Chronic Pain in Adult Survivors of Childhood Abuse

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Chronic pain is a common symptom in patients in general—and even more common in adult survivors of childhood abuse. But patients rarely reveal their abuse history to their care providers. And even when survivors do, health care providers rarely connect events in childhood to symptoms in adults.

In this article, I describe challenges for providers in understanding and diagnosing chronic pain. I also describe two common pain syndromes that have been associated with past abuse—fibromyalgia and irritable bowel syndrome—and possible mechanisms by which traumatic events can lead to chronic pain, including changes in neurotransmitter levels and sleep architecture. Finally, I describe some preliminary interventions that are possible with adult survivors who are now suffering from chronic pain.

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The Challenges of Chronic Pain

To practitioners, chronic pain is a diagnostic enigma. The amount of pain chronic-pain patients report often seems far above what doctors would expect, especially when there are no lab or radiologic findings to confirm its existence. Not surprisingly, doctors often become frustrated with chronic pain patients, as Gershon (1998) notes.

> Physicians become angry. Patients who present themselves to doctors with problems that are insolvable are perceived as threatening and are often dismissed as mentally unbalanced, with the epithet "crocks" whispered behind their backs (p. xiv).

There are several aspects of chronic pain that make it difficult to treat. First, pain is subjective, and people are often upset when they talk about it. Therefore, it is difficult for an outsider to step into the patient's shoes and understand his experience. Second, chronic pain does not fit classic models of disease that says that pain is due to tissue damage. In many cases, there is little or no verifiable physical evidence to support a patient's story. Finally, chronic pain results from a complicated interaction of psychological, social and physical factors including past and present experiences, socioeconomic status, social support, personal values, and ethnic background (with some ethnic groups tending to be more "stoic" about pain than others). All of these factors make chronic pain difficult to understand and treat. Add to it a history of childhood abuse, and it further complicates the picture.

In the next section, I examine the connection between past abuse and chronic pain. But first, a few general concepts.

Pain Threshold, Secondary Hyperalgesia, and Central Sensitization

Some people have a higher tolerance for pain than others. In making these comparisons, we speak of the pain threshold. Threshold refers to the magnitude of sensation necessary for it to be perceived. Someone with a lower pain threshold is hypersensitive, and will perceive pain even when lightly touched. Some consider this hypersensitivity a major evolutionary advantage because it alerts people to potential danger. However, the increased pain when not in danger makes for a poor tradeoff (Woolf & Salter, 2000).

Another way to describe the lowered pain threshold is secondary hyperalgesia. In primary hyperalgesia, pain perception stems directly from pain caused by damaged tissue. In secondary hyperalgesia, pain exists without injured tissues; even light touches are perceived as painful. Prolonged sensory disturbance reduces the pain threshold, and the net result is that the neurons fire at low levels.

Central sensitization is another key concept. It is responsible for hypersensitivity spreading to non-injured tissue (Crofford, 2007; Marcus, 2000; Woolf & Salter, 2000). Central sensitization explains why pain that starts in one specific area of the body can "spread" to other areas—even when there has been no tissue damage in that area (Miller, 2000).

In the next section, I describe two pain syndromes that have been associated with childhood abuse. Secondary hyperalgesia, lowered pain thresholds, and central sensitization will be revisited when describing these specific conditions as well.

Chronic Pain Syndromes in Adult Survivors

In this section, I describe research on the relationship between childhood abuse and two chronic pain syndromes: fibromyalgia, and irritable bowel syndrome. Their pathophysiology are also described.

Fibromyalgia Syndrome

Fibromyalgia syndrome (FMS) is chronic pain syndrome characterized by widespread musculoskeletal pain, decreased pain threshold, sleep disturbance and psychological distress (Boisset-Pioro, Esdaile, & Fitzcharles, 1995; Crofford, 2007; Wolfe, 1997). FMS is diagnosed using American College of Rheumatology (ACR) criteria. FMS includes widespread pain that persists for at least three months, and tenderness in at least 11 of 18 specific tender points (Bradley & Alarcon, 1997).

