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The Ultimate Painkiller?

Does suffering in a group make it easier? Dr. Steven M. Platek believes the camaraderie of CrossFit can get you through the nastiest WOD.

By Dr. Steven M. Platek **June 2010**

Susannah Dy/CrossFit Journal

I'd been following CrossFit HQ main-site WODs for about six months before I decided to try a WOD at the local box, No Excuses CrossFit in Suwanee, Ga. One Saturday afternoon, soon after joining No Excuses, I got my first taste of CrossFit camaraderie, and I loved it! You can say I am addicted to it.

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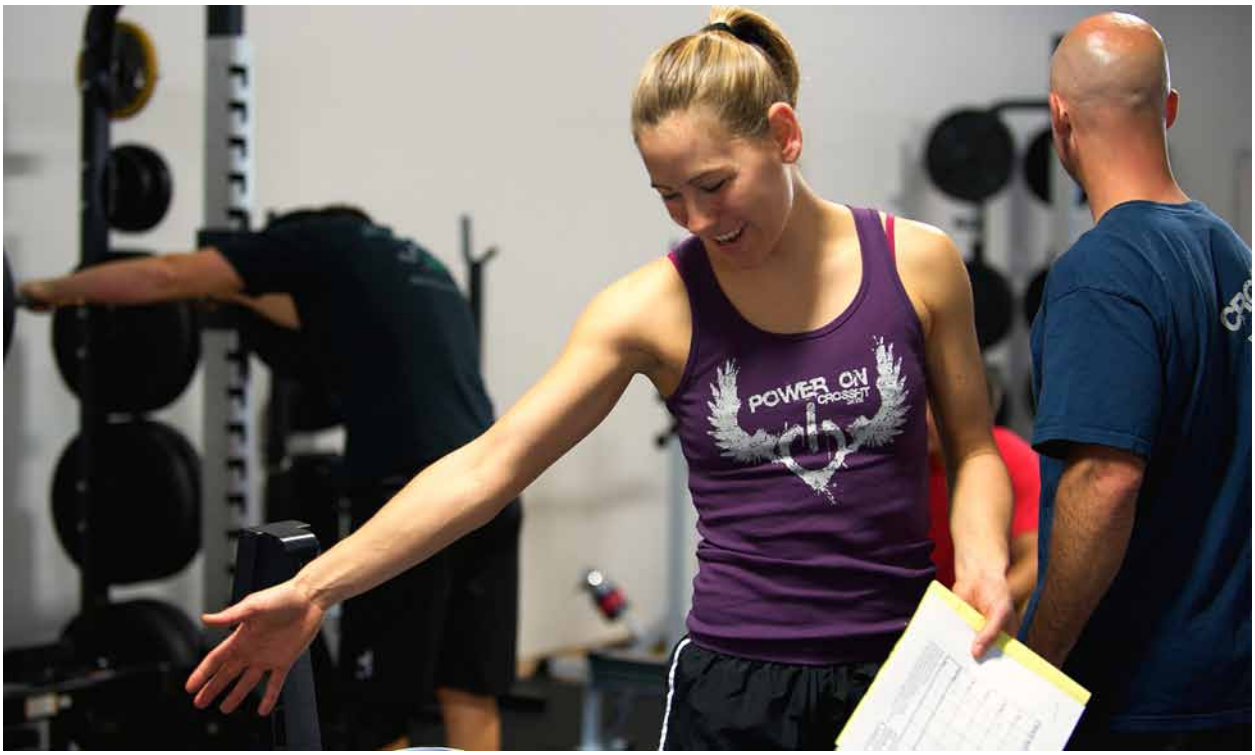
Everyone was super friendly (although that might be because we enforce a 10-burpee rule for anyone who does not introduce themselves to a newbie), supportive, motivational and encouraging. This feeling was amplified on the following Monday afternoon when the WOD was the 300 Workout. I have to be honest: I'd heard rumors about the 300 but never paid much attention to it because I was following main-site WODs and it never came up. Without the encouragement of Coach Ben and the others, my time of 20:32 would have been slower. This camaraderie helped me get through the WOD without dying!

