

Title	物体の昇降作業において荷重の認知が腰部筋肉に与える影響の実験的検討
Author(s)	佐々木, 仁大
Citation	
Issue Date	2021-03
Type	Thesis or Dissertation
Text version	author
URL	http://hdl.handle.net/10119/17569
Rights	
Description	Supervisor:日高 昇平, 先端科学技術研究科, 修士(知識科学)

Research on low back pain has been conducted in many countries around the world, and the causes of herniated discs and postural lumbago have been clarified from the research until now. However, the causes of many other types of low back pain have yet to be elucidated. In the future, as the population of the elderly increases, the number of persons with subjective symptoms due to low back pain is expected to increase, and research on low back pain and its causes are urgently needed.

Among low back pain, many studies have been conducted on lumbar sprain. Since lumbar sprains often occur during heavy lifting, studies have been conducted to evaluate the effects of heavy lifting on lumbar tissues and to quantitatively analyze the effects of load perception on the lumbar spine during heavy lifting. In addition, studies on the lumbar spine and intra-abdominal pressure have been conducted to prevent back pain and reduce the burden on the lower back, and the wearing of a support belt has been reported to be effective. However, studies on heavy lifting have only suggested an effect on the lumbar region depending on whether or not a person perceives the load when lifting heavy objects, and the effect on the lumbar muscles has not been clarified.

Studies on the lumbar spine and intra-abdominal pressure have shown that wearing a support belt is effective, but the “Bundesärztekammer” in Germany reported that continuous wearing of a support belt is not recommended because it leads to damage of the lumbar muscles.

In this study, we conducted an experiment to evaluate the effects on the lumbar muscles, which have not been clarified in previous studies, and to evaluate whether the strong load on the lumbar muscles can be reduced by increasing the intra-abdominal pressure during object lifting and lowering.

In this experiment, subjects were asked to perform a task in which they repeatedly lifted differently loaded objects in order to clarify the effect of load perception on lumbar muscles in object lifting and lowering tasks. In the experiment, the muscle activity of the lumbar region (erector spinae muscles) was measured using an EMG sensor. From the measured data, the amount of muscle potential during 0.3 s before the lifting was calculated, and the burden on the lower back in each condition was evaluated by performing a two-way analysis of variance.

The experimental results showed that there were significant differences in both load

perception and intra-abdominal pressure. The interaction effect showed no significant difference, indicating that the presence or absence of load recognition and intra-abdominal pressure may directly lead to a reduction in the burden on the lumbar muscles during heavy lifting.