Case report

DISTAL FEMORAL FRACTURE DURING LOWER LIMB DRESSING TRAINING IN A PARAPLEGIC PATIENT: A CASE REPORT

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Abstract Distal femoral fracture could occur during lower limb dressing training in a paraplegic patient. We report a 64-year-old man presenting with a fracture T10-T11 and complete T8 paraplegia after a fall. After posterior spinal fusion was carried out, a Jewett brace was applied to help stabilize the spine and then the patient was transferred to a rehabilitation ward for intensive rehabilitation. During lower limb dressing training, there was a sudden fracture of his right thigh. Plain films revealed a spiral fracture at the distal one third of the right femur. After surgical treatment with a plate and screws, the fracture was healed without any complications. By presenting a paraplegic patient with femoral fracture during lower limb dressing training, we here present a dressing training guideline to prevent such a complication. Chiang Mai Medical J 2007;46(3):115-118.

Keywords: femoral fracture, dressing training, paraplegia, spinal cord injury

Dressing training is one of the major self-care activities for spinal cord injury (SCI) patients. We hereby present a paraplegic patient with femoral fracture during lower limb dressing training at a rehabilitation ward. The fracture was caused by low energy, with rotational force, while sitting in a cross-legged position. We suggest that to prevent such a complication, risk factors of a fracture, osteoporosis and limited range of motions of the lower limb should be screened. Then, occupational therapists can follow our proposed dressing training guideline and select a suitable dressing method for each patient.

Case report

A 64-year-old man with chronic renal insufficiency had a fracture T10-T11 and complete T8 paraplegia after a fall. He underwent posterior spinal fusion. A Jewett brace was applied to help stabilize the spine. One month later he was transferred to a rehabilitation ward for intensive rehabilitation. During lower limb dressing training on a mat, he sat
with extended legs, while an occupational therapist supported his back. As his wife was pushing his right leg to bend the knee into a cross-legged position, there was a sudden cracking sound from the right thigh. Plain films of the right thigh and both hips showed a spiral fracture at the distal one third of the right femur with osteopenia (Fig. 1) and osteoarthritic change of both hips. The fracture was treated with a plate and screws. Later the fracture healed without any complications.

**Discussion**

Extremity fractures are common in patients with SCI and usually occur in chronic cases with osteoporosis, a risk factor of fracture. In this case, osteoporosis may be due to underlying senility and chronic renal disease.\(^{(1)}\) However, femoral fracture during lower extremity dressing training has never been reported.

Sitting in a cross-legged position during lower limb dressing training is usually a starting position for paraplegics. Such a position might produce a rotational force causing spiral fracture.\(^{(2)}\) Besides osteoporosis, this patient also had a limited range of motions (ROMs) of the right (R) and left (L) lower extremity as follows (SFTR system): hip Sp: R 0-0-90, L 0-0-100; hip Fp: R 15-0-0, L 20-0-0; hip Rp: R 20-0-10, L 25-0-20; knee Sp: R 0-10-90, L 0-0-90.

After this incident, we analyzed the case and proposed a guideline for lower limb dressing training to prevent fracture that might occur in the lower limb of SCI patients. Figure 2 presents a guideline that includes checking balance in a sitting position, measuring ROMs of the hip, knee and thoracolumbar joints, and then categorizing patients into 4 subgroups. If ROMs are limited, then stretching is performed until they are adequate. Then, occupational therapists follow the dressing training guideline.\(^{(3,4)}\)

Method A is appropriate for paraplegics with good balance when sitting and adequate for lower limb ROMs: hip flexion > 110 degrees, hip external rotation ≥ 35 degrees, hip abduction ≥ 25 degrees and knee flexion ≥ 115 degrees.\(^{(5,6)}\) Dressing training is performed in a sitting position. A patient dresses the most difficult or heaviest leg first followed by the other one, pulls up a garment as high as possible above both knees, and then rolls the body from side to side to pull it over the hip.\(^{(1)}\)

Method B is performed in a long-sitting position. It is suitable for those with knee and hip rotational ROM limitations, but full thoracolumbar (TL) flexion and/or hip flexion ROM.\(^{(3)}\) Method C is performed in a lying
position with the hip and knee bent. This technique is suitable for those with poor balance when sitting, but no hip and knee ROM limitations. Finally, method D is appropriate for paraplegics with hip ROM limitations with or without knee ROM limitations. These patients need a dressing stick as a substitute for forward flexion.

This guideline was tested against existing practice and has appeared to work well, in which time, there has been no incidence of lower limb fracture occurring during lower limb dressing training in our rehabilitation ward.

**Conclusion**

During post-acute rehabilitation or chronic phase, rehabilitation personnel should be aware of the risk factors of lower limb fracture in SCI such as osteoporosis and lower limb and back ROM limitation. According to our proposed guideline, thorough ROM examination should be carried out prior to lower limb dressing training. Whenever limitation of ROMs is detected, stretching to gain acceptable ROMs should be performed, then an appropriate method of dressing training should be chosen.
บรรดูคุณข่ายของผู้ป่วยอัมพาตท่อนล่างที่กระรอกจากการฝึกใส่กางเกง:
รายงานผู้ป่วย 1 ราย

สยามทองประเสริฐ, น.บ., อภิชนาโฆวินทะ, น.บ., เตือนใจอัฐวงศ์, ว.บ.
ภาควิชาเวชศาสตร์ฟื้นฟู คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่

บทคัดย่อ การฝึกใส่กางเกงของผู้ป่วยอัมพาตท่อนล่างอาจเป็นสาเหตุให้กระดูกต้นขาหักได้ ผู้เขียนได้รายงานผู้ป่วยชายไทยอายุ 64 ปีที่มีประวัติได้รับอุบัติเหตุกระดูกสันหลังหักระดับ T10-T11 และอัมพาตท่อนล่างตั้งแต่ระดับ T8 หลังจากได้รับการผ่าตัดเชื่อมกระดูกสันหลังและใส่กายอุปกรณ์เสริมแล้ว ผู้ป่วยได้ฝึกการใส่กางเกงให้กระดูกต้นขา ในระหว่างการฝึกใส่กางเกงเกิดการหักของกระดูกต้นขาขวา ผู้ป่วยได้รับการผ่าตัดข้อศอก 1 ข้อเพื่อมีการกระตุ้น ในรายงานผู้ป่วยนี้ผู้เขียนได้เสนอแนวทางการฝึกใส่กางเกงในผู้ป่วยอัมพาตท่อนล่างเพื่อป้องกันการเกิดกระดูกต้นขาหัก เชียงใหม่เวชสาร 2550;46(3):115-118.

คำสำคัญ: กระดูกต้นขาหัก การฝึกใส่กางเกง อัมพาตท่อนล่าง ใส่กางเกง