

## MEDICAL MALPRACTICE



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Brenda Osmond is a lawyer at Pacific Medical Law. Brenda obtained her law degree from UBC and was called to the bar in 2010. Her law practice is focused on representing patients who have suffered injury as a result of medical malpractice. Even before she joined the legal profession Brenda was no stranger to advocating for the interests of patients, using her advanced degree in clinical pharmacy to promote safe and effective patient care. Throughout her career Brenda has been a speaker at professional development conferences and a frequent contributor to professional publications.

### Can science address the credibility conundrum of chronic pain?

#### INTRODUCTION

Chronic pain is a feature of many personal injury, motor vehicle, and medical malpractice claims. The characterization of chronic pain for the courts can be complicated by a plaintiff's pre-existing conditions, their poor memory and sometimes even their inability to describe their current symptoms and the impact they have on their day-to-day functioning. Advances in neuro-imaging are held out by some as potential solutions to these challenges. In this paper I will review developments in neuro-imaging and consider their usefulness and applicability to negligence claims.

#### BRAIN IMAGING

One form of imaging that is actively being investigated as an objective measurement of pain is functional magnetic resonance imaging (fMRI). fMRI detects patterns of blood flow in the brain which reflect brain activity, allowing researchers to examine if there are neurological correlates for mental experiences. The goal is to be able to identify a particular pattern of brain activity that aligns with a particular mental state.<sup>1</sup>

A number of potential uses of fMRI brain imaging are being investigated around the globe. In the US, attempts have been made to submit fMRI evidence in court as an advanced form of lie-detection. So far, courts have not admitted this fMRI evidence on the basis that it does not yet meet the standards for admissibility as novel scientific evidence. fMRI is also being researched as a way to distinguish certain types of true and false memories, with a view to addressing the problems inherent in eyewitness testimony. Chronic pain is another area that is receiving attention from researchers who are investigating the ability of fMRI results to provide objective data about pain states.<sup>2</sup>

In 2017 a task force of the International Association for the Study of Pain (IASP) considered the use of brain imaging in the diagnosis of chronic pain and reviewed the ethical and legal implications of its use. The task force, led by neuroscientist Karen

D. Davis of Toronto Western Hospital, developed a Consensus Statement<sup>3</sup> addressing medical, legal and ethical issues and described criteria for the evaluation of fMRI measures of pain. The goal was to provide a framework for developing valid protocols for neuroimaging in chronic pain, and a context for the use of neuroimaging in court.

The IASP defines pain as an "unpleasant sensory and emotional experience." Since pain is, by definition, an emotional experience, the current gold standard for the assessment of pain is self-reporting.<sup>4</sup> Different people exposed to the same pain stimulus can present with a wide range of pain experiences and responses, ranging from the stoic to the histrionic. It is no wonder, then, that there is a great deal of interest in finding more objective methods for evaluating reports of pain. An objective method could prove useful for clinicians in treating pain, for patients trying to better manage their pain, for employers needing to devise accommodation programs for employees, for insurers and of course, the courts.

#### THE CREDIBILITY CONUNDRUM

The possibility that a picture – a brain image – could confirm and quantify the nature of a plaintiff is tantalizing. Although courts are often willing to accept expert evidence about the inextricable link between chronic pain and psychological injuries, the plaintiff's behavior can often cast doubt on the veracity of their claims of pain. For example, in two recent BC cases, the plaintiffs' demeanor led the courts to comment specifically on their credibility. In *Park v Targonski*, 2017 BCCA 134 (CanLII) the court found that the plaintiff embellished her pain-related complaints when she was assessed by doctors and when she testified at trial. The trial judge accepted that the plaintiff's chronic pain and depression were caused by the motor vehicle accident in question, and that her injuries included a profound psychological component, but the judge's reasons included several adverse findings regarding the plaintiff's credibility. In *Koltai v Wang* 2017 BCCA 152 (CanLII) the trial judge had grave reservations about the plaintiff's credibility due to inconsistencies between his mobility as captured on video surveillance and that demonstrated in independent functional capacity assessments. These

inconsistencies brought into question the plaintiff's reports of pain and the impact it had on his mobility. In these cases, could objective data on the presence and severity of the plaintiff's pain have assisted the court beyond the assistance already provided by experts who gave evidence?

Brain-imaging techniques have rarely been admitted into evidence at trial. In one case in 2015, a truck driver in Arizona sued his former employer for chronic wrist pain related to a burn caused by molten asphalt. The plaintiff had an fMRI brain scan that demonstrated that lightly touching the affected wrist provoked a signal in sensory regions and other brain areas associated with pain – touching the other wrist did not. The plaintiff's expert gave evidence that those results could distinguish true pain from imagined pain. The defence called a neurologist who told the court that pain was too subjective to measure in this way and that the signature the fMRI was detecting could have been produced if the plaintiff had expected to feel pain or was unduly concentrating on it. The judge admitted the scan into evidence, and the case settled for \$800,000, more than ten times the company's initial offer.<sup>5,6</sup>

Not surprisingly, a small number of private clinics are now offering fMRI, with some promoting the imaging as being able to document pain and provide objective visual and graphic documentation of pain. Many neuroscientists are concerned that the technology is far from being accurate enough for the courtroom.<sup>7</sup>

### CAN YOU OUTSMART A BRAIN SCAN?

How accurate is the technology? Is it possible to “trick” an fMRI?

