their surgery.

**Results.** The majority (n = 51) of children reported that their worst pain (mean rating 8.81 on VAS) occurred immediately upon waking from surgery. The mean pain intensity at the time of the interview was 5.1 (range = 0-10). The mean number of behavioural and cognitive coping strategies generated was 2.28 and 1.02, respectively. A majority of the parent-child pairs (48/60) agreed that it was important for children to know in advance about postoperative pain.

**Conclusions.** The majority of participants reported experiencing considerable pain during the first 36 hours following surgery. Older children reported using a similar number of behavioural but more cognitive coping strategies than younger children. Generally, parents were accurate judges of their child's pain and distress and reported that helping their child manage postoperative pain was challenging and anxiety-provoking.

Finley, G. A., McGrath, P. J., Forward, S. P., McNeill, G., & Fitzgerald, P. (1996). Parents' management of children's pain following 'minor' surgery. *Pain*, 64, 83-87.

**Objective.** To evaluate the prevalence, severity, and parents' management of children's pain following short-stay or day surgery.

**Design.** Cross-sectional, prospective, survey.

**Setting.** Children's hospital.

**Participants.** 189 parents of children (2-12 years old) who had undergone short-stay or day surgery.

**Main Outcome Measures.** 3-day diary of child's pain and methods used to alleviate it.

**Results.** Some surgeries (i.e., myringotomy) resulted in little pain. Others such as tonsillectomy, circumcision and strabismus repair, resulted in about half of the children experiencing clinically significant pain (i.e., >30 mm on 100 mm VAS). 68% of parents reported being told to give their child acetaminophen "if necessary", 13% were told to use acetaminophen regularly and 8% recalled no instruction. For children with pain ratings in the clinically significant range on the day after surgery, 13% of parents gave no pain medication and 47% gave between 1-3 doses. For children with pain ratings in the clinically significant range 48 hours after surgery, 17% of parents gave no medication and 45% gave between 1-3 doses.

**Conclusions.** Some types of minor surgery reliably result in significant pain. Most parents, even when they recognize that their child is in pain, do not give adequate medication for pain.

Reid, G. J., Hebb, J. P. O., McGrath, P. J., Finley, G. A., & Forward, S. P. (1995). Cues parents use to assess postoperative pain in their children. *The Clinical Journal of Pain*, 11, 229-235.

**Objective.** To describe the cues (verbal and nonverbal) parents report using to assess pain in their children following surgery.

**Design.** Prospective survey.

**Setting.** Children's hospital.

**Participants.** 176 parents (172 mothers, 4 fathers) of children undergoing short-stay or day surgery.

**Main Outcome Measures.** Parents recorded any clues on how their child was feeling for the day of and 2 days following surgery and rated their children's pain 5 times per day using a VAS.

**Results.** Parents most frequently cited verbal report and appetite as cues to how their child was feeling, but a variety of other cues were also reported. Cue types were not significantly related to gender. Children whose parents used appetite as a cue were significantly older than those who did not use this cue (mean age = 6.4 years vs. 5.5 years). The presence or absence of illness behavior, as well as disruptions to normal behavior pattern cues were significantly related to pain intensity.

**Conclusions.** This study provides insights into the types of cues parents use to assess pain in their children.

Chambers, C. T., Reid, G. J., McGrath, P. J., & Finley, G. A. (in press). Development and preliminary validation of a postoperative pain measure for parents. *Pain*.

**Objective.** To develop and validate an observational method to assess postoperative pain in children for parents.

**Design.** Case series.

**Setting.** Children's hospital.

**Participants.** 110 children (56.4% male; mean age = 9.4 years; age range = 7-12 years) requiring day surgery and their parents (106 mothers, 3 fathers, 1 grandfather; mean age = 36.2 years).

**Main Outcome Measures.** The Postoperative Pain Measure for Parents, a 29-item checklist of the non-verbal cues parents typically use to assess pain following surgery, was completed by parents for 2 consecutive days following surgery. Children made ratings of pain intensity and emotional distress.

**Results.** The Postoperative Pain Measure for Parents assesses a single construct, showed good internal consistency ( $\alpha=0.89$

and 0.91 for Day 1 and Day 2), and scores were not influenced by child age or gender. Scores were significantly related to child emotional distress and decreased with pain ratings made by children from Day 1 to Day 2 and discriminated between high/moderate pain surgeries vs. low pain surgeries.

**Conclusions.** This measure showed good initial psychometric properties.

Knight, J. C. (1994). Post-operative pain in children after day case surgery. *Paediatric Anaesthesia*, 4, 45-51.

**Objective.** To investigate the incidence, assessment, and management of pain following day case paediatric surgery.

**Design.** Prospective survey.

**Setting.** General hospital.

**Participants.** 98 children (94 male; mean age = 4.75 years, age range = 2-143 months) undergoing day surgery.

**Main Outcome Measures.** Pain ratings were made by children (older than 3 years), parents, and nurses on leaving the recovery room, at 1 hour post-operatively and immediately prior to discharge. Use of analgesia, and pain ratings were recorded on the evening of surgery, and 24 hours and 48 hours postoperatively. Children used the Faces Pain Scale (Bieri et al., 1990) and adults used a 0-6 numerical rating scale with anchors 'no pain' and 'worst possible pain'.