Three studies have examined whether past abuse is more common in patients with FMS. In one study, 40 women with FMS were compared to 42 healthy women (Taylor, Trotter, & Csuka, 1995). Sixty-five percent of women with FMS reported a history of sexual abuse, compared with 52% of the controls.[1] The difference between the groups was not significant. Abuse history was related to a more severe

manifestation of symptoms and greater functional disability, however. Within the patient group, sexually abused FMS patients reported significantly more symptoms and pain than did non-abused FMS patients. Sexual abuse appeared to exacerbate the underlying condition (Taylor et al., 1995).

Another study (Boisset-Pioro, et al., 1995) compared 83 FMS patients with 161 arthritis patients with no FMS. Fifty-three percent of the FMS patients reported a history of physical or sexual abuse, compared with 42% of non-FMS patients, with no significant difference. FMS patients who were sexually abused in childhood had significantly more symptoms than non-FMS patients. This was especially true if the abuse was contact abuse, or if there were multiple events. In addition, FMS patients were significantly more likely to report physical abuse in child- or adulthood, or in combination with sexual abuse, than the non-FMS patients.

McBeth and colleagues (McBeth, MacFarlane, Benjamin, Morris, & Silman, 1999) with a community sample indicated that subjects who experienced childhood adversity (child abuse, parental loss, illness of a family member, and parental drug overdose) had a significantly higher tender point count than subjects without this history. The odds ratio for child abuse was particularly high (OR = 6.9), and indeed childhood abuse was the best independent predictor of a high tender-point count.

More recently, Sachs-Ericsson and colleagues (Sachs-Ericsson, Kendall-Tackett, & Hernandez, 2007), using data from the National Comorbidity Study, noted that subjects with a history of either physical or sexual child abuse, or intimate partner violence, were more likely to report pain when describing their current health symptoms. Van Houdenhove et al. (in press) found that 64% of patients in a group for FMS or Chronic Fatigue Syndrome had at least one type of either child or adult trauma. More concerning was that 39% of the group reported abuse during childhood and as adults, indicating a lifelong pattern of abuse.

Although these findings are somewhat mixed, it does appear that childhood abuse can make men and women vulnerable to FMS. Research on the pathophysiology of FMS can provide insights about why this may occur.

The Pathophysiology of Fibromyalgia. At this point, no one knows what causes FMS. One theory is that prolonged emotional stress, infection or physical trauma combine with a genetic predisposition to make people sick (Bradley & Alarcon, 1997). This theory has inherent appeal. Many FMS sufferers can point to a specific traumatic event (e.g., a car accident, an infection, or a severe life stress) as the precipitant of their illness.

Neurotransmitter abnormalities have also been observed in FMS patients, such as dysregulation of the Autonomic Nervous System or HPA axis (Crofford, 2007). For example, Wolfe and colleagues noted that patients with FMS have low levels of serotonin and 5-HIAA (a serotonin metabolite) in their cerebral spinal fluid (Wolfe, Russell, Vipraio, Ross, & Anderson, 1997). Serotonin levels were significantly related to both depression and tender-point count.

FMS patients also have higher levels of the neuropeptide Substance P. In a study of 32 FMS patients and 30 healthy controls, those with FMS had 3 times more Substance P in their cerebral spinal fluid than the healthy controls (Russell et al., 1994). Serotonin controls Substance P, and when it is low, Substance P levels are allowed to rise (Wallace & Wallace, 2002).

Women with fibromyalgia also had abnormalities in their patterns of blood flow to parts of the brain associated with pain perception (Mountz, Bradley, Modell, Alexander, Triana-Alexander, Aaron, et al. 1995). As predicted, women with fibromyalgia had significantly impaired blood flow to three brain structures: the hemithalami, head of the caudate nucleus, and the cortex. Not surprisingly, these women's pain thresholds were significantly lower. Traumatic events may be behind these aberrant activation patterns, and the abnormal levels of serotonin and Substance P.

