BIO-PSYCHO-SOCIAL INTERVENTIONS for PEDIATRIC PAIN

PATRICK J. MCGRATH AND ANITA M. UNRUH

“Science Helping Children”
Who we are?

- **Patrick McGrath OC, PhD, FRSC, FCAHS**
  - Professor, Psychology, Pediatrics & Psychiatry & Canada Research Chair, Dalhousie University
  - Integrated VP, Research and Innovation, IWK Health Centre and Capital District Health Authority

- **Anita Unruh, BScOT, MSW, PhD**
  - Professor of OT, Health and Human Performance
  - Associate Dean, Research and Academics
  - Dalhousie University
Goals of this workshop

- Understand the range of psychosocial models in pediatric pain
- Be ready to initially apply these models to clinical practice
Strategies/Interventions

- Same strategy or intervention can be used with different models or theories
  - Cognitive interventions in fear of pain model or in cognitive model

- Eclectic approach to models or theories is the most common,
  - 3 grams of operant, 2 grams of cognitive and a dash of family therapy
Eclecticism

- **Advantages:**
  - Apply what seems relevant
  - Not constrained by one model
  - Get best fit

- **Disadvantages**
  - Who decides what is relevant?
  - Decision making muddled?
  - Open to biases of clinician
  - No standardization
Your case

- Name
- Age
- Gender
- History of pain
- History of disability
- Treatments attempted
- Home
- School
- Friends
Cognitive behavioral treatments for recurrent pain

- Relaxation
- Hypnosis
- Distraction
- Imagery
- Cognitive interventions
- Biofeedback
- Operant methods
- Graded activity
- Modeling
- Behavioral rehearsal
Psychological interventions in isolation?

- The three P’s of Chronic pain treatment
  - Psychology
  - Pharmacology
  - Physiotherapy
- Not discipline specific, focused on function
  - Pharmacology needs some sort of physician but not necessarily anesthetist
  - Psychology could be delivered by trained social worker
Advantages of integration

- **From patient point of view**
  - One stop shopping
  - Single message

- **From professional point of view**
  - Education of each other
    - Psychologist has to understand pharmacotherapy, physio etc.
  - No splitting of professionals
Integration

- Challenge of organizational structures
- Disciplinary isolated practices
- Lack of collegial practices in some environments
- Funding mechanisms
- What is your situation?
  - How can it be changed?
Relaxation, 3 major types

- No evidence of differences between them
- Best evidence in headache
- All have risk of adverse responses
  - Feelings of being out of control, panic
  - Injury if using tension type
Jacobsen, 1930’s

- 30+ sessions
- Tension release
- Used for a wide variety of medical and psychological problems
- Variations used in anxiety and stress management
  - Bernstein and Borkovec 1987
Shultz & Luthe 1950’s

- 30+ sessions
- Suggestion of heaviness and warmth
- Positioning

Psychosomatic illness
Benson, 1970’s

- Fewer sessions
- Breathing exercises
  - Based on eastern approaches
  - Deep slow breaths
Relaxation

• Widely used
• Usually not a sole intervention
• headache
  ○ tension and migraine
• arthritis, fibromyalgia?


Relaxation

- **Mode of action**
  - **Cognitive**
    - In some people has a paradoxical effect
    - Highly anxious people feeling out of control
  - **Physiological**
    - Calming the HPA axis
Effects of relaxation for pain

- Widely used for many types of chronic pain
- Mostly part of a cognitive behavioral intervention
- Some studies as solo treatment in headache
Relaxation for pain

• Different than relaxation for anxiety?
  ○ Systematic desensitization of fear of pain
  ○ Active Coping strategy
  ○ Direct effect on musculature
How does your case fit?

- Would you use relaxation with your case? Which type of relaxation? Why relaxation? Why this type?
Calm Imagery

- Imagine you are on a beautiful ocean beach, on a wonderful July day, running on the shore with your friends, smell the salt air, enjoy the sunlight, hear the waves and the birds, feel the breeze
Hypnosis

- effective in procedure pain (i.e. injections) & headaches
  - many variations
- Focused attention plus suggestion
- Relaxation often used

- Many find it unacceptable
  - religious reasons
  - fear of external control
Use of hypnosis

- As a form of relaxation
- Suggestion
- Distraction
- Magic??
<table>
<thead>
<tr>
<th>How does your case fit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you use hypnosis with your case? Why hypnosis?</td>
</tr>
<tr>
<td>circle5</td>
</tr>
</tbody>
</table>
Cognitive therapy

- Rational emotive therapy
  - Albert Ellis

- Cognitive therapy
  - Aaron T. Beck
  - Irrational thinking
Cognitive interventions

- Helping those in pain change what they are thinking
- Not extensively studied in children & adolescents
- Relies on ability to think about thinking (metacognition)
Cognitive Therapy

- **A**cknowledge the feeling
- **D**escribe the self statements or images
- **A**ssess how accurate or helpful
- **P**resent alternatives
- **T**hink Praise
Choose an uncomfortable feeling
- Anger, depression, fear

Acknowledge the feeling
- Often not noticed
- Sometimes denied
  - I just feel my pain
- Difficult to determine
Describe the self statements or the images that are triggering the feeling
- What are the best bets?
- What might it be?