**Results.** Mean pain ratings were all below 1.5 (i.e., between second and third face) for the first three postoperative pain assessments. Mean pain ratings were all below 2.0 (i.e., third face) for the following three postoperative assessment times. The mean pain rating in the recovery room prior to administration of an analgesic was 4.5 (range 2-6); 48% of children were prescribed diamorphine if required and 91% paracetamol. During the first 3 days following surgery, 84.4% were given a mean of 2.98 (range 0-10) doses of paracetamol.

**Conclusions.** Although mean pain ratings were low, significant levels of analgesics were required, suggesting that minor paediatric surgeries are associated with considerable post-operative pain.

### Commentary

Parents have increasing responsibility to care for their children after surgery because many more operations are being done on an out-patient or short-stay basis. Many children's hospitals have embraced the concept of "family-centred care", which places a high priority on the involvement of parents in their child's care.

Are parents aware that there is a problem with pain after surgery? Bennett-Branson and Craig (1993) found that most parents warned their child of possible pain after surgery and provided general statements of support, but few gave specific directions. Finley et al. (1996) showed a high prevalence of post-operative pain following "minor" surgery by parents' report and an inadequate level of treatment, in most cases.

If parents are to help their children with postoperative pain, they must know how to measure it, and self-report is clearly not available for many children. Although parents' scores for procedure pain correlate reasonably well with their children's, little work has been done on postoperative pain measurement.

Reid et al. (1995) determined behavioral cues used by parents to identify their children's pain following out-patient or short-stay surgery. Chambers et al. (in press) used these cues to create a parents' checklist for postoperative pain, and found good sensitivity and specificity when compared to child self-report.

Few studies have looked at parents' treatment of postoperative pain. Bennett-Branson and Craig (1993) studied 60 children and their parents following minor surgery. They found that parents wanted to help their children manage postoperative pain, but found the task daunting. Most attempted to distract or soothe the child. Parents' anxiety was highly correlated with children's anxiety, however, the children felt that their parents helped them cope with the pain.

Both Knight (1994) and Finley et al. (1996) show substantial underdosing of medication (primarily acetaminophen) by parents. Parents seem to recognize that their child is in pain, and failure to treat is due to lack of knowledge or to fears of the effects of treatment. Attitudes toward medications are affected by fears of addiction, side-effects, and tolerance (Gedaly-Duff & Ziebarth, 1994; Forward et al., in press; Chambers et al., in press).

To change attitudes and behaviour, Chambers et al. (1996) gave parents either a booklet about pain assessment and treatment, the same booklet without the treatment section (i.e., assessment only), or a general booklet about coming to the hospital. Although there was some improvement in attitudes toward medication use, this made little difference in drug administration, except on the third day postoperatively, when parents in the experimental group gave slightly more medication.

Parents get mixed or vague instructions about treatment of their child's pain. Both Finley et al. (1996) and Chambers et al. (in press) found that less than 50% of parents were told to give acetaminophen regularly following surgery. Availability does not seem to be the problem, as Forward et al. (1995) reported that 95% of mothers had acetaminophen

in the home.

We know that parents can recognize pain, and there is progress towards providing them with a practical tool for measurement. It is clear that parents often have inappropriate attitudes towards using medication (even acetaminophen), and that these attitudes can be improved, but that this does not guarantee appropriate behaviour. Also, parents generally do not receive specific instructions about dealing with the pain (in fact, it may be downplayed).

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## References

- Chambers, C. T., Reid, G. J., McGrath, P. J., Finley, G. A., & Ellerton, M. L. (in press). Parents' attitudes and management of postoperative pain in children following a pain education booklet. *Children's Health Care*.
- Forward, S. P., Brown, T. L., & McGrath, P. J. (in press). Mothers' attitudes and behavior toward medicating children's pain. *Pain*.
- Gedaly-Duff, V., & Ziebarth, D. (1994). Mothers' management of adenoid-tonsillectomy pain in 4- to 8-year-olds: a preliminary study. *Pain*, 57, 293-299.

## Fibromyalgia in Children

Malleson, P. N., Al-Matar, M., & Petty, R. E. (1992). Idiopathic musculoskeletal pain syndromes in children. *Journal of Rheumatology*, 19, 1786-1789.

**Objective.** To clarify the nature of reflex neurovascular dystrophy and fibromyalgia in children and to investigate related factors and long term outcome.

**Design.** Case series (retrospective chart review).

**Setting.** Rheumatology clinics.

**Participants.** 81 children seen between 1982 and 1990 who met criteria for localized idiopathic pain syndrome, reflex neurovascular dystrophy, diffuse idiopathic pain syndrome or fibromyalgia. All were 16 years old or less at onset of symptoms.

**Main Outcome Measures.** Age of onset, duration of first episode, duration of follow-up, location of affected limbs and areas of tenderness, clinical outcome, number of recurrences, associated symptoms and stressors.

