Functional Abdominal Pain (FAP) in Childhood and Adolescence: Association with Anxiety in Adulthood

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Disclosures: None
Questions:

- Is functional pain “in your head”?
  - Advances in pain research

- Does functional pain in childhood predict pain and psychiatric disorder in adulthood?
  - Prospective study of childhood risk

- What are the implications for practice?
  - Clinical issues for discussion
Recurrent Abdominal Pain
Research Criteria used by John Apley (1958; 1975)

- Recurrent episodes of abdominal pain
- Severe enough to affect activities
- Duration $\geq 3$ months
Recurrent Abdominal Pain (RAP)

- Prevalence ≈ 10% (Western society)
- Ages 4-17; More girls than boys
- Organic disease rarely identified ("medically unexplained")

"Functional" abdominal pain (FAP)
Conceptual Framework: Stress appraisal, emotion and coping
(Richard Lazarus, 1991)

**Threat Appraisal**
- Potential harm or loss; uncertain coping ability
- Emotions: fear, anxiety
- Action tendencies: avoidance, escape, narrowed options

**Challenge Appraisal**
- Potential gain or growth; possibility
- Emotions: complex; determination?
- Action tendencies: approach, activation, expanded options
Children Perceive FAP as a Threat

- Pain is unpredictable, may be severe
- No cure from parents, doctors
- What if my stomach hurts at school (the mall; horseback riding)?
Parents Perceive FAP as a Threat
(Quotes from parents of FAP patients)

- “What if this is really serious?”
- “The doctors have given up on her”
- “I don’t know how to help or who to get help from”
Physicians Perceive FAP as a Threat:
No standard of care for medically unexplained symptoms

- What if I miss something?
- How can I explain the pain to the family if results of medical tests are normal?
- There’s nothing I can do. How can I get the family to a mental health provider?

Vanderbilt, 1985: The Adolescent Clinic next door to the Pediatric Gastroenterology Clinic hires a pediatric psychologist
Psychologists Perceive FAP as a Threat: Lack of credibility as treatment provider

01/05/01  FAX

FROM: Mr. & Mrs. S.  
TO: Dr. Lynn Walker

We have several questions that we think can be answered by fax.

Do you believe our son’s problem is physical or a psychological problem?

If you feel it’s a physical problem, then what do you hope to accomplish with him?

If you feel it’s a psychological problem, what is your plan to help resolve it?
Advances in Pain Theory and Research:

Implications for reducing threat and increasing challenge associated with FAP
Acute Pain
Acute Pain

- Pain message is useful – limit activity
- Source of pain is clear
- Pain resolves after healing

... the most common type of pediatric pain

Medication is usually effective
Specificity Theory of Pain

“The Pain Pathway,” Rene Descartes, 1664
The Headache, George Cruikshank, 1830
Chronic Pain

- Pain message is not useful
- Source of pain is unclear
- Pain continues after healing (becomes “medically unexplained”)
- . . . regarded as rare in children

Medication often is not effective
Specificity theory cannot explain pain without tissue damage (chronic, recurrent pain)

Terms used:
- Functional pain
- Medically unexplained pain
- Idiopathic pain

Implicit Message:
- “The pain is not real”
- “It’s all in your head”
- “Stop complaining!”

Stigma (threat)
Gate Control Theory (1965)*
Ronald Melzack & Patrick Wall

* Revised by Melzack (2001; 2005) → Neuromatrix theory of pain
Three Components of Pain

- **Nociception**
  - Stimulation of nerves that convey information about actual or potential tissue damage
  - Conscious awareness not necessary

- **Emotion**
  - Immediate reaction to nociception (e.g., fear, anger)

- **Cognition**
  - Meaning attached to pain (e.g., childbirth vs surgery)
Definition of Pain
(International Association for the Study of Pain, IASP)

“An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”
Ascending & descending pain pathways link nociception, emotion, and cognition

Society for Neuroscience, 2006
The Pain “Gate” in the spinal cord

Watkins & Maier, Ann Rev Psychol, 2000
Neural influences on human pain and sensory processing

Facilitation
- Substance P
- Glutamate and EAA
- Serotonin (SHT$_{2a, 3a}$)
- Nerve growth factor
- CCK

Inhibition
- Descending anti-nociceptive pathways
- Norepinephrine–serotonin (SHT$_{1a, b}$), dopamine
- Opioids
- GABA
- Cannabinoids
- Adenosine

Clauw, 2009
Factors that open and close the pain gate (for ALL kinds of pain)

<table>
<thead>
<tr>
<th>Category</th>
<th>Open (increase)</th>
<th>Close (decrease)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical/Injury</td>
<td>Injury</td>
<td>Medication</td>
</tr>
<tr>
<td>Sensory</td>
<td>Counterstimulation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(heat, massage)</td>
<td></td>
</tr>
<tr>
<td>Emotional</td>
<td>Fear, anxiety</td>
<td>Joy, pride, love</td>
</tr>
<tr>
<td>Cognitive</td>
<td>Attention</td>
<td>Distraction</td>
</tr>
<tr>
<td></td>
<td>Negative beliefs</td>
<td>Positive beliefs</td>
</tr>
</tbody>
</table>
Key Findings of Pain Research

- Pain can occur without tissue damage; FAP has a neurobiological basis
- Centers for thoughts and feelings in the brain influence how the brain processes pain signals
- Changing thoughts and feelings can change pain; they are a legitimate focus of pain assessment & treatment
Functional pain syndromes

“the fundamental problem is with . . . sensory processing rather than an abnormality confined to the body region where pain is experienced”

Daniel Clauw, 2009
Research on Functional Abdominal Pain:
The relation of sensory, cognitive, and affective dimensions of pain to long-term outcomes
Research Questions

Can we identify subtypes of FAP based on individual differences on dimensions of pain?

