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Insole pressure measurement to assess weight shift and task effect in AK amputee gait – Case report

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BACKGROUND

During above-knee (AK) amputee gait training, proper weight shifting to affected limb is an essential requirement for independent gait. However, amputee, therapist, and physiatrist frequently have difficulties in evaluation how well it is performed and what task is appropriate for current status of the patient. Although 3D gait analysis is gold standard, it has limitations in various tasks and environments. Therefore, we used insole pressure meter to assess weight shift with task effect. A 67-year-old man presented to our medical center after traffic accident and diagnosed right femur fracture. He had recurrent osteomyelitis and got operation; AK amputation in right femur. On postoperative day 30 (POD 30), he was transferred to rehabilitation medicine department for gait training. He did not have definite motor weakness in hip muscles. He had prosthesis with ischial containment socket, fluid vortex intelligent control knee and dynamic foot (Figure 1). On POD 37, insole pressure measurement was conducted. He walked with a crutch with 3-point partial weight bearing mode and 4-point mode. He was more familiar to modified 3-point mode than 4-point mode. Maximum load on prosthetic foot was 2.3 N/cm2 in 3-point mode and 4.8 N/cm2 in 4-point mode (Figure 2). On POD 72, test was repeated with a cane. He walked with holding the cane on the ipsilateral side as his injury and on the contralateral side. He was more familiar to holding the cane on the contralateral side of amputation. Maximum load on prosthetic foot was 6.1 N/cm2 in contralateral mode and 9.7 N/cm2 in ipsilateral mode (Figure 3).

Conclusion

Insole pressure measurement system can provide information for weight shifting in AK amputee gait. 4-point mode is more relevant for increasing weight shift than modified 3-point mode. Ipsilateral cane mode is more relevant for increasing weight shift than contralateral cane mode.