Sleep Problems in Fibromyalgia. Sleep is an area of interest in fibromyalgia research. In patients with FMS, deep, delta-stage sleep is interrupted by faster alpha waves that are superimposed on the delta sleep (Wallace & Wallace, 2002). A recent study examined these abnormalities in greater detail. Roizenblatt and colleagues (Roizenblatt, Moldofsky, Benedito-Silva, & Tufik, 2001) compared the sleep of 40 FMS patients and 43 healthy controls. They found three distinct patterns of alpha-wave activity in sleep. The first was *phasic alpha*, in which there is an episodic occurrence of alpha waves during delta activity. The second is *tonic alpha sleep*, where alpha is continuously present during non-REM sleep, not only during delta sleep. The third pattern is *low alpha* activity.

Phasic-alpha occurred in 50% of the FMS patients, and was the most common pattern for this group. It occurred in only 7% of the controls. In contrast, the low-alpha pattern was the most common for the controls (83%), compared to 30% of FMS patients. The phasic-alpha pattern was associated with longer-lasting pain symptoms and poor sleep quality. The patients with phasic-alpha sleep exhibited less total sleep time than the other two groups. Phasic-alpha sleep was associated with more pain, a higher tender-point count, and a greater number of clinical manifestations of FMS (Roizenblatt et al., 2001). Traumatic events may create changes in sleep such that abuse survivors manifest more phasic-alpha sleep.

Irritable Bowel Syndrome (IBS)

Irritable bowel syndrome is the second pain syndrome I describe. IBS is a functional disorder of the lower gastrointestinal tract. It is diagnosed using the "Rome criteria." Symptoms include abdominal pain or cramping; altered bowel habits (either diarrhea or constipation), consistency or passage; passage of mucus; and bloating or abdominal distention. The symptoms can be continuous or recurrent, and must be present for at least three months (American Gastroenterological Association, 1997). Symptoms generally present with one of two patterns: diarrhea without abdominal pain and

alternating diarrhea and constipation with abdominal pain (Subramani & Janowitz, 1991). Not surprisingly, a relatively high percentage of people with IBS have a history of either physical or sexual abuse. As Leserman and Drossman (2007) note, patients with a history of physical or sexual abuse in childhood, or intimate partner violence, have 1.5 to 2 times the risk of reporting gastrointestinal symptoms or having a functional gastrointestinal disorder.

Walker and colleagues (1993) compared 28 patients with irritable bowel syndrome and 19 patients with inflammatory bowel disease (IBD). Sexual victimization was much more common among the IBS patients than those with IBD. Patients with IBS had higher rates of severe lifetime sexual trauma (32% vs. 0%), severe child sexual abuse (11% vs. 0%), and any lifetime sexual victimization (54% vs. 5%). When patients had co-occurring chronic pelvic pain, they were more distressed and had more functional disability than women who had either complaint alone.

IBS, heartburn, and upper-GI pain have been significantly related to all types of childhood and adult abuse in another study. Abused patients were twice as likely to have IBS as those who were not abused. Patients who reported abuse both in adulthood and childhood were three times as likely to have IBS. Although 40% of patients with a peptic ulcer had a history of abuse, the odds of having an ulcer were not significantly different based on abuse status (Talley, Fett, Zinsmeister, & Melton, 1994).

Ali and colleagues (Ali et al., 2000) found that women with functional GI illness (such as IBS) were significantly more likely to have been raped than women with organic GI illness (34% vs. 10%). Similarly, physical assault was more common in women with functional illness than in women with organic illness (18% vs. 10%).

Drossman and colleagues (Drossman, Li, Leserman, Toomey, & Hu, 1996; Leserman et al., 1996) found that 60% of women in treatment for GI illness had a history of abuse. Sixty-six percent of women with functional diagnoses, and 56% of women with organic conditions had abuse histories. This was an only marginally significant difference. The patients with histories of severe abuse (i.e., rape, life-threatening injuries) had more functional than organic illness. The functional conditions included esophageal pain, dyspepsia (upper abdominal pain), and IBS. The organic illnesses included ulcerative colitis, Crohn's disease, liver disease, pancreatic/biliary disease, and "other" organic disease. Interestingly, the highest percentages for abuse survivors were for functional abdominal pain (84%) and liver disease (72%). Liver disease included cirrhosis and chronic hepatitis B and C. These disorders could be a result of high-risk health behaviors (alcohol abuse, unsafe sex, sharing needles), and could explain why there is a high percentage of abuse survivors in this group.