Studies designed to test the robustness of fMRI data for lie-detection have shown that deliberate attempts to alter the fMRI readings (countermeasures) could be successful. By having participants think of specific memories in order to make answers to neutral questions seem more personally relevant, study participants have been able to significantly alter the accuracy of the brain scan results.<sup>8</sup>

Some authors suggest that neuroimaging for pain signals may offer more robust results than neuroimaging for lie-detection. They suggest this in part based on the theory that attempts at countermeasures during pain neuroimaging would involve

self-infliction of pain, making it less likely, and more obvious, if a subject was trying to manipulate the results.<sup>9</sup> Despite that view, there are examples in which subjects have been able to manipulate imaging results even when identifying pain was the goal. In 2005 one study had healthy volunteers lie in an fMRI scanner and touch a hot plate while they were shown a video of flames. The video responded to their brain activity and gave them visual feedback. Volunteers were able to control the intensity of the flame by imagining the pain was more or less severe than it actually was,<sup>10</sup> suggesting that fMRI, as it exists at the moment, may not provide the objectivity necessary to make it reliable evidence in court.

Aside from the issue of a subject's attempts to “out-smart” the fMRI scan, this research shares challenges common to many other forms of research - contrived lab settings might not reflect real-world complexities.<sup>11,12</sup> The emotions that accompany the experience of chronic pain, including the impact on one's day-to-day activities, and the impact chronic pain can have on loved ones and care givers, may impact on the patient in ways that can't be objectively measured.

### CAN BRAIN IMAGING REMOVE THE SUBJECTIVITY OF SELF-REPORTING?

The IASP has attempted to distinguish the human experience of pain from its neural processes. In identifying pain as “an unpleasant sensory and emotional experience ...” the IASP notes that pain is perceptual and exists only insofar as an individual experiences it. It can only be identified through introspection and honest self-reports. On the other hand, nociception is the “neural process of encoding noxious stimuli,” and can occur without an individual being aware of it. Nociception can even be detected in people under anaesthesia. fMRI measures brain activity and provides information about nociception, and by inference, pain – but this is only a proxy measure of pain.<sup>13</sup>

The experience of pain varies tremendously within and between individuals, and this variability poses a challenge for the use of brain imaging findings as an objective biomarker of pain.<sup>14</sup> In addition, chronic pain often co-occurs with a broad variety of emotional, cognitive and motivational changes, including mental disorders, which further complicates the identification of a specific neuromarker of chronic pain.<sup>15</sup>

Under controlled laboratory settings, fMRI data has shown impressive results. In one study it has been able to differentiate between painful and non-painful stimuli with 81% accuracy. In another, fMRI results reported subject's pain signatures with 93% accuracy.<sup>16</sup> In follow-up tasks, researchers distinguished acute pain from social feelings of rejections, and demonstrated the reduction of pain response upon giving participants analgesic medications.<sup>17</sup> As notable as these results are, the studies all looked at the infliction acute pain in healthy patients, and their applicability to chronic-pain sufferers in the real world is still unknown.<sup>18</sup>

Acute pain is associated with activity in many brain areas that belong to different functional brain systems, rather than with

activity in dedicated “pain” centres within the brain.<sup>19</sup> Many (if not all) features of brain activity that have been associated with pain are not specific to pain.<sup>20</sup> Given that the experience of pain has diverse influences, from nociception to social context, researcher doubt that a single neuromarker will be found to reflect all aspects of acute and chronic pain in all contexts.<sup>21</sup>

Given that pain is, by definition, an emotional experience” perhaps the important question is not “can we remove the subjectivity” but “how do we ensure that the objective data from a brain scan is taken in the context of the plaintiff’s subjective experiences?”

### CHRONIC PAIN V ACUTE PAIN

Although neuroimaging techniques appear to be effective at detecting acute pain caused in the laboratory in healthy volunteers, detecting chronic pain is a different matter.<sup>22</sup> No brain areas or networks have yet been specifically and exclusively linked to chronic pain. In addition, there is a substantial overlap of chronic pain with other processes and comorbidity with mental disorders. This inherent lack of specificity is a fundamental road-block for brain imaging-based diagnostic tests for chronic pain.<sup>23</sup>

Despite these challenges, strides are being made in the realm of imaging and chronic pain. One study looked at the neurological signatures associated with chronic back pain. Painful electrical stimuli were administered to the lower back of chronic pain patients and healthy controls. The fMRI was able to differentiate between pain perceptions in the two subject groups with 92.3% accuracy.<sup>24</sup> Impressive results, but the applicability of those results to the real world remains to be seen.