**Results.** *Localized idiopathic pain syndrome:* 41 children (38 female) were identified with this syndrome. Of these, 24 had definite, 14 had probable, and 3 had possible reflex

neurovascular dystrophy. The mean age of onset was 10.8 years (range 7-15 years). Of the 36 patients seen more than once, they were seen for a mean of 16.3 months. The mean duration of the first episode was 9.6 months among patients with definite reflex neurovascular dystrophy compared to a mean of 19.2 months in those with probable or possible diagnoses. The mean number of recurrences was 1.3. Major stressors identified in the charts included "overachievement" (26%), learning difficulties (24%), single parent family (15%) and sexual abuse (7%), but these stressors were not assessed or documented in a standardized manner. *Diffuse idiopathic pain syndrome*: 40 children (39 female) were identified with this syndrome; 35 of these met diagnostic criteria for fibromyalgia (Yunus & Masi, 1985). Mean age of onset was 11.5 years (range 8 - 16 years) for those meeting criteria for fibromyalgia compared to 12.2 years (range 9 - 16 years) for those who did not. Associated stressors included "overachievement" (54%), learning difficulties (29%), single-parent family (28%) and suspected sexual abuse (9%). Four children with localized idiopathic pain syndrome developed diffuse idiopathic pain syndrome during follow-up and 4 children with diffuse idiopathic pain syndrome had a history of an episode of localized idiopathic pain syndrome.

**Conclusions.** Long-term idiopathic musculoskeletal pain represented approximately 5% of cases seen. Recurrences or persistence of pain was very common.

Buskila, D., Press, J., Gedalia, A., Klein, M., Neumann, L., Boehm, R., Sukenik, S. (1993). Assessment of nonarticular tenderness and prevalence of fibromyalgia in children. *Journal of Rheumatology*, 20, 368-370.

**Objective.** To determine the prevalence of fibromyalgia syndrome and nonarticular tenderness in healthy children.

**Design.** Prospective survey.

**Setting.** Community school.

**Participants.** 338 healthy children attending school (179 boys, mean age = 11.5 years; range= 9-15 years).

**Main Outcome Measures.** 18 tender points were identified by thumb palpation. Children and their parents were questioned about widespread pain and aching. 13 sites (9 tender point, 4 control) were examined with a dolorimeter.

**Results.** 21 (7 boys) children were diagnosed with fibromyalgia (Multicenter Criteria Committee, 1990) and 7 had 11 or more tender points but did not have widespread pain. Thresholds for both tender point and control sites were significantly lower in girls ( $p < 0.001$ ). No age differences were observed in thresholds or in prevalence. Children without fibromyalgia showed five tender points or less, with

the exception of the 7 children who had 11 or more tender points without widespread pain.

**Conclusions.** Prevalence of fibromyalgia was 6.8%. Assessment of tender points should be incorporated as a routine part of examination for complaints of nonarticular diffuse musculoskeletal pain.

Buskila, D., Neumann, L., Hershman, E., Gedalia, A., Press, J. & Sukenik, S. (1995). Fibromyalgia syndrome in children - An outcome study. *Journal of Rheumatology*, 22, 525-528.

**Objective.** To examine outcome of children with fibromyalgia 30 months following initial diagnosis.

**Design.** Cohort study.

**Setting.** Community school.

**Participants.** 21 children previously diagnosed with fibromyalgia; 7 children previously identified with 11 or more tender points without widespread pain. 30 months following diagnosis, 15 of the 21 children with fibromyalgia were recontacted for repeat assessment; 6 children had moved from the region. All 7 children with excessive tender points were recontacted. None of the children had received medical treatment during the 30-month follow-up period.

**Main Outcome Measures.** 18 tender points were identified by thumb palpation. Children and parents were questioned about widespread pain and aching. 13 sites (9 tender point, 4 control) were examined with a dolorimeter. Children were also asked about sleep disturbance, fatigue, morning stiffness, paresthesias, headache, and irritable bowel.

**Results.** Of the 15 previously diagnosed children, only 4 (27%) still met the diagnostic criteria outlined by the American College of Rheumatology. The mean number of tender points significantly decreased from 12.5 to 4.6 ( $p < 0.001$ ) and the threshold ratings for both tender sites and control sites significantly increased (2.4 vs. 3.4,  $p = 0.007$ ; 4.1 vs. 5.6,  $p = 0.012$ , respectively). None of the 7 children with excessive tender point counts had developed Fibromyalgia at follow-up. The mean number of tender points significantly decreased from 11.4 to 3.4 ( $p = 0.001$ ) and the threshold ratings for both tender sites and control sites significantly increased (2.7 vs. 3.9,  $p = 0.001$ ; 4.3 vs. 6.8,  $p < 0.001$ , respectively).

**Conclusions.** A favourable outcome for children with fibromyalgia was observed. All 7 children identified with an excessive tender point count improved in their levels of tenderness thresholds and point counts.

Yunus, M. B., & Masi, A. T. (1985). Juvenile primary fibromyalgia syndrome: a clinical study of thirty-three patients and matched normal controls. *Arthritis and Rheumatism*, 28(2), 138-145.

**Objective.** To describe the clinical features of primary fibromyalgia syndrome.

**Design.** Case control.

**Setting.** Rheumatology clinic.

**Participants.** 33 children diagnosed with fibromyalgia (31 Caucasian; 31 female; aged 9-17 years; mean age = 14.7 years). Mean age of onset was 12.3 years and ranged from 5-17 years. An equal number of controls matched on age (+/- 2 y), gender, and race were recruited among friends of children with fibromyalgia. Controls were 9-19 years in age with a mean age of 14.5 years.

