

Trunk and lower extremity kinematics during gait after posterior fixation for thoracolumbar fracture

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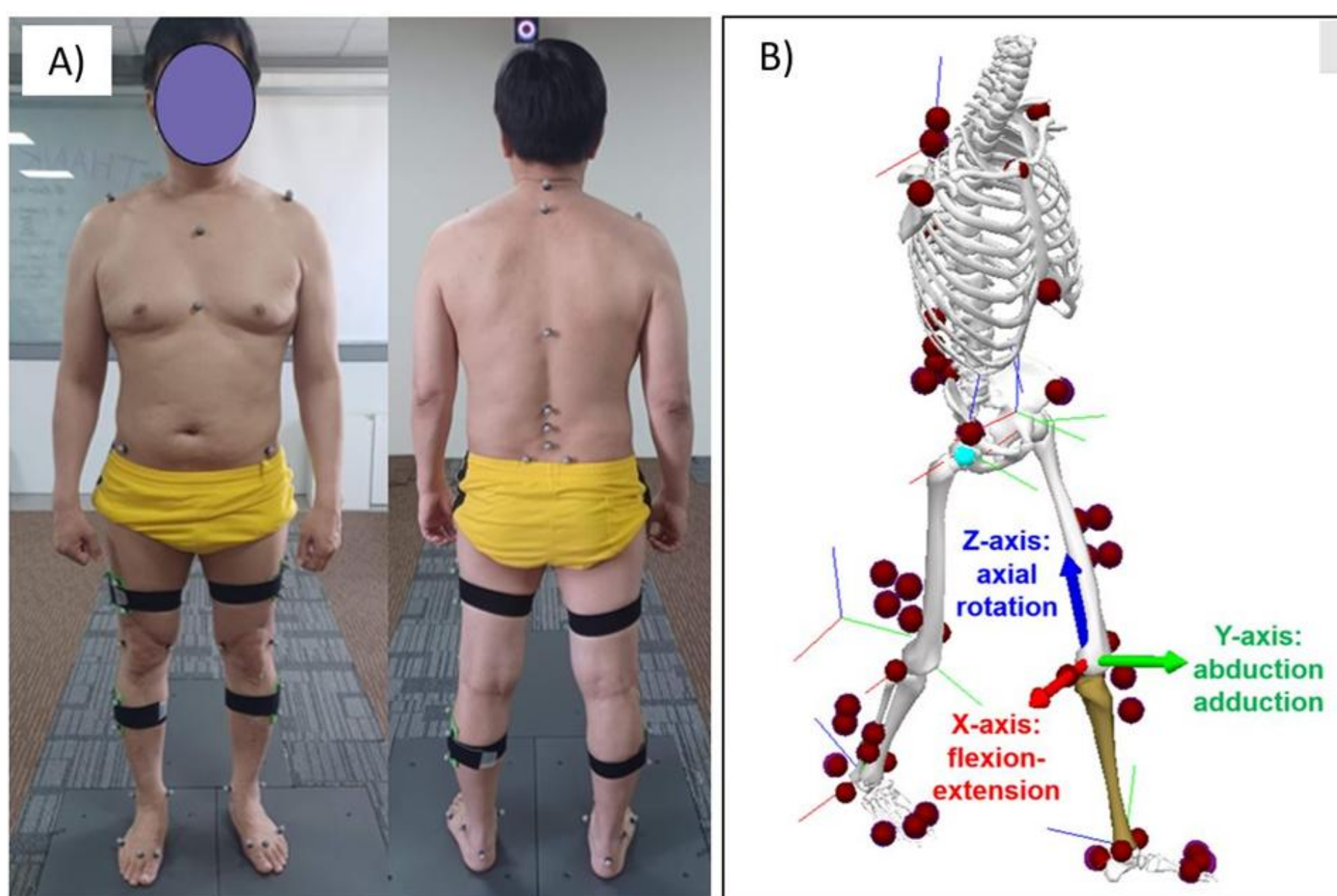
INTRODUCTION & AIM

Posterior fixation is usually performed to restore spinal stability and decompress the spinal canal for unstable thoracolumbar burst fractures. To fully understand the effect of posterior fixation on the gait patterns, both the lower extremity and the trunk joint movement patterns should be assessed by gait analysis.