### THE POTENTIAL IMPACT OF NEUROSCIENCE AND NEUROIMAGING EVIDENCE AT TRIAL

An expert’s narrative description of what is seen on any brain imaging can be technical and difficult to follow. Nonetheless, research has suggested that the general public is more likely to accept poor arguments if they are accompanied by neuroscientific evidence.<sup>25</sup> In one study, explanations of psychological phenomena that included even logically irrelevant neuroscience information were more satisfying to lay people than explanations without any neuroscience information.<sup>26</sup>

Demonstrative evidence in the form of an image from an fMRI, can provide a colourful representation comparing a “normal” brain to the plaintiff’s brain. Some authors have sug-

gested that courts should consider limiting expert evidence on the neurobiology of chronic pain to verbal testimony, to ensure that decision-makers are not unduly influenced by being shown visually appealing brain images.<sup>27</sup>

Even if the technological concerns about the utility of fMRI data are overcome, there are additional policy concerns that need to be considered. For example, these scans are likely to remain expensive and may not be available to every plaintiff. There is a possibility that an adverse inference may be drawn against a plaintiff who does not present fMRI results to bolster their complaints of chronic pain.<sup>28</sup>

### CONCLUSION

The use of neuroimaging to find objective evidence of mental states could set up a contest between subjective mental experiences and objective brain states.<sup>29</sup> According to the IASP Consensus Statement, the “most meaningful gauge of a person’s pain is their self-report. Neither the absence of a known cause nor an aberrant response to a stimulus negates the experience of pain. If a patient honestly reports pain, they have pain...”<sup>30</sup>

In its current form, brain imaging is not sufficiently reliable to be used as a “pain detector” to either support or contradict an individual’s self-report of pain.<sup>31</sup> As with many developing scientific fields, future researchers may look back with amusement at what was viewed as a hurdle to acceptance or what was accepted as a panacea. Although data from fMRI cannot be safely generalized to the real world some experts predict that future advances in the neuroimaging technology and analysis will eventually address these problems.<sup>32</sup>

For any brain imaging test to be useful in supporting or refuting a claim of pain it must meet rigorous standards, both of meeting scientific criteria and legal criteria. It must also recognize that each individual is unique, and that abnormal brain activity or structure alone does not prove that an individual is experiencing pain. Imaging results cannot stand alone but need to be assessed in the context not only of the patient’s current medical and behavioural profile, but also of their past experiences.<sup>33</sup>

28. *Ibid* at 635.
29. Chandler, *supra* note 1 at 837.
30. Davis, *supra* note 3 at 635.
31. *Ibid* at 634.
32. Chandler, *supra* note 1 at 835.
33. Davis, *supra* note 3 at 634.

In *Saadati v. Moorhead*, [2017] 1 SCR 543, 2017 SCC 28 (CanLII) the court criticized the notion that the task of assessing the plaintiff's legally recoverable mental injury should be down-loaded to a diagnostic classification system. The court held that in adjudicating a claim of mental injury a trier of fact was not concerned with the diagnosis, but with the level of harm that the plaintiff's symptoms represented. That sentiment may prove relevant to chronic pain and fMRI. If the technology advances enough to allow the results into evidence, the impact of an objective finding of the presence of pain must be taken in the context of the patient's experience of that pain. The subjectivity of the person's response to pain will remain a key element in the analysis of the effect of that pain on a plaintiff. [V](#)

1. Jennifer A. Chandler, "The Impact of Biological Psychiatry on the Law: Evidence, Blame, and Social Solidarity" (2017) 54:3 Alberta Law Review 834.
2. Chandler *ibid* at 835.
3. Karen D. Davis, *et al.* Brain imaging tests for chronic pain; medical, legal and ethical issues and recommendations. (Oct 2017) 13 Nature Reviews | Neurology 624-638.
4. *Ibid* at 624.
5. *Ibid* at 625.
6. Sara Reardon, "The Painful Truth" (2015) 518 Nature 475.
7. *Ibid*.
8. Natalie Salmanowitz, "The case for pain neuroimaging in the courtroom: lessons from deception detection (4 February 2015) Journal of Law and the Biosciences, 144.
9. *Ibid* at 146.
10. Reardon, *supra* note 6 at 475.
11. Salmanowitz, *supra* note 8 at 145.
12. Davis, *supra* note 3 at 627.
13. *Ibid* at 626.
14. *Ibid*.
15. *Ibid* at 629.
16. Salmanowitz, *supra* note 8 at 141.
17. *Ibid*.
18. *Ibid* at 142.
19. Davis, *supra* note 3 at 627.
20. *Ibid* at 628.
21. *Ibid* at 629.
22. Chandler, *supra* note 1 at 836.
23. Davis, *supra* note 3 at 631.
24. Salmanowitz, *supra* note 8 at 142.
25. Reardon, *supra* note 6 at 476.
26. Weisberg, D.S., Keil, F.C., Goodstein, S., Rawson, E. & Gray, J.R., The Seductive Allure of Neuroscience Explanations (2008) 20 J. Cogn. Neurosci. 470-477.
27. Davis, *supra* note 3 at 634.