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Case report

A case of excessive femoral anteversion which caused instability of the medial collateral ligament of the knee joint

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ABSTRACT

Introduction: The most cases of excessive femoral anteversion may be asymptomatic, because the he hip joint is a ball joint. However, when the hip, knee, or ankle joint is in a pathological state, excessive femoral anteversion may not be compensated for and induce symptoms.

Case report: A 16-year-old female with achondroplasia. Medullary compression by the odontoid process caused right hemiplegia at 10 months after birth and equinus foot concomitantly developed. At 14 years old, right knee pain developed during walking. For treatment, firstly, tenodesis of medial collateral ligament of the knee joint (MCL) was performed. Oblique osteotomy was applied to the proximal MCL attachment site over the distal tibial tuberosity, followed by simple limb lengthening, which improved knee instability. To prevent recurrence of knee instability, varus and derotationosteotomy of the femur and Vulpius procedure (triceps surae muscle lengthening) were additionally performed, and gait stabilized after surgery.

Discussion: Regarding the pathogenesis, her gait was originally in-toeing because of excessive femoral anteversion, but the lower leg did not internally rotate during walking because of equinus foot, and the foot grounded in an externally rotated position, loading burdens on the MCL. This condition may have gradually caused instability of the knee over the years.

Conclusion: We surgically treated the patient with knee joint valgus instability caused by excessive femoral anteversion and equinus foot and achieved a favorable outcome.

1. Introduction

This work has been reported in line with the SCARE criteria [1].

The conditions indicated for rotation osteotomy to treat excessive femoral anteversion set by Staheli are: 8 years old or older, severe esthetic dysfunction, anteversion exceeding 50°, and 85° or more internal rotation with 10° or less external rotation [2]. Since fewer patients are actually surgically treated, most cases of excessive femoral anteversion may be asymptomatic.

Paley developed various osteotomy procedures for treatment of instability of the collateral ligament of the knee joint and one of these is osteotomy of the proximal MCL attachment site over the distal tibial tuberosity followed by simple limb lengthening for treatment of MCL instability and specified cases with leg length discrepancy and bilateral cases as favorable indications [3]. Since our patient originally had a short stature and varus knee on the opposite side, we simultaneously performed deformity correction and limb lengthening of the opposite side.

We report a patient with excessive femoral anteversion which caused MCL instability.

2. Case report

A 16-year-old female with achondroplasia. Medullary compression by the odontoid process caused right hemiplegia at 10 months after birth and equinus foot concomitantly developed. At 14 years old, right knee pain developed during walking and she visited our department.

3. Physical examination

The height was 118.2 cm (−7.5SD), and the body weight was 32.3 kg (−2.4SD).

The right lower limb muscle strength was low on the muscle manual test as follows: iliopsoas, 4; quadariceps, 4; major gluteus, 4; middle gluteus, 2; tibialis anterior, 2; extensor and flexor hallucis longus, 0; and gastrocnemius, 2. No muscle weakness was noted in the left lower limb.

The ranges of motion of the right/left hip joints were: flexion, 120°/120°; extension, −40°/-20°; abduction, 30°/30°; internal rotation, 80°/30° (Fig. 1a); and external rotation, 10°/25°. In the sitting position, the

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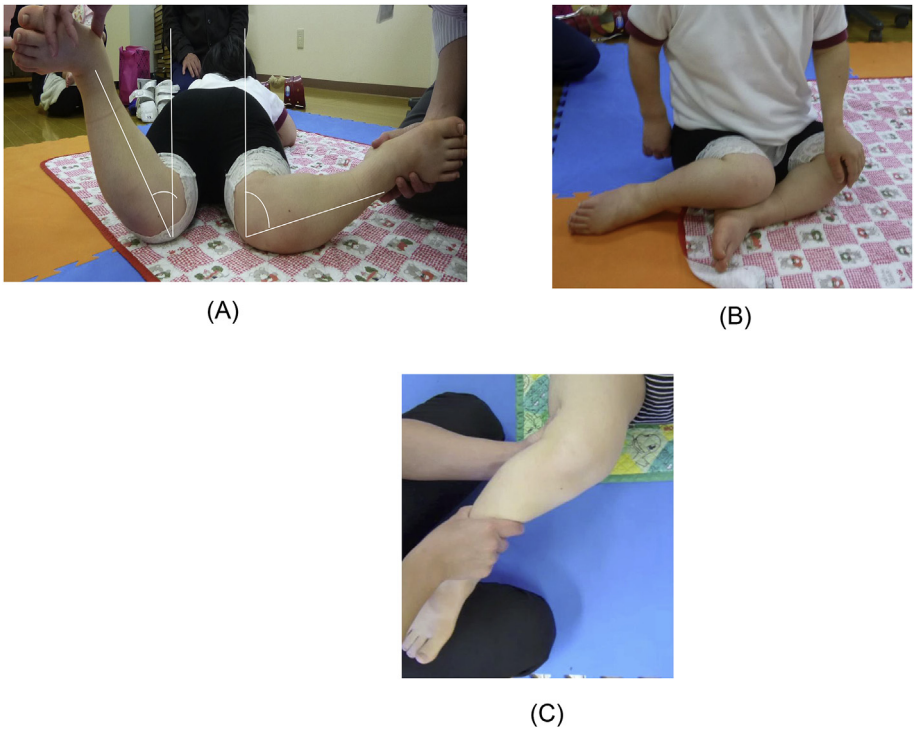

Fig. 1. a: Internal rotations of the right and left hip joints were 80 and 30°, respectively. **b**: In the sitting position, the right and left hip joints were internally and externally rotated, respectively. **c**: Marked instability of the right knee was noted in the presence of valgus stress.

right and left hip joints were internally and externally rotated, respectively (Fig. 1b). No problem was noted in the range of motion of the knee joint, but marked right knee instability was observed in the presence of valgus stress (Fig. 1c). Dorsiflexion knee extensions of the right and left ankle joints were −20° and 10°, respectively, and dorsiflexion knee flexions were −10° and 20°, respectively, showing right equinus foot.

Regarding gait, the entire lower limb was rotated externally to acquire better clearance of the equinus foot in the swing phase (Fig. 2a). To complement weak hip joint flexor muscle strength, sartorius muscle strength was utilized, which may have caused external rotation of the entire lower limb. On one-leg standing in the stance phase of walking, the foot and crus were fixed in an externally rotated position on the ground, but the proximal region above the knee joint showed knee-in gait (Fig. 2b). The patient complained of knee joint pain during walking.

4. Images

On frontal radiography in the long standing position, the mechanical axis deviations (MAD) were 19 mm toward the lateral side and 27 mm toward the medial side on the right and left legs, respectively. The mechanical lateral distal femoral angles (mLDFA) were 83 and 95°on the right and left legs, respectively, the medial proximal tibial angles

Fig. 2. a: The entire lower limb was externally rotated to improve clearance disturbed by the presence of equinus foot in the swing phase. **b**: On one-leg standing in the stance phase, the foot and crus were fixed in an externally rotated position on the ground, but the proximal region above the knee joint showed knee-in gait.