Figure 1. An X-ray of this patient: above knee amputation with prosthetic leg

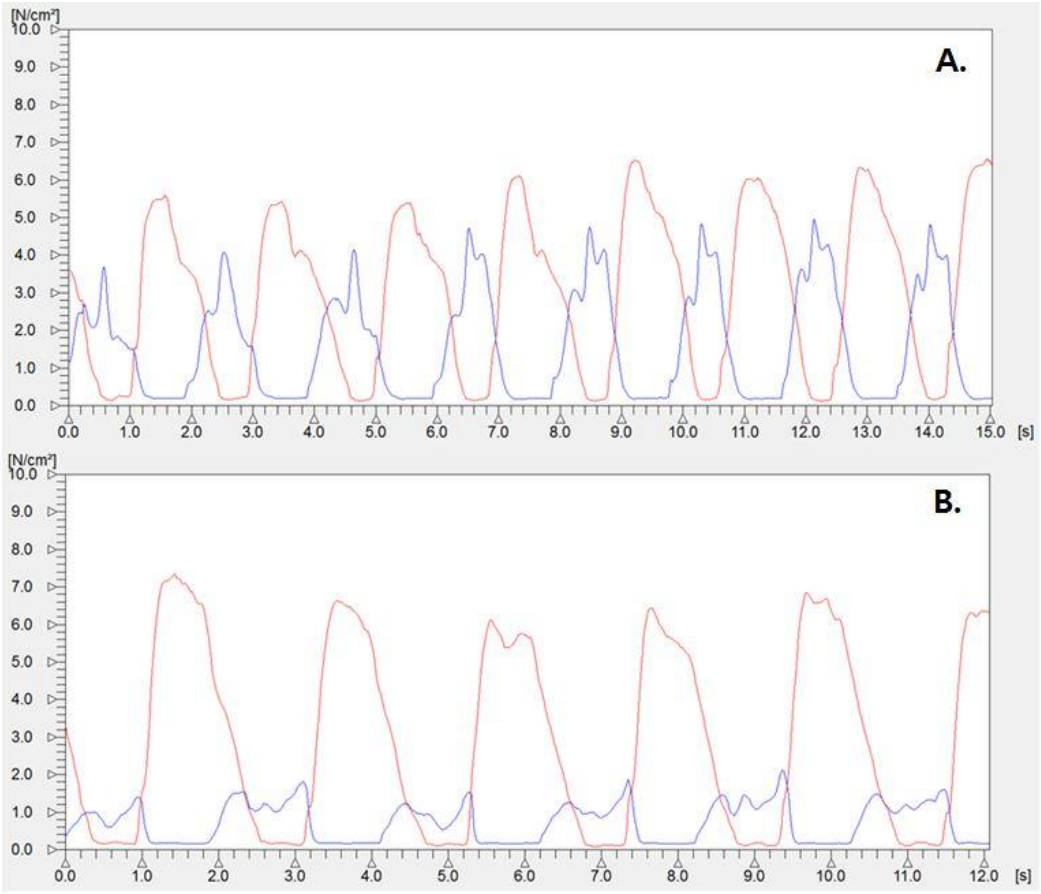

Figure2. Insole pressure measurement, A. 4-point mode, B. 3-point mode (red: left, blue: right)

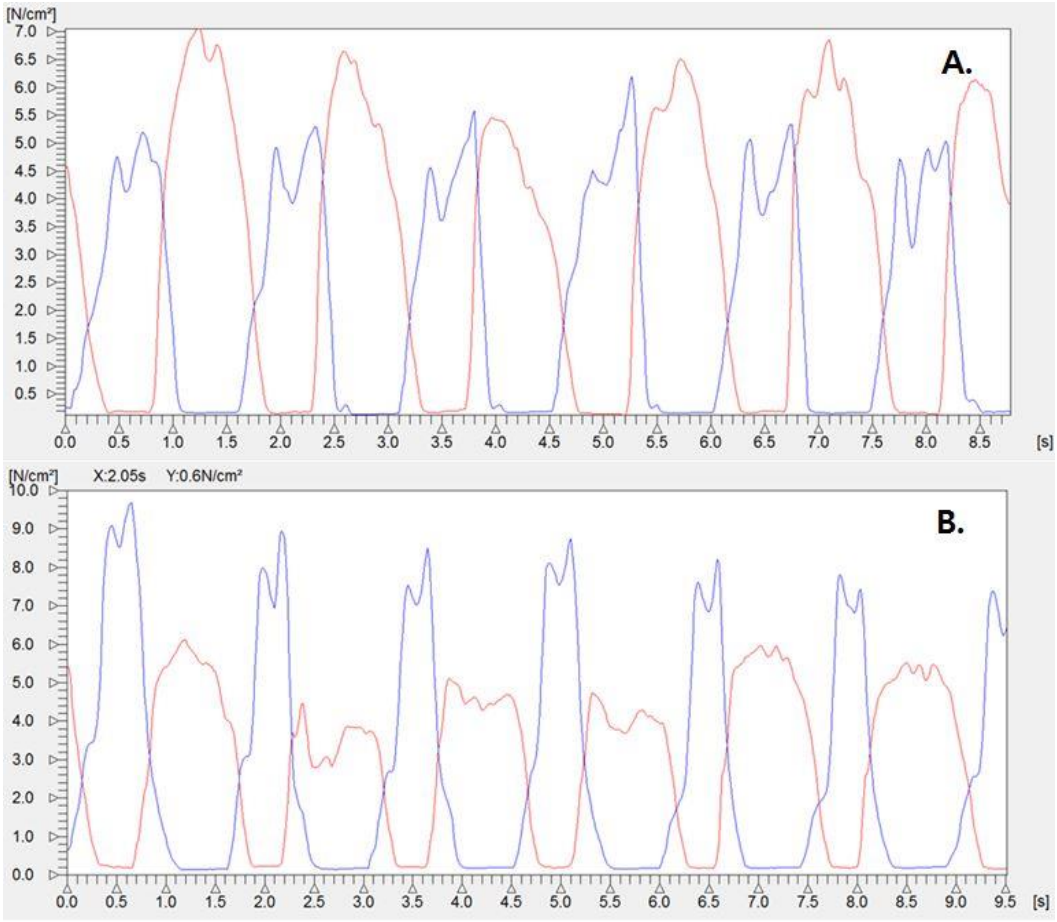

Figure3. Insole pressure measurement, A. Cane on the contralateral side, B. ipsilateral side (red: left, blue: right)