**Main Outcome Measures.** Tender points, defined as areas of exaggerated tenderness induced from firm fingertip palpation, were determined from report of severe pain, physical withdrawal, characteristic body recoil or facial expression of pain.

**Results.** A significantly higher proportion of children with fibromyalgia reported musculoskeletal and non-musculoskeletal symptoms than normal controls. The mean number of tender points reported by children with fibromyalgia was significantly higher than that reported by controls (mean = 13, range = 5-31 vs. mean = 0.8, range = 0-4,  $p < 0.001$ ).

**Conclusions.** Fibromyalgia in children is a nonarticular rheumatic syndrome characterised by diffuse musculoskeletal aching and/or stiffness. Physical examination reveals presence of soft tissue tender points which are consistent and reproducible at follow-up. Suggested criteria for appropriate diagnosis of fibromyalgia in children are presented.

Walco, G. A., Ilowite, N. T. (1992). Cognitive behavioral intervention for juvenile primary fibromyalgia syndrome. *Journal of Rheumatology*, 19(10), 1617-1619.

**Objective.** To determine the effectiveness of a cognitive-behavioral intervention for symptoms of juvenile primary fibromyalgia syndrome.

**Design.** Before-after trial.

**Setting.** Pediatric rheumatology clinic.

**Participants.** 7 girls (mean age = 13.04 years; range = 8.6 - 17.7 years) who met criteria for fibromyalgia according to Yunus and Masi's (1985) criteria. Two girls did not complete treatment; one was in an automobile accident, and another

withdrew after 4 sessions. Five children had no DSM diagnoses, 1 met criteria for Overanxious Disorder, and another, who later withdrew, met criteria for Somatoform Pain Disorder.

**Interventions.** Treatment included 4 to 9 sessions of instruction, focusing on progressive muscle relaxation and guided imagery, of self-regulatory techniques aimed at reducing pain, and improving sleep and mood.

**Main Outcome Measures.** Pediatric Pain Questionnaire, 10 cm VAS to assess intensity of present, average, and worst pain during past week, diagnostic interview to evaluate possibility of DSM-III-R diagnosis.

**Results.** Mean pain intensity rating of "average" pain on the VAS was 8/10 (range = 6.8-9.5). Following treatment, the mean VAS rating was 0 and based on interviews, activities of daily living returned to premorbid levels of functioning. A follow-up telephone interview with parents (mean length of follow-up = 10.8 months, range = 4-24 months) showed that 4 children reported no subsequent pain, and one reported intermittent low-intensity pain that was easily controllable using self-regulatory techniques.

**Conclusions.** Cognitive-behavioral strategies may be useful in treating pain and other symptoms such as sleep and/or mood disturbance associated with primary fibromyalgia syndrome in children.

Reid, G.J., Lang, B. A., McGrath, P.J. (in press). Primary juvenile fibromyalgia: Psychological adjustment, family functioning, coping and functional disability. *Arthritis and Rheumatism*.

**Objective.** To determine the importance of psychological and family factors in juvenile primary fibromyalgia.

**Design.** Case-control.

**Setting.** Children's hospital.

**Participants.**  $n = 45$ ; equal numbers of children with fibromyalgia (all met Yunus & Masi's (1985) criteria), Juvenile Rheumatoid Arthritis (JRA) and pain free controls matched on age (+/- 6 months) and gender. Age range = 10 - 18 years.

**Main Outcome Measures.** Tender point examination using dolorimeter, pain tolerance, functional disability, school attendance, depression, anxiety, coping with pain, family functioning, illness behavior encouragement, symptom diary.

**Results.** There were no significant group differences on measures of anxiety, depression or perceived family functioning in children or their parents. Children with fibromyalgia had higher levels of problem-focused avoidance coping than both children with JRA and controls. Children with fibromyalgia and JRA had higher levels of functional

disability and more school absences than controls as rated by parents. Children with fibromyalgia had higher self-reported ratings of functional disability.

**Conclusions.** Fibromyalgia is associated with disability comparable to that of other conditions associated with recurrent pain. Functional disability among children with fibromyalgia and JRA can be predicted by psychological adjustment, physical status, parents' physical status and coping.

### Commentary

Fibromyalgia is characterized by complaints of widespread pain and tender points on palpation. The cause is unknown and the diagnostic category itself is contested by some. The American College of Rheumatology (ACR) has established diagnostic criteria that should make diagnosis more consistent (Multicentre Criteria Committee, 1990).

Fibromyalgia has not been widely studied in children and adolescents but there is good evidence that fibromyalgia occurs in clinic samples and in the general population. Malleson et al. (1992) did a retrospective chart review of children with idiopathic musculoskeletal pain presenting at children's rheumatology clinics. Most of the children (35/40) with diffuse pain met Yunus and Masi's (1985) criteria for fibromyalgia. They found that these children had frequent reoccurrences. Buskila et al. (1993) studied 338 healthy Israeli schoolchildren, aged 9 to 15 years, from a single school and found 6.2% to have fibromyalgia using the ACR criteria. There were no age or sex differences. Children with fibromyalgia had lower thresholds for tenderness than children without fibromyalgia at both tender and control sites. There were 7 children who had low pressure-pain thresholds at tender points but did not report widespread pain and thus were not diagnosed as having fibromyalgia. A 30-month follow up (Buskila et al., 1995) found that 73% of the children originally diagnosed with fibromyalgia no longer had fibromyalgia. None of the children with low pain thresholds had developed fibromyalgia.

