PERTURBATION IN TRUNK MOTION OF LOW BACK PATIENTS

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INTRODUCTION

Analysis of trunk motion consists of a complementary test, which includes the diagnosis and follow-up of patients with low back pain [1,2]. The information provided by the analysis usually shows significant reduction in trunk mobility or functional compensatory behavior. Measuring three-dimensional spine motion in able-bodied subjects and patients with LBP, this study was undertaken to determine: a) if trunk motion and particularly coupling motions were perturbed in LBP patients, which trunk segments are mostly affected, and b) whether or not trunk rigidity was reduced after eight weeks of physiotherapy.

METHODS

The fourteen subjects with low back pain who participated in this study had an age of 33±7.3 years, height of 172±9 cm and weight of 70.9±15.6 kg. The thirteen able-bodied subjects who participated in this study had an age of 35.1±9 years, height of 175±10 cm and weight of 68.5±9.7 kg. Data were collected using a four-camera high-resolution motion analysis video-based system while subjects were performing five principal movements, namely, right and left lateral bending and rotations as well as forward trunk flexion. The amplitude differences of the principal movements and the coupling motions of trunk and thoracic and lumbar segments of the able-bodied subjects and LBP patients were determined using ANOVA with a threshold of $p < 0.05$.

RESULTS AND DISCUSSION

The absence of a difference in the principal motions leads us to believe that there is no limitation of movement because no significant difference was observed between the able-bodied subjects and the patients before and after treatment. Significant differences, however, were observed in the coupling motions between the control subjects and the group of the LBP subjects before treatment (Figure 1).

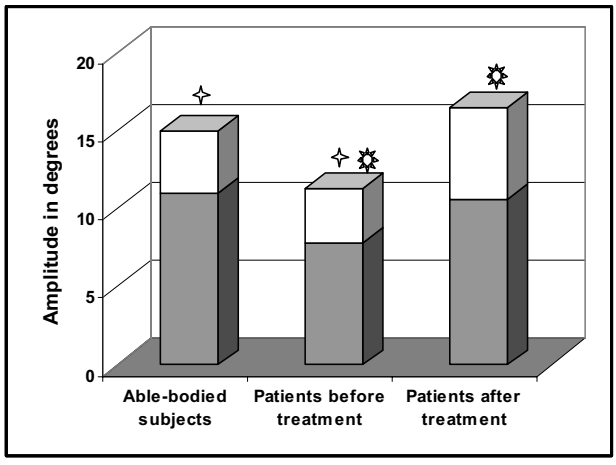

Figure 1: Maximum coupling in rotation for the lumbar segment during lateral bending of the trunk.

The difference for the coupling motions in rotation at the lumbar level during the principal movements of extension was 29% between the able-bodied subjects and LBP patients.

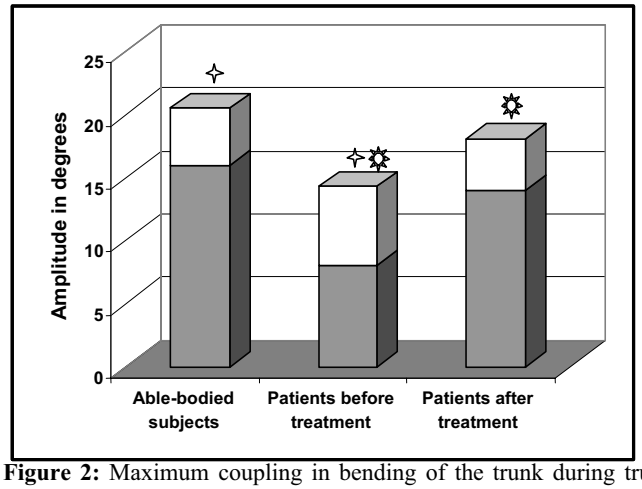

Figure 2: Maximum coupling in bending of the trunk during trunk rotation.

The significant differences in the coupling in lateral extension were recorded at the thoracic level for the principal rotation motion, as indicated in Figure 3. During lateral bending, the coupling rotation at the lumbar level was reduced by 27% in the patient group before treatment while the same group had a 50% reduction in the thoracic coupling bending motion.

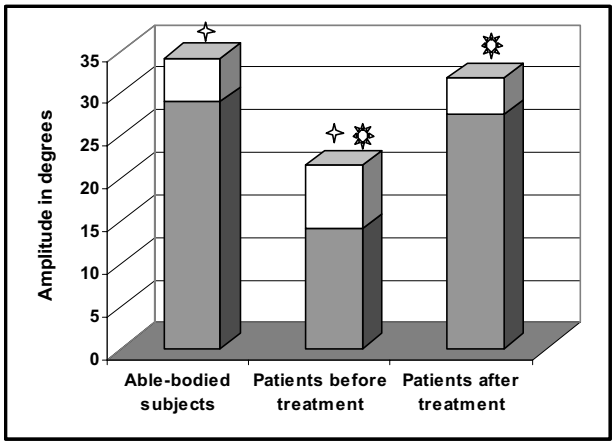

Figure 3: Maximum coupling in bending of the thoracic segment during trunk rotation.

CONCLUSIONS

No indication appeared to locate trunk rigidity in patients with LBP. Reduction in the coupling motion can be expected for LBP patients before treatment. The rigidity might also be manifested for the coupling motions for the segments having the most mobility during the principal motions being executed.

REFERENCES

1. Allard P, et al. Appleton and Lange publishers 357-67, 1999.
2. Beggs JS. Hemisphere Publishing Co, 223, 1966.