MAX JORDON – EFFECTS OF SPINAL MANIPULATION ON BRAIN ACTIVITY IN INDIVIDUALS WITH CHRONIC LOW BACK PAIN

ABSTRACT

Chronic low back pain (cLBP) continues to be one of the most common health conditions in the United States. Despite an enormous amount of research, there are no treatments for this condition that consistently improve outcomes. For decades health professionals have incorporated spinal manipulative therapy (SMT) into their practice, but the evidence to date has shown that SMT has only small to modest effect sizes when treating cLBP. One way to improve the effectiveness of SMT is by getting a better understanding of its underlying mechanisms so that the intervention be more specifically targeted to the appropriate individual.

While biomechanical theories exist to help explain how SMT works, they do not sufficiently explain all the phenomena associated with this treatment. To better understand the mechanisms behind SMT, researchers have begun to study the neurophysiological effects of SMT using functional magnetic resonance imaging (fMRI); however, to date there have been no published studies assessing the effects of SMT on the performance of lumbopelvic motor tasks. Therefore, the overall purpose of this body of work was to describe the differences in cortical activity between individuals with and without cLBP when performing lumbopelvic motor tasks, and to assess the effects of SMT in these populations. Results from this body of work will help health care professionals implement this technique in a more specific and focused manner.

Key findings from this study demonstrated how individuals with cLBP exhibit a broader network of brain activation compared to asymptomatic individuals when performing lumbopelvic motor tasks. Specifically, there appears to be two networks that are active during the performance of lumbopelvic tasks: a “motor network” that consists of the precentral gyrus and the supplemental motor area that is common in both groups, and a “motor-pain network” that is only active in individuals with cLBP consist
of the Insula and Middle Cingulate Cortex. These two networks seem to share a common hub, the Putamen, that can assist in translating information between these two networks.

It is the Putamen that is impacted the most with spinal manipulation. Both the levels of activation and functional connectivity increases with spinal manipulation in individuals with cLBP, but not asymptomatic individuals. This suggests that spinal manipulation might affect the cortico-basal-ganglia motor loop in individuals with cLBP.