



Case Study

Effect of unilateral exercises on low back pain in an urban driver

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Abstract. [Purpose] This study aimed to develop unilateral exercises for urban drivers and investigate the effect of these exercises on low back pain (LBP). [Subject and Methods] A 40-year-old male driver, who complained of LBP on the left side at L3–5 levels, participated in this study. A two-session program was conducted, and LBP, pelvic tilt angle, and trunk range of motion were measured after each session. [Results] After the unilateral exercises, the anterior pelvic tilt angle was improved and the visual analog scale score of back pain decreased. [Conclusion] Analyzing car features and performing individual approaches are necessary in providing treatment for urban drivers with LBP.

Key words: Low back pain, Unilateral exercises, Urban driver

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INTRODUCTION

Urban taxi drivers differ from other professional drivers with respect to their risk profiles for work-related low back disorders¹⁾. Biomechanical studies show that the driving activities within automobiles can impose postural strains on lumbar spines¹⁾. Funakoshi et al. reported that back pain is an important health problem for taxi drivers, as well as an urgent occupational safety and health management issue²⁾. Back pain is significantly related to the suitability of the driver's seat pan, job stress, and time²⁾. The current study developed unilateral exercises for urban drivers and investigated the effect of these exercises on low back pain (LBP).

SUBJECT AND METHODS

A 40-year-old male, who complained of LBP on the left side at L3–5 levels, participated in the study. The objective and methods of the study were explained to the subject prior to his participation. Informed consent was also obtained according to the ethical principles of the Declaration of Helsinki. He complained of continuous LBP for 6 months. He had been driving a taxi for 4 h/day in an urban area. An examination revealed that his pelvis was tilted posteriorly. When he performed a forward flexion in the standing position with his knees fully extended, he experienced pain and stiffness in his left lower back. The visual analog scale (VAS) score of his back pain was 7. An examiner measured the pelvic inclination with a palpation meter (PALM; Performance Attainment Associates, St. Paul, MN, USA). The rotation of the innominate bones in the sagittal plane was also measured with the caliper tips of the PALM in contact with the ipsilateral anterior superior iliac spine and posterior superior iliac spine³⁾. In the initial assessment, the anterior pelvic tilt angles were 2° and 8° on the right and left sides (normal range, 11 ± 4°), respectively. A dual inclinometer (ACUMAR, Lafayette Instrument Co., Lafayette, USA) was used to measure the trunk angles. The initial lumbar flexion angle was 60°, and the initial extension angle was 45°. An examination revealed that his lumbar was rotated to the left side. This study conducted two 10-day sessions and measured the LBP, pelvic tilt angle, and trunk angle after each session. Session 1 involved lumbar extension and flexion exercises, as

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well as lumbar stability exercises using a ball. Session 2 comprised unilateral resistance exercises, which include pushing and holding for 10 s with the left foot on a 45-degree inclined springboard while sitting on a chair with the knee flexed. The unilateral stretching exercise for the quadratus lumborum (QL) muscles was performed by crossing the right leg over the left leg and slowly lowering both legs to the right; this position was held for 30 s with the arms extended out to the sides of the body. The subject performed the unilateral exercises for 1 h/day.

RESULTS

After the first session, the anterior pelvic tilt angles were 4° and 8° on the right and left sides, respectively. The lumbar flexion angle was 68°, and the extension angle was 45°. Lumbar rotation movement was observed during lumbar flexion. The VAS score of back pain decreased from 7 to 5. After the second session, the anterior pelvic tilt angles were 9° and 10° on the right and left sides, respectively. The lumbar flexion angle was 68°, and extension angle was 50°. Lumbar rotation movement was not observed during flexion. The VAS score of back pain decreased to 3.

DISCUSSION

Lumbar extension and flexion and lumbar stability exercises that are generally recommended for people suffering from lumbago are also helpful for normal pelvic alignment, as well as in reducing LBP among urban drivers. However, the effects of these exercises are limited. With the driver's seat on the left side in Korean cars, the driver operates the accelerator and the brake pedal with the right foot. The accelerator is located near the right foot, and the brake pedal is located between the right and left feet. Urban drivers spend a considerable amount of time on operating the brake pedal while driving around the busy roads of cities^{1, 2}). Extending and pushing on the right leg to operate the brake pedal between the right and left feet increase the length of the right leg; this operation may have caused the right lateral tilt in the right side of the pelvis and one-sided backward tilt of the right pelvis^{4, 5}). Therefore, resistance exercises with the left foot pushing a decline board, which was performed by the subject in the current study, were considered to reduce greatly the differences in the angles of the right and left sides of the pelvis as well as the pain therein. Moreover, while the right foot moves repeatedly back and forth between the accelerator and the brake pedal, the muscles around the left side of the pelvis stiffen⁴). In particular, the QL muscles of the waist move in a compensatory manner to maintain the pelvic posture in the sitting position⁵). The unilateral stretching exercise for the QL muscles performed in the current study is considered to reduce lumbago by improving the right lateral tilt in the right side of the pelvis and reducing the tension of the QL muscles. In conclusion, analyzing car features and performing individual approaches are necessary in providing treatment for urban drivers with LBP.

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