In another study, Drossman, Leserman and colleagues (Drossman, Leserman, Li, Keefe, Hu, & Toomey, 2000) followed a group of 174 women who had been referred to a GI clinic for a period of 12 months. Half of their subjects had been physically or sexually abused, and 14% had experienced severe abuse. Patients who were more severely abused also had poor health status. Patients who were "profoundly pessimistic" about their illnesses had poorer outcomes. Abuse and maladaptive coping were the two most important predictors of health outcome.

Scarinci and colleagues (Scarinci et al., 1994) studied a sample of 50 patients with 1 of 3 pain syndromes: gastroesophogeal reflux disease (GERD), non-cardiac chest pain (NCCP), and irritable bowel syndrome (IBS). Fifty-six percent of the sample reported a history of physical or sexual abuse. Among the conditions studied, 92% of patients with GERD and 82% of patients with IBS were abuse survivors, compared with only 27% of patients with NCCP. Abused patients also had significantly lower pain threshold levels in response to finger pressure, and significantly lower cognitive standards for judging stimuli as noxious. These results held even after controlling for psychiatric disturbance.

Two Theories of Irritable Bowel Syndrome. There are no obvious physiological markers of IBS. However, as with FMS, some intriguing neuroendocrine and cerebral abnormalities have been observed. These studies are summarized below.

Changes in GI Physiology. One theory of IBS is that traumatic events lower the pain threshold of the viscera, making it hypersensitive to stimuli (Drossman, 1994; Wingate, 1991). There is preliminary empirical support for this view. In a study of pain perception, 14 IBS patients were compared to 11 healthy controls. After being exposed to high-pressure pain in the sigmoid colon, all of the IBS patients developed rectal hyperalgesia, whereas none of the control patients did. The IBS patients also showed signs of central sensitization–the pain "spread" to other parts of the abdomen, and outlasted the actual application of the stimulus (Munakata, Naliboff, Harraf, Kodner, Lembo, Chang, et al., 1997).

Hypersensitivity also can be measured in the brain. In this study using positron emission tomography (PET) scans, six IBS patients were compared with six healthy controls in their cerebral blood flow patterns following administration of painful stimuli (Silverman, Munakata, Ennes, Mandelkern, Hoh, & Mayer, 1997). Following the painful stimuli, the healthy subjects had activity in the anterior cingulate cortex. The patients with IBS, on the other hand, had activation of the left prefrontal cortex, and no activity in the anterior cingulate cortex (ACC).

The ACC releases endorphins and is part of a central nervous system response to pain (Toner, Segal, Emmott, & Myran, 2000). If the ACC does not respond, the pain modulation system fails and patients are more susceptible to pain. The prefrontal cortex is associated with both hypervigilance and anxiety. When it is activated, there is an increase in pain (Silverman et al., 1997; Toner et al., 2000). Cognitive-behavioral therapy may increase activation of the ACC, and decrease activation in the prefrontal cortex.

Enteric Nervous System. Research on the enteric nervous system also provides some insight into IBS. According to Gershon (1998), humans have three nervous systems: sympathetic, parasympathetic, and enteric. The enteric nervous system includes the nerve cells of the entire gut (esophagus, stomach, small and large intestine).

Gershon's research demonstrates that the enteric nervous system is distinct and large. The gut actually has *more* nerve cells than the spinal cord. The enteric nervous system can act independently of the other nervous systems, and can activate effectors all by itself. Serotonin is also manufactured and stored in the bowel, and is prefentially located on enteric nerves (Gershon, 1998).

This line of research raises some intriguing possibilities relevant to abuse survivors. Namely, do traumatic events influence this nervous system? Serotonin is one possible connection. Earlier, I referenced research on fibromyalgia that found abnormally low levels of serotonin related to sleep and pain difficulties. What is the relationship between trauma and levels of serotonin in the gut? How is the sensation of pain in the gut influenced by changes in serotonin levels? What is the relationship between the enteric nervous system and the central nervous system? Given what we know about visceral hypersensitivity, these questions should be considered in future research.