The underlying cause of fibromyalgia is unknown. A very wide variety of causes has been suggested but none have been firmly established. Depression and sleep problems are common in patients with fibromyalgia but it is unclear if they are the cause or result of the disorder. Malleson et al. (1992) and Yunus and Masi (1985) both found high rates of psychopathology in fibromyalgia patients. However, they used very weak measurement. In contrast, Reid et al. (in press) found no differences between adolescents and their families with fibromyalgia, juvenile rheumatoid arthritis and pain-free controls on a variety of well-validated instruments

measuring clinical psycho-pathology.

The one treatment trial in adolescents (Walco & Ilowite, 1992) was a clinical series of cognitive-behavioral treatment with 7 patients. They found that 4 of the 5 patients who completed more than 4 sessions of treatment were pain-free and the remaining patient who completed treatment had sharply reduced pain.

There is need for many more descriptive and case-control studies in both clinical and normal samples to delineate the prevalence, correlates and characteristics of fibromyalgia. As well, randomized trials are needed to determine the effectiveness of treatments.

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### Reference

Multicenter Criteria Committee. (1990). The American College of Rheumatology 1990 criteria for the classification of Fibromyalgia Arthritis and Rheumatism, 33, 160-172.

### Psychological Factors in Recurrent Abdominal Pain

Alfvén, G. (1993). The pressure pain threshold (PPT) of certain muscles in children suffering from recurrent abdominal pain of non-organic origin. *Acta Paediatrica*, 82, 481-483.

**Objective.** To determine if recurrent abdominal pain (RAP) of non-organic origin is related to increased pain sensitivity.

**Design.** Case control.

**Setting.** 7 fourth grade classes from community schools in a suburb of Stockholm, Sweden.

**Patients.** 170 children (most 11 years) in the fourth grade; 30 later withdrew. Two groups were formed: one without pain symptoms (n = 50) and one with RAP (n = 49). The remainder had recurrent headache or other infrequent symptoms.

**Main Outcome Measures.** The Rutter Behavioral Scale was completed by teachers; participants were interviewed by the school nurse using a standardized questionnaire about common symptoms. The pressure pain threshold of six muscles from the left side of the body was measured by algometer.

**Results.** Thresholds were lower ( $p < 0.05$ ) for all muscles except quadriceps ( $p = 0.22$ ) among those with RAP. Neurotic or anti-social traits were not more prevalent among those with RAP.

**Conclusions.** RAP of non-organic origin is related to increased tenderness in abdominal muscles linked to a more general increase in muscular tension. The results support the hypothesis that RAP could be a part phenomenon of a specific pattern of muscle tension and tenderness.

Faull, C. & Nichol, A. R. (1986). Abdominal pain in six-year-olds: An epidemiological study in a new town. *Journal of Child Psychology and Psychiatry*, 27(2), 251-260.

**Objective.** To determine the prevalence of recurrent abdominal pain (RAP) in 5- to 6-year olds and any related factors.

**Design.** Case control survey.

**Setting.** First schools in a new town in northern England.

**Participants.** A population-based sample of children in their second year of school with RAP, scoring above the cut-off score on a screening questionnaire (response rate was 88.9%). Interviews were conducted with 145 children who had either a high or a low probability of being a case. Nine of these were unclassifiable.

**Main Outcome Measures.** Structured interview with parent; Rutter Behavior Scale; Conners Teacher Rating Scale.

**Results.** Prevalence estimates ranged from 24.5% to 26.9%. In children with RAP, duration of pain ranged from 5 minutes to 24 hours; the majority of episodes lasted less than 1 hour. 42% of children had missed school at least once and 58% had missed daily activities because of pain. Some associations with school difficulty, behavioural disturbance and housing were reported.

**Conclusions.** Prevalence of RAP was noted to be quite high in this population.

Raymer, D., Weininger, O., & Hamilton, J. R. (1984). Psychological problems in children with abdominal pain. *The Lancet*, Feb. 25, 439-440.

**Objective.** To determine prevalence of psychological distress in children with organic and non-organic abdominal pain.

**Design.** Case control.

**Setting.** Children's hospital and community controls.

**Participants.** 90 children aged 8 to 16 years: 60 were randomly drawn from hospital clinics (44 had organic (24 with Crohn's disease and 20 with ulcerative colitis) and 16 had non-organic abdominal pain). 30 age-matched pain-free

controls were selected from community schools.

**Main Outcome Measures.** Coopersmith Self-Esteem Inventory, Personal Adjustment Inventory, Heisel Life Events scores, The Moyal-Miezitis Children's Stimulus Appraisal Questionnaire, and Children's Depression Inventory.

**Results.** Personal maladjustment and stimulus appraisal variables did not differ between groups. Crohn's disease and non-organic pain groups reported lower self-esteem scores than controls. Children with Crohn's disease reported more stressful events than children with ulcerative colitis and non-organic pain, but the combined organic pain group did not differ from controls or the non-organic pain group. Organic and non-organic pain groups did not differ on depression scores, but children with Crohn's disease reported higher depression scores than controls or children with ulcerative colitis.