The purpose of this study was to compare trunk and lower extremity kinematics during gait between healthy adults and patients who underwent posterior fixation surgery after thoracolumbar fractures.

METHOD

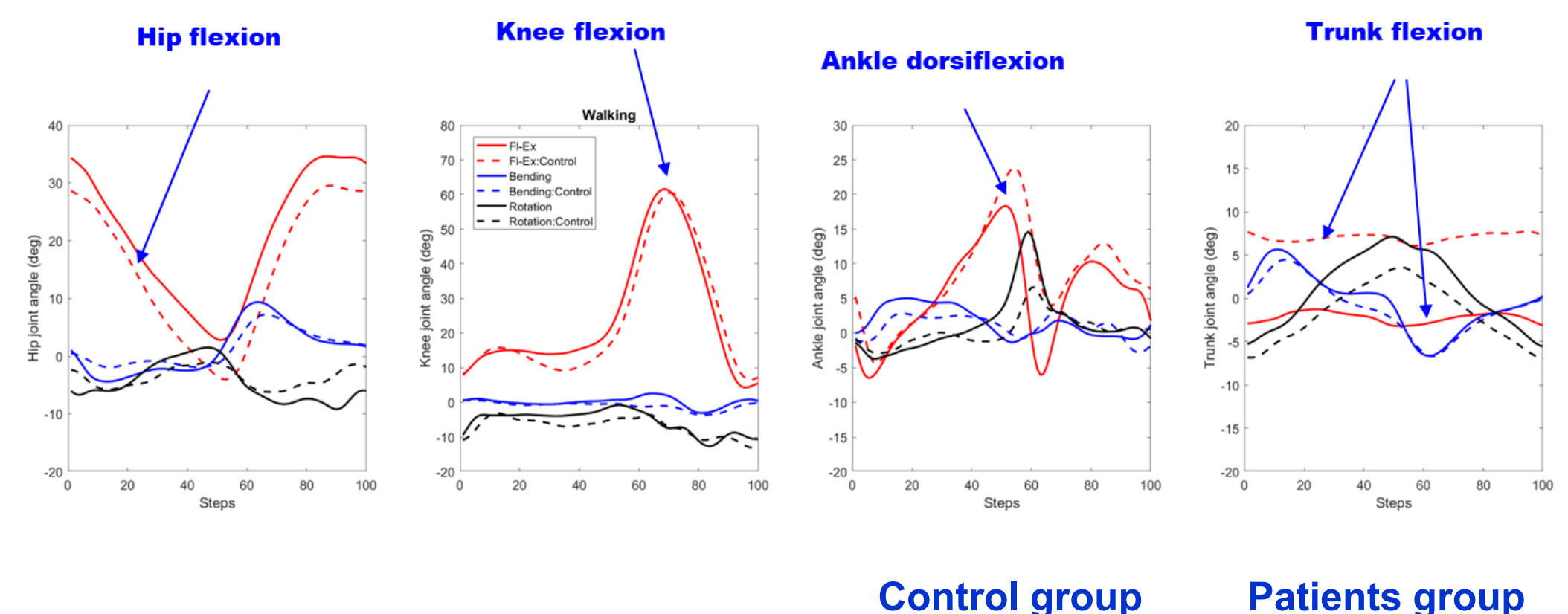
- We recruited 9 male patients who had posterior fixation after traumatic thoracolumbar burst fracture.
- The gait analysis was performed at 18.1 ± 2.5 months after surgery. The Optitrack motion capture system with 10 cameras, and 43 reflective markers were used to record the trunk and lower extremity movements during gait.