The Nature of Pain

This experience, one I've never had at any Globo Gym, got me thinking about the CrossFit model and its relationship to pain. A CrossFit workout is a competitive environment, which is why times and loads are posted online and on whiteboards. Even individual athletes are trying to beat previous PRs. The numbers on the whiteboard drive athletes to better performances; camaraderie, friendly rivalries and increased motivation are important byproducts.

From a neuroscientific perspective, I think there is a lot to say about CrossFit's effects on pain thresholds.



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Why is a WOD easier when someone is encouraging you?
Is it possible that support structures can somehow act as painkillers during a WOD?

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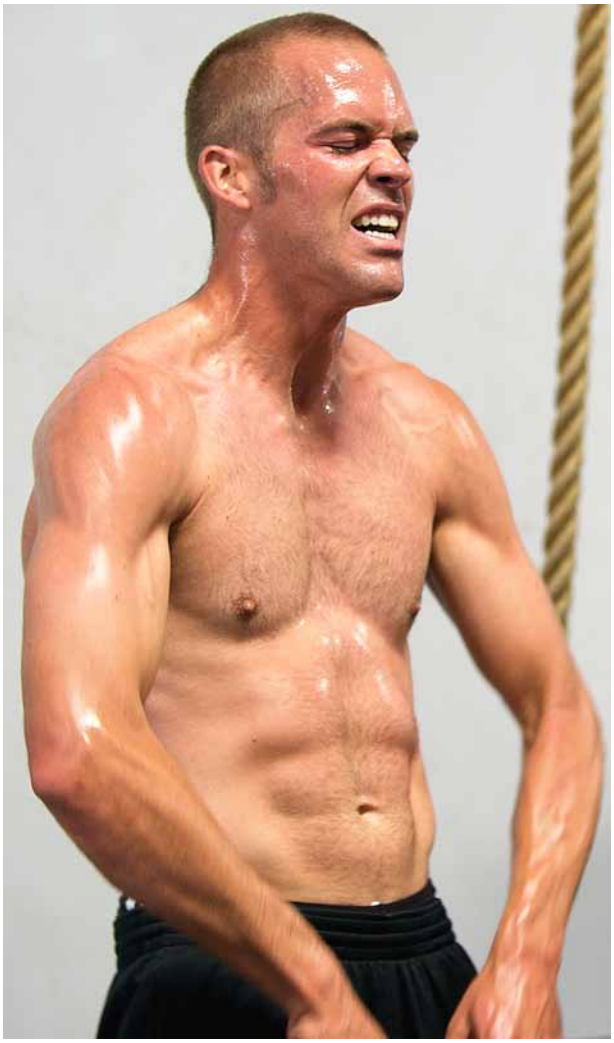
What does this have to do with pain? From a neuroscientific perspective, I think there is a lot to say about CrossFit's effects on pain thresholds. Technically there are several types of pain, but here I am just using "pain" as a general term for things that cause discomfort and generally suck. Pain is a biophysiological response, usually in response to cellular damage or insult; that is, cells are dying (or stretching, bursting, shrinking, not being oxygenated, etc.), and that cues sensory neurons (usually called nociceptors) responsible for transmitting information about pain to tell the brain something bad has happened (1-5).



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More research needs to be done on the link between "social painkillers" and physical pain, but most athletes will tell you that WODs are somehow easier with a little company.

(One type of pain is technically referred to as "nociception." Nociceptive pain is usually the type we think of when we think of pain to the body. The other main type, neuropathic pain, is when there is direct damage to the nervous system.)

The pathway from pain (e.g., putting your hand on a hot burner) to brain is fast, efficient and multi-faceted (2). It has to be fast and efficient because pain, the perception of things hurting or not being normal, is our biology's way of saying, "Stop! Do something different! Or at least do something that makes this pain go away!" When my hand hits a hot burner, a very rapid set of neuronal signals tells my brain to automatically pull my hand back. It's a reflex (1).

However, other processes are at work here. For example, my brain is very quickly making associations between pain and warm red things, burners and stoves (6). My brain is also evaluating the extent of the pain: do I need emergency care or just cold water and ice? All of this is happening at sub-second speed, and for the most part it's unconscious to us (5, 7, 8).