**Conclusion.** Organic and non-organic abdominal pain groups reported more psychological distress than pain-free controls. Significant differences between organic and non-organic abdominal pain were not found suggesting that psychological distress may not be a viable factor by which to distinguish cases of organic from non-organic abdominal pain.

Sanders, M. R., Shepherd, R. W., Cleghorn, G., & Woolford, H. (1994). The treatment of recurrent abdominal pain in children: A controlled comparison of cognitive-behavioral family intervention and standard pediatric care. *Journal of Consulting and Clinical Psychology*, 62, 306-314.

**Objective.** To evaluate a cognitive-behavioral family intervention (CBFI) for recurrent abdominal pain (RAP) compared to standard pediatric care (SPC).

**Design.** Randomized control trial with follow-up.

**Setting.** Clinical sample.

**Participants.** 44 children with RAP randomly assigned to one of two treatment groups (CBFI: mean age = 107.2 months, 13 girls; SPC: mean age = 113.9 months, 15 girls). Groups did not differ on demographics or duration of pain.

**Interventions.** CBFI: self-management of RAP and contingency management training for parents in 6 weekly sessions. SPC: 4-6 sessions with gastroenterologist over 8 weeks.

**Main Outcome Measures.** Pain intensity, Parent Observation Record of pain behavior (POR), assessment of maternal care giving and children's self-coping for pain, RAP relapse and daily interference.

**Results.** Pain intensity and POR did not differ between CBFI and SPC groups at pretreatment but decreased at post-treatment for both groups through to 12 month follow-up.



More children in CBT were pain free at post-treatment and 6 month follow-up, and they had lower rates of relapse and less pain-related disability than the SPC group.

**Conclusions.** A cognitive-behavioral intervention is more beneficial to children's management of RAP than standard pediatric care.

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.

**Objective.** To investigate the relation of psychosocial factors to recurrent abdominal pain (RAP) in children.

**Design.** Case control.

**Setting.** Pediatric clinic.

**Participants.** 88 children with RAP, 57 children with peptic disease, 56 healthy children with acute illness/injury, and 48 children with mood disorders. Children were 6-18 year-old consecutive patients (predominately Caucasian, no difference in gender or SES).

**Main Outcome Measures.** Child somatic symptoms and disability, child emotional-behavioral adjustment, negative life events, social learning of illness behavior, child competence, and family functioning.

**Results.** RAP patients reported more emotional and somatic symptoms, higher incidence of family illness, and perceived parental reinforcement of illness behavior, than healthy children. RAP and healthy children did not differ significantly on competence, family functioning, or negative life events. Psychiatric patients reported more emotional and behavioral problems, lower levels of competence, and greater family dysfunction than RAP patients, but RAP patients indicated higher somatic complaints, disability, incidence of family illness, and perceived reinforcement of illness behavior than psychiatric patients. Peptic disease and RAP patients did not significantly differ on somatic and emotional symptoms or other psychosocial factors.

**Conclusion.** Organic and non-organic recurrent abdominal pain may not be distinguishable on the basis of emotional distress, somatic complaints, or disability. Differences in family functioning were not found between RAP, peptic disease, and healthy children.

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.

**Objectives.** To examine the moderating influence of child competence, parent somatic symptoms and child sex on the impact of negative life events in children with abdominal pain.

**Design.** Longitudinal interview study.

**Setting.** Pediatric clinic.

**Participants.** 197 pediatric patients with chronic abdominal pain (duration > 1 month), their parents and teachers. 68 children were diagnosed with organic pain, 26 with specific pain, and 103 with non-specific pain.

**Main Outcome Measures.** Children's Somatization Inventory and Self Perception Profile for Children (child), Family Inventory of Life Events (mother), Health Resources Inventory (mother and teacher), Parent Somatic complaints (parents).

**Results.** Children's somatic complaints were not consistent over a year. Negative life events were related to children's somatic complaints and correlations between moderator variables were low. Children who had experienced many negative life events reported more somatic complaints if they also reported low levels of social competence. Academic competence was not a significant moderator. Boys of mothers with high somatic complaints and negative life events reported more somatic complaints than boys of mothers with high somatic complaints and no negative life events. Girls' symptom levels were not affected by mothers' complaints. Boys were more severely affected by negative life events than girls. Children of fathers with high levels of somatic complaints reported higher levels of somatic complaints.

**Conclusions.** There is an association between somatic complaints in children and negative life events. This relation is moderated by parent and child factors.

Walker, L. S., Garber, J., Van Slyke, D. A., & Greene, J. W. (1995). Long-term health outcomes in patients with recurrent abdominal pain. *Journal of Pediatric Psychology, 20*, 233-245.

**Objectives.** To examine health care utilization, somatic and emotional symptoms and functional disability in children that were seen for RAP 5 to 6 years earlier.

**Design.** Longitudinal survey.

**Setting.** Pediatric clinic.

**Participants.** 31 former patients with RAP, 31 former healthy patients (ages 17-22 years at follow up) and their mothers.

