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It is well-documented that chronic pain, anxiety, and depression often coexist and that their effects on the individual are both confounding as well as amplifying. Complementary and alternative medicine (CAM) therapies are often chosen by those suffering from chronic pain as well as by those suffering from depression or anxiety. Among CAM therapies, aromatherapy, the therapeutic or medicinal administration of volatile essential oils extracted from plants, is the fastest growing. Is aromatherapy effective at inhibiting the anxiety and depression associated with chronic pain?

Chronic pain, anxiety, and depression are often tightly woven together in a dark fabric that surrounds the afflicted, filtering their interactions and relationships with the world around them. Pain is typically considered chronic due to some combination of its prevalence and duration, or when it evolves to become the condition to be treated instead of merely the symptom of an underlying physiology. One study of 400 patients in a chronic pain clinic found that 73% suffered concurrently with anxiety and nearly all (93%) were depressed (Castro & Daltro 2009). The potentially detrimental effects on human life are illustrated in the fact that over 20% of those with chronic pain attempt suicide at least once in their lifetime and the incidence rate climbs from there when mood disorders such as anxiety and depression accompany the pain (Ilgen, Zivin, McCammon, Valenstein 2008).

Discussion

An attempt to understand chronic pain, depression, and anxiety and how they weave their fabric of despair requires a look into the brain under the influence of each. Functional magnetic resonance imaging (fMRI) provides a unique picture of neural activity, represented by evaluating changes in blood flow in the brain's capillary beds. It allows the working brain to be directly monitored in its entirety, providing valuable information about central nervous system

processes. A study using fMRI to evaluate chronic pain patients revealed a loss of neurons in pain pathways of the lateral prefrontal cortex (Borsook & Becerra, 2006). In addition to its significance in executive function, this area of the brain regulates limbic structures. Alterations in its structure and function contribute to mood disorders. Chronic pain and mood disorders also share neurotransmitter and neuroendocrine alterations, further linking them in a multi-faceted network of cause and effect (Narasimhan & Campbell, 2010). Functional imaging of the brain has been used to monitor the analgesic effects realized when mood disorders such as anxiety and depression are effectively treated.

A great deal is to be learned from the individuals who suffer with chronic pain, anxiety, and depression. Their motivations and perceptions are important data regarding their brain functions. Chronic pain sufferers increasingly choose CAM therapies. Forty percent of individuals seeking relief from ongoing pain associated with a spinal cord injury use CAM (Cardenas & Jensen 2005). Similarly, a survey of those currently taking opioid medication for chronic pain showed that 44% of them were also using CAM therapies (Fleming, Rabago, Mundt, & Fleming, 2007). Individuals with mood disorders also seek CAM therapies for relief. In fact, an article in the American Journal of Psychiatry indicates that individuals self-reporting anxiety attacks and severe depression chose CAM therapies more frequently than conventional therapies. However, only 3% of them described using aromatherapy specifically (Kessler et al., 2001). Participants in a study by Gedney, Glover, and Fillingim (2004) reported diminished intensity and unpleasantness of their pain after inhaling the aroma of lavender essential oil. McCaffrey, Thomas, and Kinzelman (2009) found that sachets containing the essential oils of lavender and rosemary eased the test-taking anxiety experienced by nursing students. Another study revealed that administering essential oil of bergamot to subjects induced a balancing

effect on the autonomic nervous system, lowered blood pressure and heart rate, and reduced anxiety (Chang & Shen, 2011).

Conclusion

Aromatherapy has been shown to be beneficial to those who suffer from anxiety and/or depression. When these mood disorders are tightly intertwined with chronic pain it stands to reason that all three would be inhibited by aromatherapy's effects. The truth behind its effectiveness is doubted by medical researchers and just as fervently touted by both care providers and the afflicted for which they care. This contradiction seems to be rooted in the absence of scientifically and statistically valid experimentation of the random, controlled, double-blind type that researchers prefer. Such studies are difficult from a methodology standpoint (how does one administer aromatherapy without the test subject being aware?) and costly (similar studies regarding the efficacy of pharmaceuticals have the powerful financial backing of those who stand to gain monetarily based on the results). Is aromatherapy's mechanism of relief rooted in the placebo effect, it's anxiolytic effect, or via molecular binding to the opioid receptor? Using fMRI in the future to observe the human brain during inhalation or absorption of various essential oils could provide statistically sound, conclusive data to be considered in conjunction with patient-reported affective results.

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