For a process as important as pain response, we often see redundant mechanisms. In case of failure of one pathway, the others will compensate. Interestingly but not surprisingly, several "pathways" deliver the pain message to the brain. One pathway, the spinothalamic tract, is in part responsible for generating the automatic aftermath of pain: reflexive retraction and covering up of the injury site. The pain information also reaches cortical brain areas that allow us to consciously determine where the pain is located and generate behavioral responses in order to answer the question, "What should we do about this pain?"

Acetaminophen and Ibuprofen can reduce physical pain; camaraderie reduces social pain.

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Without these basic pain pathways (low-level sensory aspects of pain at the lowest levels of consciousness), we cannot "feel" pain correctly. Several pathways exist because pain perception is important for species survival. It trains a species to stop doing stupid things that result in cellular or bodily damage. In some cases, people with damage to these pathways or genetic conditions that render these pathways dysfunctional do not feel pain (9-11). While that might seem appealing, consider standing in the snow barefoot. When your feet start to hurt from being too cold, you would probably go inside or put on footwear. People with congenital pain intolerance would not have this perception and thus not go inside, resulting in frostbite and eventually death of the limbs—very maladaptive.

"Feeling" pain is like feeling the "burn," the cut of a knife, the impact of a punch, the pain associated with tearing your ACL, or the agony of feeling your feet literally freezing in the snow. Often we feel pain but do not immediately respond to it. For example, consider a young child who falls and scrapes his knee. Many children pop right back up without much indication of injury and continue to run … until they peer down at the knee and see red liquid oozing from the wound. Out of nowhere, it seems, tears appear. The same response can be observed when a child falls and seems fine upon getting up but then sees a parent's alarm and begins cry. The alarm of the parent is contagious to the child.

This is what we neuroscientists refer to as the "neural alarm system" (12). It's essentially the brain's oh-shit response. It's an interpretation of the pain, from either your own or another person's perspective, irrespective of the actual amount of pain you might be experiencing. It can be the case that if someone else sees your wound as more serious than you initially thought, a more intense pain can be felt. Social cognitive processes make this possible. The injury is now interpreted as being important and demanding some response. For our little fella, it's "cry so mom or dad will pick me up and all things in the universe will be good again." For a chef, it's "wrap my fingers so I don't bleed in the soup and have my restaurant closed down." And so forth.

> The thing that reduces social pain—camaraderie—should be able to reduce physical pain.

Susannah Dy/CrossFit Journal

A WOD is a fascinating mixture of emotions, and the relationships between them are not totally understood. CrossFitters, however, have some very interesting ideas about what goes on during a group workout.