Assess how logical, rationale, sensible, healthy the statement is
- It may be somewhat true but ...
- Is it going to make me happier to think that way?
ADAPT contd

- Present alternatives that are more helpful, sensible etc.
  - What is another way of thinking?
  - Is there something else I could say to myself?
- Think praise
  - Good job
  - That’s a better way of thinking
  - That will make me feel a bit better
Let’s ADAPT

- Person on your left
  - Each try ADAPT
  - How did you do?
  - What were the challenges?
How does your case fit?

Would you use cognitive methods with your case? Which method? Why cognitive methods? Why this type?
Good friend method

• When you feel in pain, upset, afraid
  ○ Identify what you are saying to yourself
  ○ e.g. “I cannot manage this headache. I don’t know what I can do here at school. It is horrible. I can’t stand it.”
<table>
<thead>
<tr>
<th>What would a good friend say?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of friend critical</td>
</tr>
<tr>
<td>Warm supportive, sensible</td>
</tr>
<tr>
<td>Could be a composite</td>
</tr>
<tr>
<td>Might be different friends</td>
</tr>
</tbody>
</table>
Good Friend method

What would Beth say

“What are you crazy? You are good at coping with your headaches. You know, do some relaxation in the bathroom. You’ve got some ibuprofen. Take it right away. Chill out. You will do fine.”
Let’s try Good Friend Method

- Role play good friend method
- 3 people (patient, coach, good friend)
  - Situation
  - What you are thinking
  - What would a good friend say
Cognitive interventions (Ellis)

- Irrational Beliefs
  - Powerful demands expressed in terms of “must”, “should” or “ought to”
  - Beliefs imply or state an extreme outcome
  - “People who have chronic pain cannot lead a productive life”
Irrational beliefs

- “Because I have a headache today, I will always have a headache.”
- “There is nothing I can do.”
- “My life is miserable and without any positive aspects.”
- “I am a victim of events I cannot control.”
Ellis’ Intervention

- **Activating Events**
  - Back pain or other pain begins

- **Beliefs**
  - I cannot control my pain. It will get worse. I am miserable.

- **Consequences**
  - Give up. Go home and to bed. Disability from pain. Depression.
Disputing the beliefs

- I can help my back pain. I don’t have to be a cripple. I can make a difference.
- Lots of people with bad back pain, function quite well.
- So what can I do?
- How can I make a difference in my own life?
- I will take 3 ibuprofen and do my stretches.
- It will be difficult but I can manage. Maybe I will stand up for part of the meeting. Yes, that will help a bit.
Let’s try Ellis’ method

- Person on your right
- Take 5-10 minutes to try it out
Behavior Therapy

- based on learning principles
- classical conditioning (Wolpe)
- operant reinforcement (Skinner)
- social learning (Bandura)
Operant methods I

- reinforcement: what increases behaviour
  - positive reinforcement: add positive event contingent on behaviour
  - negative reinforcement: remove negative event contingent on behaviour
- extinction: withholding reinforcement
- punishment: what decreases behaviour
Pain Behavior

- not the same as pain
- includes complaints, grimaces, disability, handicap
- cannot reinforce sensation or perception
- Does change in pain behavior change pain?
Operant challenges

- Is it congruent with cognitive approaches?
- Can operant approaches be used in conjunction with other approaches.
- How do you use operant methods?
Operant methods II

- Use of punishment risky
  - avoidance,
  - aggression
  - anxiety
- Better to use positive reinforcement
- Differential reinforcement DRO as prime method
Operant methods III

- **Stimulus control**
- **Time restriction of complaints**
  - listen attentively for specified time period
  - ignore the rest of the time
- **praise coping behavior**
Operant methods IV

- **DRO of sick role behavior**
  - Differential reinforcement of other behavior
- paying attention to healthy behavior
- ignoring pain behavior
Grandma’s rule:

If you’re sick enough to stay at home, you're too sick to watch TV play on the computer or visit friends.

Stay in bed all day and 3 doses of cod liver oil for you!
How does your case fit?