**Main Outcome Measures.** Abdominal Pain Index, Children's Somatization Inventory, Functional Disability Inventory, Center for Epidemiologic Studies Depression Scale, Child Behavior Checklist (parent only), Child Health History and Health Service Utilization.

**Results.** 1 former RAP patient reported a later diagnosed organic cause for RAP (Crohn's Disease). After examination of 7 others' medical records they were retained in the analyses due to lack of organic evidence. Comparisons of the former RAP patients and the former well patients revealed that former RAP patients reported more frequent abdominal pain, higher levels of somatic symptoms, functional disability, depression internalizing behavior problems. RAP patients also reported more school or work absences and mental health and medical visits than formerly well patients.

**Conclusions.** Less than 5% of patients' symptoms could be explained by organic cause, despite appropriate medical tests at initial assessment, and those diagnoses that were missed on initial assessment were not life threatening. Children who had experienced RAP remained significantly more likely to report somatic and emotional symptoms, functional disability, and health care utilization 5 to 6 years after initial assessment.

### Commentary

Recurrent stomach aches are among the most common pediatric pain complaints, affecting around 10-15% of school age children (Faull & Nicol, 1986; Rappaport & Leichtner, 1993). No more than 5-10% of children's stomach aches are readily accounted for by known physical pathology; another 10% seem to be caused by physiologically dysfunctional but non-pathological conditions such as lactose intolerance or autonomic lability. Inconsistencies in the definition of RAP hamper comparison of research results. The mechanisms accounting for abdominal pain in most cases remain unexplained.

Recent studies of pressure pain threshold show that widespread muscle tension and tenderness may occur in many children with RAP (Alfvén, 1993), but this may be due to a greater tendency to report pain rather than to a disorder of the abdominal musculature. Lowered motility of the gut and constipation may play a role in many cases, as suggested by a randomized, blinded trial of increased dietary fibre which produced significant reductions in pain in half of the children in the experimental group (Feldman et al., 1985). Contradicting the widespread assumption that most RAP is "psychogenic", several studies have shown that rates of anxiety, depression, behavioral problems, family problems, and negative life events are elevated just as much in children with abdominal pain known to have an organic basis as they

are in children with non-organic RAP (Raymer et al., 1984; Walker et al., 1993, 1994, 1995). A theoretical model proposed by Rappaport and colleagues links four interacting influences with the development of RAP: the child's temperament, health-related habits, somatic predisposition, and external life events (Rappaport & Leichtner, 1993). Long-term follow-up studies indicate that many children with untreated RAP continue to have frequent abdominal pain, suggesting that remission is not always spontaneous and that intervention may be important. It has been speculated that RAP sometimes represents the beginning of a lifelong somatization disorder. Three controlled studies support the effectiveness of cognitive-behavioral intervention, in comparison with controls who receive standard pediatric care or remain on a waiting list (Sanders et al., 1994). No symptom substitution has been shown to occur when pain reports diminish in response to cognitive-behavioral treatment. Effective interventions for children include encouraging them to return to school and other activities, while offering training in coping strategies such as relaxation, imagery, and distraction (Sanders et al., 1994). Parents can be taught to cue and reward these more effective responses to stomach aches while reducing their own inadvertent modelling and encouragement of maladaptive illness behavior (cf. Walker & Zeman, 1992; Kuttner, 1996). It will be important in future research to employ a consistent definition of RAP, and to identify the effective components of these cognitive-behavioral treatment approaches.

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## Recent Articles

McGrath, P. A. Seifert, C. E., Speechley, K. N., Booth, J. C., Stitt, L. & Gibson, M. (1996). A new analogue scale for assessing children's pain: an initial validation study. *Pain*, 64(3), 435-443.

**Objective.** To determine the validity of the Coloured Analogue Scale (CAS), a measure of pain intensity, and its relation to the Facial Analogue Scale (FAS; McGrath, 1990), and a VAS.

**Design.** Case control validation study.

**Setting.** Pain clinic.

**Participants.** 104 children (60 girls; age range = 5-17 years). 51 children had recurrent headache for at least 3 months and 53 were healthy controls.

**Main Outcome Measures.** Children were randomly assigned to rate painful events on the Children's Pain Inventory (CPI) with a 165 mm VAS and either the CAS (145 mm long triangular shape which begins as a narrow light pink colour on the bottom and increases and widens to a deep red colour on the top) or the FAS (a set of 9 faces that depict increasing levels of emotional distress).

**Results.** There were no differences in pain ratings made by children using the CAS or FAS. Children rated more severe pain events (e.g., broken bone) higher on the CAS or FAS than less severe events (e.g., bruise). The CAS was rated as very easy to use more often than the VAS.

**Conclusions.** The psychometric properties of both the CAS and the FAS are equivalent to the VAS, but the CAS appears to be easier to use than the VAS.

**Comment.** A useful addition to self-report scales for measuring pain in children.

Barker, D. P., Willetts, B. Cappendijk, V. C., & Rutter, N. (1996). Capillary blood sampling: should the heel be warmed? *Archives of Disease in Childhood*, 74, F139-F140.

**Objective.** To determine the relation between heel skin temperature and time taken to collect a blood sample in infants.