Do some subtypes have better outcomes than other?
Clinical Sample

- FAP patients (1993-2004), n = 754
  - no organic disease identified
- Ages 8-15, 60% female, Caucasian
- Patient and mother interviewed at pediatric gastroenterology clinic
Multidimensional Pain Assessment

- **Sensory**
  - Pain intensity, frequency, duration

- **Cognitive**
  - Pain Catastrophizing
    - “When I have pain, I worry all the time about whether it will end.”
  - Perceived pain coping efficacy
    - “I know I can handle it no matter how bad my stomach hurts”

- **Affective**
  - Negative emotions
Cluster Analysis

Clustering Variables: Shape, Color

Our Clustering Variables:
Sensory, cognitive, affective dimensions of pain
Cluster 1: High Pain Dysfunctional (25%)

- Pain is intense, frequent
- High catastrophizing, low efficacy, high negative affect
- High disability (avoidance)

[Parents also rate child’s pain as severe]
Cluster 2: High Pain Adaptive (40%)

- Pain is intense, frequent
- Moderate catastrophizing, moderate efficacy
- Try to be active despite pain/suffering

[Parents also rate child’s pain as severe]
Cluster 3: Low Pain Adaptive (35%)

- Minor, infrequent pain
- Low catastrophizing, high perceived efficacy
- Little change in child activities due to pain

[Parents rate pain as more severe than child]
Do children in the 3 clusters (with different initial pain profiles) have different outcomes as adolescents & young adults?
Prospective Longitudinal Study

- Follow-up 9 years later (n=379)
- Average age 21 years

- Interview (in person or by phone)
  - Chronic abdominal pain
  - Other chronic pain
  - Psychiatric disorder
Chronic Abdominal Pain
(≥ weekly X 3 months) at 9-year Follow-up

*
Other Chronic Pain
(back, chest, joints, head) at 9-yr follow up

*
Anxiety and Depressive Disorders at 9-year follow up

Anxiety:
- High Pain Dysfunctional: *ns*
- High Pain Adaptive
- Low Pain Adaptive

Depression:
- High Pain Dysfunctional
- High Pain Adaptive
- Low Pain Adaptive

* ns
Job Loss due to Illness during 9-year period

*
Conclusions

- FAP can be classified into distinct, clinically meaningful subgroups

- One subgroup (~25%) has very poor long-term health outcomes

- Poor outcomes may be driven by anxiety-related processes (threat appraisal, fear, avoidance)
Limitations

- Tertiary care patients with history of pain at baseline evaluation
- No assessment of psychiatric disorder at baseline
- No control for treatment
Clinical issues for discussion

- FAP is heterogeneous. Subgroups may have different treatment needs.
- Pain-related cognitions/emotions predict outcomes. They may be a useful focus for the medical evaluation.
- Education about pain is needed for the general public and providers to reduce stigma and facilitate treatment.
Critical Goal for Pain Education and Treatment:

Reduce Threat Appraisal,

Increase Challenge Appraisal
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Thank you!

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Discovery of Central Sensitization of Pain

Evidence for a central component of post-injury pain hypersensitivity

Clifford J. Woolf

Department of Anatomy, University College London, London WC1E 6BT, UK
Characteristics of central sensitization

- Hyperalgesia (increased response to mild stimuli)
- Allodynia (pain response to non-painful stimuli)
- Increased nociceptive receptive fields

“The fundamental problem is with pain or sensory processing rather than an abnormality confined to the body region where pain is experienced.”

Daniel Clauw, 2009
Central Sensitization of Pain

Pain Sensitization

Experiencing pain makes us hypersensitive to more pain

- Hyperalgesia
- Allodynia
- Normal pain response

Stimulus Intensity

Pain intensity
Neonatal gastric suctioning results in chronic visceral & somatic hyperalgesia in rats

Visceral hyperalgesia
(EMG response to graded colorectal distention)

Somatic hyperalgesia
(latency of paw withdrawal to noxious heat stimulus)

“Central sensitivity syndromes” in humans

Fibromyalgia
- 2% to 4% of population
- Defined by widespread pain and tenderness

Regional Pain Syndromes
- Irritable bowel syndrome
- Interstitial cystitis/painful bladder syndrome
- Temporomandibular joint disorders
- Idiopathic low back pain
- Tension headache
- Vulvodynia

Chronic Fatigue Syndrome
- 1% of population
- Fatigue and four of eight minor criteria

Psychiatric Disorders
- Major depression
- Obsessive-compulsive disorder
- Bipolar disorder
- Post-traumatic stress disorder
- Generalized anxiety disorder
- Panic attack

Somatoform Disorders
- 4% of population
- Multiple unexplained symptoms—no "organic" findings

Clauw, 2009
Catastrophizing Self-talk

This water is freezing! I'm going to go into shock and drown, I just know it.
RAP

Medical Evaluation

<5% Significant Disease
Crohns, Ulcerative Colitis, Ulcer

10% Minor Abnormalities
Lactose intolerance, Reflux

>80% No Disease or Abnormality:
“FUNCTIONAL”

IBS
Dyspepsia

Functional Abdominal Pain
RAP

Medical Evaluation

<5% Significant Disease: Crohn's Disease, Ulcerative Colitis, Peptic Ulcer

10% Minor Abnormalities
Lactose intolerance
Reflux

>80% No Disease or Abnormality: “FUNCTIONAL”

IBS
Dyspepsia
Functional Abdominal Pain

Effective medical treatments

No established medical treatments