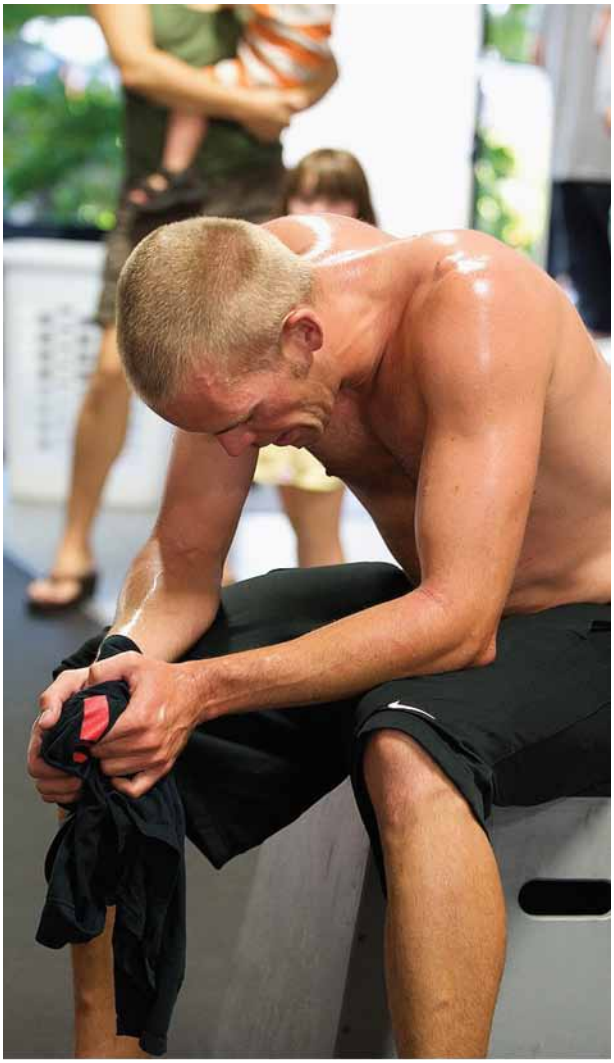
CrossFit: We Suffer Together

Quite fascinatingly, our "feeling" of pain in the physical realm (e.g., getting burned, cut, kicked or punched) is tightly and neurologically linked to our feeling pain in the social realm (being excluded, ostracized, socially rejected or made fun of) (12-14). The kid who does not get picked for dodgeball experiences a sense of pain very similar to what he would feel if he were just kicked in the face with a dodgeball. Sure, some differences exist, but in both examples the neural alarm system would become activated. In the former case, all the pain is in the social neural alarm system with little or no physical feelings of pain (although continued social exclusion can produce real physical symptomatology).

Historically, humans are predominantly social creatures (15-16). As such, we generally respond when our support systems—membership on a team or group membership—are threatened. In fact, our brains respond using the exact same systems as those used when we are physically injured. This occurs in order to motivate us to get back into the group. This time pain does not mean "pull hand from hot burner" but rather "make a friend," "work harder to get picked for dodgeball," or "work to complete that WOD and even risk Pukie because the box is cheering."

Acetaminophen and ibuprofen can reduce physical pain; camaraderie reduces social pain. Let's take this one step further: if physical pain and social pain systems are so tightly linked neurologically, then we might hypothesize medicines that reduce physical pain ought to also reduce social pain (12). Indeed, new scientific evidence suggests certain painkillers, and variations in genetic susceptibility to painkillers, can make someone feel less upset about being excluded from a social situation (17). I think this is an amazing discovery!

Similarly, the thing that reduces social pain—camaraderie—might be able to reduce physical pain. Little scientific data supports this idea, but I think we see some evidence of this phenomenon every day in CrossFit in a highly cooperative, competitive, friendly and encouraging environment. Camaraderie, or being made to feel like you are part of a group that is supporting your goals (and a group that might have a larger purpose), can make you push through a WOD or any challenge life throws at you: a fight, a war, an athletic competition. Given the links between social and physical pain—which require more research to allow us to draw firm conclusions—it may well be that camaraderie actually reduces physical pain or delays the onset.



Susannah Dy/CrossFit Journal

In CrossFit, individuals are part of a global community linked through the Internet and CrossFit.com.

Perhaps the whiteboard and the camaraderie of the box are more than they seem. Perhaps they are prescriptive motivational tools and a sort of "medicine." Perhaps they help us overcome the pain of the WOD and reduce the impediments that stand in the way of our forging ahead, faster, stronger, again and again, as RX'd.