- Would you use operant methods with your case? Which type of operant method? Why operant? Why this type of operant method?
Graded Activity

- Start where the patient is
- Increase gradually in terms of time, intensity of activity
- May involve specific activities
  - Stretching
  - Strengthening
- May involve any activity
Graded Activity

- May be handled by Occupational or Physiotherapy
- But must be part of program
- Walking
- Swimming
- Anything
Graded activity

- Start very easy
- Gradually increase activity
- Allow for setbacks
  - Don’t stop, just reduce
- Make it fun
- May use pedometers or “Fit bit”
  - Easy recording, graphing results
Graded Activity

- Graded activity and cognitive change
- Which comes first?
- Cannot wait till cognitions change
- Must be part of program from the beginning
Social modelling

- Albert Bandura
- Observe the consequences of pain behavior
- See similarities between self and model
- Have the ability to do what model does
- Believe that consequences will be similar as model
e.g. I can watch Olympic moguls but...

Evidence for support
- Pain runs in families
- Pain models in the lives of pain sufferers
- Hard to separate from genetic explanations or other environmental explanations

Social modelling

- **An important aspect of group therapy**
  - Members model coping behavior
  - Be wary of negative contagion e.g. “war stories”
- **Important when dealing with parents and partners**
  - Can they be appropriate models e.g. physical activity
Self modelling

- If I make a pain face, groan and complain
- Will I feel more pain?
- Will I feel more negative affect?

- Expression of pain, makes pain worse
- Supression of pain, makes pain better
29 subjects, thermal stimulation while making standardized pain, control, or relaxed faces

more negative effects in response to painful stimulation while holding the pain face

not due to differences in the difficulty or unpleasantness of making the pain face.

Expressing pain
  - does not provide relief
  - May make pain worse

Distraction

- Mostly used in acute pain
- Can be used in chronic pain
- Degree of involvement important
- Active involvement better
- Individually selected
- Hard to maintain
- Best distraction is meaningful activity
  - Hobby, work, volunteer
Effects of distraction


- AUTHORS' CONCLUSIONS: Overall, there is preliminary evidence that a variety of cognitive-behavioral interventions can be used with children and adolescents to successfully manage or reduce pain and distress associated with needle-related procedures.
Can distraction be enhanced?

- 40 children (3-10 years) acute burn care procedures randomized to Standard Distraction (SD) and Multi Modal Distraction (MMD) (combined procedural preparation and distraction).

- **RESULTS** MMD reduced pain intensity and distress scores when compared to SD. Length of treatment days to healing.

How does your case fit?

- Would you use distraction with your case? Which type of distraction? Why distraction? Why this type?
Biofeedback

- Best validated for headache
- especially temperature biofeedback for migraine
- Muscle tension biofeedback
- as effective as prophylactic medication
- combined with relaxation training

The main results were medium-to-large mean effect sizes for biofeedback in adult migraine and tension-type headache patients. Treatment effects remained stable over an average follow-up period of 14 months.
Strategies for treatment

- Follow protocol devised for problem area
  - Skills taught in sequence
  - Advantages
    - Don’t miss anything
    - Manualize for patient/therapist

- Individual analysis of each case
  - Individual behavioral analysis
  - Focus on what is needed
  - Are there methods to determine what to do
A curriculum

Session 1:
- Introductions
- Education
  - Pain physiology
  - Pain psychology
  - Pain medications
- Goal setting
• **Session 2**
  - Checkin and Goals
  - Relaxation

• **Session 3**
  - Checkin and Goals
  - Exercise

• **Session 4**
  - Checkin and Goals
  - Cognitive methods
• **Session 5**
  - Checkin and Goals
  - Reducing avoidance
  - Overcoming fear

• **Session 6**
  - Checkin and Goals
  - Social activities

• **Session 7**
  - Checkin and Goals
  - Relaxation
• Session 8
  ○ Checkin and Goals
  ○ Overcoming setbacks
Customized protocol

- Follow protocol
- Customize all components
- Omit components
- Develop new components
Commonly used but probably ineffective

- Counseling
- Psychotherapy
- Where is the evidence?
Eccleston et al. 2003

- Systematic review and meta-analysis of pain treatments
- NNT=2.3 for treatment of pain in children and adolescents
- Repeated in 2010
- Palermo, Eccleston et al.
Empirically Supported Treatments
aka evidence-based treatments

- Identify treatments that work
  - 2 RCT’s, different labs
  - against placebo or other treatment
  - well defined interventions
- J of Pediatric Psych, 24,2,1999
  - headaches, abdominal pain, procedures, disease
Empirically supported treatments in headache