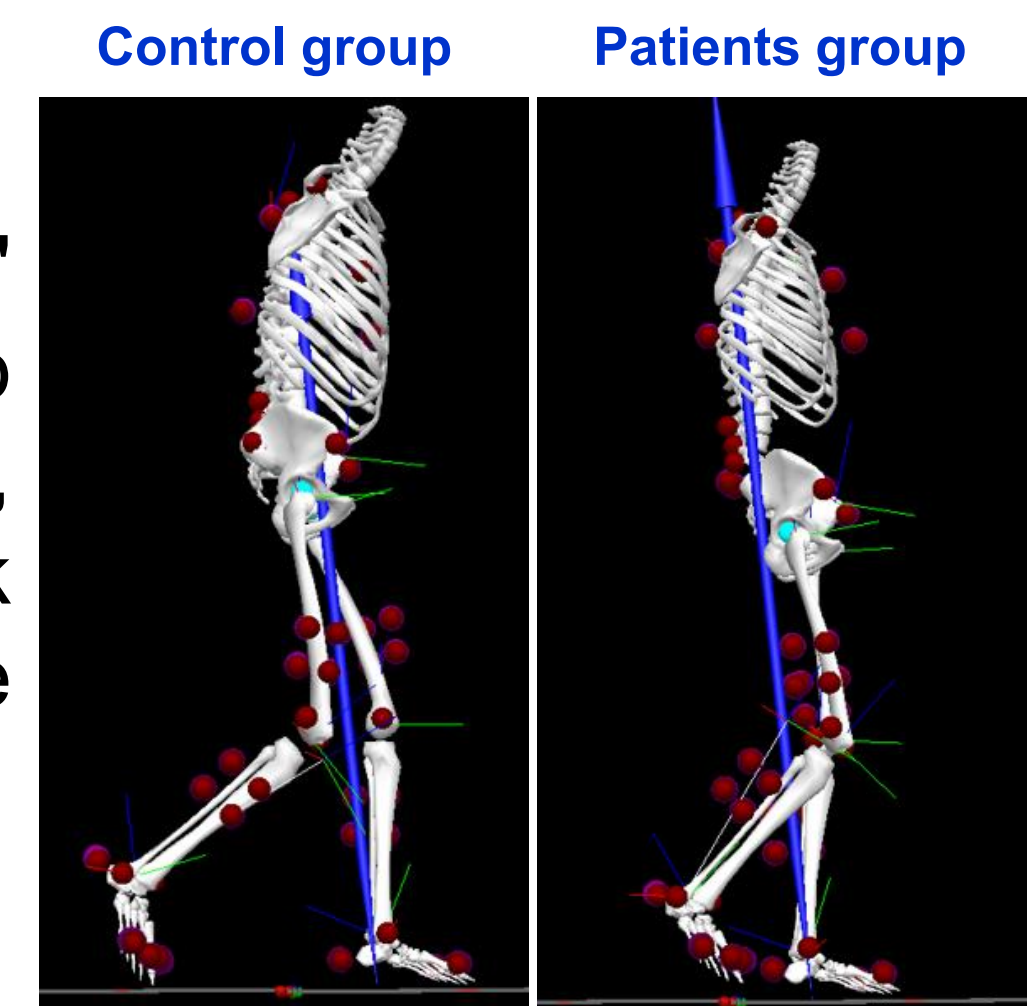
- The trunk, hip, knee, and ankle joint angles in sagittal (SP), frontal (FP), and transverse plane (TP) were compared between patients and control groups. Total excursion motion was estimated. A statistical difference between the two groups was determined using an independent T-test.

RESULTS & DISCUSSION

The patients' group had significantly reduced hip extension, with mean differences of 7.0° in hip extension and 4.2° in total excursion. At the ankle joint, dorsiflexion was significantly reduced with increased plantarflexion, and internal rotation was also increased in the patients' group. Reductions were more prominent in dorsiflexion (6.4°) than plantarflexion (5.3°). However, there were no differences in knee joint kinematics.



Generally, the patients' group exhibited higher hip flexion, ankle plantarflexion, and a more extended trunk during walking than the control group.



CONCLUSION

Our results showed differences in trunk and lower extremity kinematics between patients with posterior fixation and healthy people. Patients who underwent surgery tended to have a more upright trunk posture than healthy people. This study provides fundamentals of the joint kinematics of the trunk and lower extremities after a posterior surgical operation for a thoracolumbar fracture, which may help evaluate the surgical outcomes and plan further reconstruction surgery if needed.