References

1. Berntson GG and Cacioppo JT. The neuroevolution of motivation. In *Handbook of Motivational Science*. Shah JY and Gardner WL, eds. New York: Guilford Press, 2007. pp 188-200.
2. Holden AV and Winlow W, eds. *The Neurobiology of Pain*. Manchester: Manchester University Press, 1984.
3. Merskey H. *An Investigation of Pain in Psychological Illness: DM Thesis*. Oxford: Oxford University Press, 1964.
4. Raj PP. Taxonomy and classification of pain. In *The Handbook of Chronic Pain*. Lreitler S, Beltrutti D and Lamberti A, eds. New York: Nova Science Publishers, 2007.
5. Woolf CJ and Mannion RJ. Neuropathic pain: Aetiology, symptoms, mechanisms and management. *Lancet 353*: 1959-1964, 1999.
6. Ploghaus A et al. Learning about pain: The neural substrate of the prediction error for aversive events. *Proceedings of the National Academy of Sciences 97(16)*: 9281-9286, 2000.
7. Coghill RC, McHaffie JG and Yen YF. Neural correlates of interindividual differences in the subjective experience of pain. *Proceedings of the National Academy of Sciences 100(14)*: 8538-8542, 2003.
8. Treede R. Cortical representation of pain: Functional characterization of nociceptive areas near the lateral sulcus. *Pain 87(2)*: 113-119, 2009.
9. Cox JJ et al. An SCN9A channelopathy causes congenital inability to experience pain. *Nature 444(7121)*: 894-898, 2006.
10. Hornsby J. Insensitivity to pain, congenital, with anhidrosis: CIPA. *Community Outlook*: 189, 1986.
11. Manfredi M et al. Congenital absence of pain. *Archives of Neurology 38(8)*: 507-511, 1981.
12. Eisenberger NI and Lieberman MD. Why rejection hurts: A common neural alarm system for physical and social pain. *Trends in Cognitive Science 8(7)*: 294-300, 2004.
13. Krill AL and Platek SM. In-group and out-group membership mediates anterior cingulated activation to social exclusion. *Frontiers in Evolutionary Neuroscience 1(1)*: 1-7, 2009.
14. Krill AL, Platek SM and Wathne K. Feelings of control during social exclusion are partly accounted for by empathizing personality. *Personality and Individual Differences 45*: 684-688, 2008.
15. Baumeister RF and Leary MR. The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin 117*: 497-529, 1995.
16. Kurzban R and Leary MR. Evolutionary origins of stigmatization: The functions of social exclusion. *Psychological Bulletin 127(2)*: 187-208, 2001.
17. Way BM, Tayler SE and Eisenberger NI. Variation in the mu-opioid receptor gene (OPRM1 is associated with dispositional and neural sensitivity to social rejection). *Proceedings of the National Academy of Sciences 106*: 15079-15084, 2009.

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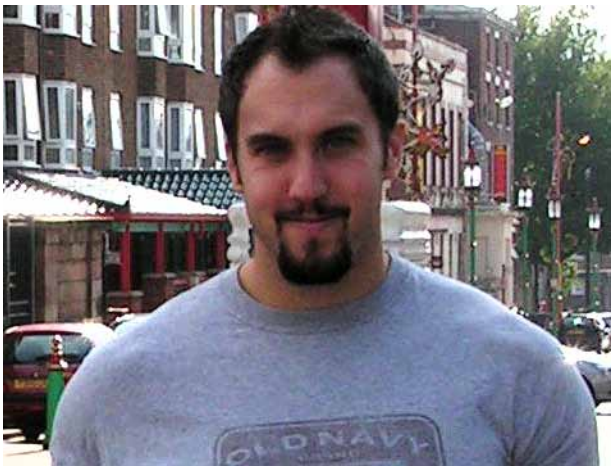

Courtesy of Dr. Steven M. Platek

About the Author

Steven M. Platek (Ph.D. Biological Psychology, University at Albany-SUNY) is associate professor of psychology in the School of Liberal Arts at Georgia Gwinnett College and associate researcher at the MARIARC imaging center of the University of Liverpool. Platek is director of the Evolutionary Cognitive Neuroscience Laboratory (ECNL), where he and his students have identified the unique neural substrates associated with self-referent phenotype matching (facial resemblance), self-face recognition, kin recognition, and attractiveness of female body morphology and male facial characteristics.

He has published over 60 scholarly peer-reviewed articles and edited three academic volumes, and he is editor-in-chief of the journal ***Frontiers in Evolutionary Neuroscience****, co-editor and managing editor of the journal* ***Evolutionary Psychology****, associate editor of the journal* ***Personality and Individual Differences****, and consulting editor for the journal* ***Human Nature****. He also serves on the editorial boards of* ***The Journal of Social, Cultural and Evolutionary Psychology; The Open Ecology Journal; Scientific Research and Essays; The Open Neuroimaging Journal; The Open Evolution Journal****; and* ***The Journal of Scientific Psychology****. A new focus for Platek and his team is to study the neurocognitive and psychological effects of various fitness-training regimens, particularly functional fitness vs. non-functional fitness movements. He and his wife Austen are also avid CrossFitters. He would like to thank coaches Ben Davis and Kyle Maynard, and Brandon Brigman of No Excuses CrossFit, for helpful comments on this idea. He is also a Level 1 CrossFit trainer and runs the new affiliate garage gym CrossFit Gwinnet.*

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