Holden et al., 1999
- 31 studies since 1980
- Relaxation/self hypnosis “well established”
- Thermal biofeedback alone “probably efficacious”
- other combinations, cognitive therapy: “promising”
Figure 3: Percentage of children with recurrent pain showing 50% reduction in pain in treatment (n=25) and control conditions (n=22) (from Hicks, von Baeyer and McGrath, J Ped Psych in press).
Empirically supported treatments in RAP

- Janicke & Finney, 1999
  - 9 studies, operant, fibre, CBT
- CBT “probably efficacious”
- Fibre “promising” (another CHEO study)
- Operant: ZIP
% PAIN FREE

RAP Sanders et al., 1994

- 44, 7-14 yr olds
- RCT, usual care vs cognitive behavioral
- pre, post, 6 mos, 12 mos
Empirically supported treatments: disease pain

- Walco et al., 1999
- No RCT’s
- ONLY
  - case studies
  - clinical series
  - weak multiple baseline designs
- CBT is “promising”
Randomized controlled trials of psychological therapies for management of chronic pain in children and adolescents: an updated meta-analytic review.

- Updated previous systematic reviews of randomized controlled trials by including new trials, and by adding disability and emotional functioning to pain as treatment outcomes.
- Twenty-five trials including 1247 young people
- A large positive effect of psychological intervention on pain reduction at immediate post-treatment and follow-up in youth with headache, abdominal pain, and fibromyalgia.
- Small and non-significant effects were found for improvements in disability and emotional functioning, (limited data)
- Omnibus cognitive-behavioral therapy, relaxation therapy, and biofeedback produced significant and positive effects on pain reduction.
- Effects of self-administered versus therapist-administered interventions found similar effects on pain reduction
What is new in recurrent pain?

- **Role of parents**
  - Instruction of parents to minimize pain behavior
  - 27, 7-18 year olds with migraine
  - Biofeedback & biofeedback + parental instruction
  - Less pain, more adaptive functioning
Psychological interventions for parents of children and adolescents with chronic illness.

- 35 RCTs involving a total of 2723 primary trial participants
- Across all treatment types, psychological therapies that included parents significantly improved child symptoms for painful conditions immediately post-treatment.
- CBT significantly improved child symptoms
- Problem solving therapy significantly improved parent behaviour and parent mental health.
What about acute pain

- Relaxation
- Hypnosis
- Distraction
- Imagery
- Cognitive interventions
- Biofeedback
- Operant methods
Non-pharmacological management of infant and young child procedural pain.

Fifty-one studies, with 3396 participants analyzed.

Heel-sticks (29 studies) and needles (n = 10 studies).
- non-nutritive sucking-related interventions
- kangaroo care
- swaddling/facilitated tucking
- rocking/holding
new review almost finished

- Psychological interventions for needle-related procedural pain and distress in children and adolescents.
- Children and adolescents aged two to 19 years undergoing needle-related procedures.
- Twenty eight trials with 1951 participants
- Distraction
- Combined cognitive-behavioral interventions
- Hypnosis
- Promising but limited evidence for
- Information/preparation, nurse coaching plus distraction,
- Parent positioning plus distraction, and distraction plus suggestion.
Efficacy trials

- Grant funded trials
  - lower caseloads, highly motivated therapists
  - close monitoring of therapists
  - select patients
  - tight control
- often in a university-based clinic
- Best chance to work (large effect sizes)
- Show it can work
Effectiveness trials

- In real world, where treatment is given
- Methodologically rigorous but
  - More difficult to have complete control
- Real life therapists
- Ongoing funding by health care system
- Smaller effect sizes
- Seldom done in pediatric pain studies
Effectiveness trial

- **Translation from lab to real world**
  - 384 children in 13 children's hospitals
  - Distraction (kaleidoscope) for venepuncture & iv insertion
  - No effect
Transfer: Efficacy to Effectiveness

- Factors to maximize transfer
  - specificity of behavior
  - supervision of therapy
    - therapists do what they want to do
      - interesting, challenging
How to develop methods that are translatable?

- Strong robust effects
- Standardized treatment manuals
- Compliance to treatment
  - When researcher is not there
- Is training enough?
What’s new in treatment

- Access:
- Pain, common BUT
- Pain Psychologists rare
- Train more psychologist: good idea
- Use other methods
Post Industrial model

- make systems that do the job
  - use evidence to develop system
  - hone system via quality assurance
  - be cost effective
    - seek efficiencies with volume
    - use skill level required for job
    - use modern technology
  - Make widely available
    - Stepped care
  - Not dependant on personal whim of therapist
Break out of the tradition: New methods

- Information and communication technologies
- Other professionals delivering care
- Non professionals delivering care
- Machines delivering care
Thanks to students, colleagues

And you for being so attentive