**Design.** Randomized clinical trial.

**Setting.** City hospital.

**Participants.** 57 infants (27 girls; median gestation = 39 weeks, range 35-41 weeks; median age = 5 days; range = 0-8 days) requiring a total of 81 heel sticks. Most (43/57, 75%) required only one procedure.

**Interventions.** Heel warming was performed in 41 heel prick

procedures. A 0.15 ml sample of blood was drawn during each procedure.

**Main Outcome Measures.** Heel skin temperature.

**Results.** Facial grimacing was observed during 80% of all procedures. No group difference was observed in sampling times; a Spearman correlation of 0.06 (ns) was found between heel skin temperature and sampling time.

**Conclusions.** Warming the heel did not improve blood flow during the procedure and was not related to behavioural distress reactions.

**Comment.** This well designed trial suggests that the common practice of heel warming has no beneficial effect on infant pain and distress during blood sampling.

Hamers, J. P. H., Abu-Saad, H. H., van den Hout, M. A., Halfens, R. J. G., & Kester, A. D. M. (1996). The influence of children's vocal expressions, age, medical diagnosis and information obtained from parents on nurses' pain assessments and decisions regarding interventions. *Pain*, 65(1), 53-61.

**Objective.** To determine the factors affecting nurses' decision making regarding whether to give a child a non-narcotic analgesic for pain.

**Design.** Factorial design.

**Setting.** 11 hospitals in the Netherlands.

**Participants.** 202 pediatric nurses (180 women; mean age = 32.1 years).

**Interventions.** Information regarding the child's medical Diagnosis (mild vs. severe), age (3 years vs. 5 years) and comments made by the child's mother (comment on child's pain vs. none) were presented via written vignettes. Variation in the child's expression (less vocal vs. vocal) was presented via videotapes. Each nurse was exposed to 1 training and 3 experimental cases.

**Main Outcome Measures.** Nurses rated the child's pain intensity, their confidence in their rating, and the likelihood that they would give the child an analgesic on a 100 mm VAS.

**Results.** Nurses attributed more pain in and said they were more inclined to administer an analgesic to children who expressed their pain vocally. No differences were found in ratings of pain intensity or likelihood of analgesic administration by medical diagnosis, by age of child or by whether mothers reported that their child had pain.

**Conclusions.** It appears that pediatric nurses considered child vocal expression as a salient cue for determining whether a child had pain and whether the child required administration of an analgesic.

**Comment.** Should nurses be alerted to the danger of missing the quiet child in pain?

Collins, J. J., Grier, H. E., Sethna, N. F., Wilder, R. T. & Berde, C. B. (1996). Regional anesthesia for pain associated with terminal pediatric malignancy. *Pain*, 65(1), 63-69.

**Objective.** To identify the characteristics of children who required regional anesthesia for pain from terminal malignancy and to identify its safety, tolerableness and effectiveness in this population.

**Design.** Retrospective case series (chart review).

**Setting.** Tertiary care hospital.

**Participants.** 11 children (7 female; age range = 5 months to 16.3 years). Nine children had solid tumors and 2 had hematological malignancy.

**Interventions.** Four patients had received epidural infusions, 2 had subarachnoid infusions, 3 had epidural infusions replaced by subarachnoid infusions, one received intermittent morphine injections and another had a thoracic epidural infusion followed by celiac plexus blockade. The duration of all infusions ranged from 3 days to 7 weeks.

**Results.** All children had pain primarily localized to one part of the body. No major complications of the epidural or subarachnoid infusion of local anesthetics were seen. Analgesia was judged to be satisfactory in all cases.

**Conclusions.** Three groups of children requiring regional anesthesia were identified: (1) those who had dose limiting side effects of opioids; (2) those whose pain was unresponsive to massive opioid infusion; and (3) those requiring analgesia for procedural pain.

**Comment.** This paper clearly shows that there is a place for regional anesthesia in terminal pediatric cancer care.

## Announcements

### Meetings

**June 29 - July 4, 1997:** International Symposium on Pediatric Pain, Sponsored by the SIG on Pain in Childhood. Contact: Dr. Eeva-Liisa Maunuksela, Department of Ophthalmology, Helsinki University, Central Hospital, 00290 Helsinki, Finland.  
Tel 358-0-471-3101; Fax 358-0-471-5008.

### Other

**Post-doctoral Fellow wanted.** Any area of pediatric pain. Date can be negotiated. Competitive salary. Contact Patrick J. McGrath Ph.D. Dalhousie University, Halifax, NS, Canada,

B3H 4J1; phone (902) 494-1580, fax (902) 494-6585, email: Patrick.McGrath@dal.ca.

The **Pediatric Pain Email List** on the Internet is a discussion group open to all interested parties. Subscribe by sending a message to Mailserv@ac.dal.ca with the message **subscribe Pediatric-pain** in the first line. If you have problems subscribing, contact owner-pediatric-pain@ac.dal.ca or allen.finley@dal.ca.

*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 would be appreciated. Please use the enclosed card to request an Author's Kit. Do not send submissions without using the Author's Kit. We will attempt to use abstracts and comments but the editors reserve the right to edit or reject any or all contributions. If you have any questions, contact Julie Goodman, Managing Editor, Pediatric Pain Letter, Psychology Department, Dalhousie University, Halifax, Nova Scotia, B3H 4J1; email jgoodman@is2.dal.ca.

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