

HIP- SPINE INTERACTION DURING SIT-TO-STAND IN HEALTHY YOUNG SUBJECTS

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INTRODUCTION

Standing up from sitting (STS) is essential for walking and therefore independent function. However, little is known about the contribution of the thoracolumbar spine during STS. It has been suggested that minimal movement occurs in the spine during STS, with trunk forward lean prior to buttock's lift off (LO) being produced solely by flexion of the hips[1,2]. The aim of this study was to use computer-aided video analysis to determine the sagittal contribution of lumbar and thoracic spine, hip and knee joints during STS in a group of healthy young adults.

METHODS

Forty-seven healthy young adults with reflective markers attached over the mid-line thoracolumbar spine, right lateral pelvis and lower limb were videotaped (i) performing STS at their preferred speed from a chair set at 100% knee height, and (ii) undertaking tests for maximal available thoracic, lumbar and hip joint flexion. The automatic digitization mode of the 2D Peak Motus was used to track the marker movement on the videotape at 50Hz. Following (Butterworth) filtering of the data sagittal thoracic, lumbar, hip, and knee angles were calculated. All angular data were normalized to 100% movement duration to accommodate speed variations between subjects.

RESULTS AND DISCUSSION

Forward trunk lean prior to LO was accomplished by concurrent lumbar and hip flexion; 1° lumbar flexion for every 2.7° hip flexion. As the lumbar spine flexed the thoracic spine extended resulting in a LO trunk angle of 45.7°(±5.8°). Following LO, the hip(s) and lumbar spine extended and the thoracic spine flexed, with the standing thoracic angle approximating the initial thoracic flexion posture in sitting. During STS subjects used 95.5%, 65.9%, and 57.7% of their maximal available hip, lumbar and thoracic spine flexion respectively.

CONCLUSION

Improved knowledge of sagittal thoracolumbar and hip-spine movement patterns in healthy subjects will facilitate rehabilitation of dysfunctional STS.

REFERENCES

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