

Research: Use of Lumbar Massage Unit while Driving Reduces Muscle Fatigue

Researchers at the University of Waterloo, Ontario, Canada, evaluated the effects of three different lumbar massage systems on low-back pain caused by prolonged periods of time spent driving an automobile. “The Effects of Lumbar Massage on Muscle Fatigue, Muscle Oxygenation, Low Back Discomfort, and Driver Performance during Prolonged Driving” tested roller, mechanical and pneumatic massage devices.

According to the authors, low-back pain is common in occupations requiring prolonged driving. This study measured lumbar and thoracic erector spinae muscle fatigue, oxygenation, blood flow and driver discomfort and performance during a one-hour driving task in which the massage devices were used. Eight volunteers (four men and four women) performed eight testing sessions each, in which they drove in a simulator around an oval course using a car seat with one of the three massage devices or a car seat without a massage device. Each type of car seat was used twice by each subject.

The roller massage unit moved horizontal metal rods in a vertical direction along the lumbar region of the seat and could be felt by the seat occupant. The mechanical unit consisted of a flexible support that curved toward the lumbar region cyclically with a random sloping distance. The pneumatic device inflated or deflated two bladders, one behind the seat cushion that provided static support and one just beneath the seat cover that provided dynamic support. To measure the effects, the researchers used electromyography (EMG), near infrared spectroscopy (NIRS), a thermometer, and subject-reported ratings of perceived discomfort (RPD).

The results indicate beneficial effects from all three massage units as shown by the temperature measures, NIRS and RPD, although many of the EMG findings were not statistically significant. Other differences between the massage devices were statistically insignificant. The authors note that increases in skin temperature suggest that massage has the potential to prevent or decrease erector spinae muscle fatigue. They also note that prolonged driving may cause static loading of passive lumbar spine structures, and the massage devices may prevent this loading.

In conclusion, the authors state, “These mechanical devices appear to contribute to reduced discomfort levels, increases in muscle oxygenation and blood flow and the prevention of muscle fatigue during prolonged sitting with no negative impact on driver performance.”

— *University of Waterloo, Ontario. Authors: J. L. Durkin; A. Harvey; R. L. Hughson; J. P. Callaghan. Originally published in Ergonomics, Vol. 49, No. 1, January 15, 2006, pp. 28–44.*