Conclusions about Pain and Abuse, So Far

So bringing all the evidence together, what have we learned? At this point, it appears that pain is somewhat more common in abuse survivors than in the general population. We also know that approximately half of all pain patients have a history of physical or sexual abuse. Some other general statements can be made.

Pain Symptoms Co-Occur

Researchers found that different types of pain often co-occur. These researchers generally focused on only one type of pain at the beginning of their studies. But the authors invariably found other types as well. For example, one study found that 70% of the FMS patients also had IBS, and 65% of the IBS patients had FMS compared with 12% of controls (Veale, Kavanagh, Fielding, & Fitzgerald, 1991). Sufferers of both syndromes also have other types of pain, including headache, backache, or pelvic pain.

Golding (1994) found those with a lifetime history of sexual assault were significantly more likely to report a wide range of chronic pain, and it was not limited to the pelvis. Reproductive or sexual symptoms were no more consistently associated with sexual assault history than GI pain, cardiopulmonary pain, or neurologic symptoms.

Similarly, in our study (Kendall-Tackett, Marshall, & Ness, 2003) of chronic pain in women from a primary-care practice, we compared women who had experienced child or domestic abuse with those who did not report such a history. The pain symptoms included on the review of systems were abdominal pain, pain or stiffness in joints or muscles, pain during urination, arthritis, back pain, and severe headaches. Women with an abuse history reported significantly more pain symptoms than women in the matched control group. But no one type of pain was particularly common. The results were the same for child abuse and domestic violence.

Pain Syndromes Have Commonalities

A broader view encourages us to consider what the various pain syndromes have in common. For example, people with fibromyalgia, irritable bowel syndrome, and migraine headaches have lower pain thresholds and are more sensitive to pain and environmental stresses than their healthy counterparts (Hassinger, Semenchuk, & O'Brien, 1999; Silverman et al., 1997). IBS and fibromyalgia could be a result of a generalized disorder of smooth muscle. This type of disorder could account for the wide-range of pain symptoms including dysmenorrhea and migraine (Veale et al., 1991).

These commonalities also suggest some areas for intervention. For example, biofeedback and cognitive therapy can be helpful in breaking the pain-fear cycle that is common in abuse survivors with chronic pain. These techniques can help the body un-learn dysfunctional and hypervigilant responses to stress, which can dramatically increase pain. On the other hand, if these pain conditions are disorders of smooth muscle, than a medication that addresses the smooth muscles may ease symptoms. If pain is related to disordered sleep, improving sleep quality through medication and behavioral changes may lessen pain. At the very least, the commonalities between pain syndromes give us a good place to start.

Conclusions

Pain is common in abuse survivors. For many years, physicians wrote off these aches and pains as "neuroticism" or somatization. We know now that there is a physiologic basis for many of these symptoms including a lowered pain threshold and alterations in sleep architecture. What we know about the pathophysiology of abuse-related pain can also suggest treatments. Relaxation techniques can be useful, as can biofeedback. Both of these techniques teach patients to be more aware of their bodies, how they work, and what are some of the early warning signs of impending pain.

Patient education is another helpful approach. It involves educating patients about the source of their pain. This can be empowering and validating, letting patients know that their pain is not "all in their heads." Cognitive therapy can be helpful for abuse survivors in general because abuse often leaves its victims with an overwhelming sense of powerlessness. Patients may feel further victimized by their pain. Cognitive therapy can help them recognize these distortions, and take whatever steps they can to alleviate or minimize their symptoms. Learning the source of their chronic pain can slow the cycle of multiple doctors' appointments, surgeries and treatments.

In conclusion, a comprehensive approach to pain management will prove to be the most effective. Relaxation techniques, biofeedback, education, and cognitive therapy can be combined with medications, physical therapy, and lifestyle changes. This multi-faceted, mind-body approach can give adult survivors a sense of hope. It can also help them manage one of the most difficult symptoms of past abuse, and move toward healing their lives.

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Footnote

[1]The authors included both contact and non-contact sexual abuse in their definition of sexual abuse.