

Reversible Femoral Distraction-Induced Sciatic Neuropraxia in an Achondroplasia Patient

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Abstract

Limb lengthening for short stature has become a standardized procedure with a good prognosis. External fixation is commonly used for those procedures. Gradual bone lengthening at a rate of 0.25 millimeter four times daily is commonly performed. Irreversible nerve traction injury was associated with acute limb lengthening rather than gradual distraction of bones. This reported case was unusual. The patient developed sciatic nerve stretch injury during the phase of gradual femoral distraction. Compression of the distraction site made the injury reversible.

Key words: Achondroplasia, sciatic-neuropraxia

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Introduction

Limb lengthening in dwarfism has become a standardized procedure with a good prognosis. It is used to correct limb length discrepancy, deformities and to increase stature. In most cases external fixation is used. Gradual distraction at a rate of 0.25 mm four times daily was the accepted physiological pattern for

lengthening of a tubular bone ^{1, 2}. Irreversible nerve traction injury was associated with acute limb lengthening rather than gradual distraction of bones ¹⁻⁵. Gradual bone lengthening is safer for nerves than acute bone lengthening because of its safety margin ^{1, 3, 6, 7}. This case was unusual. The patient developed sciatic nerve stretch injury during the phase of gradual femoral distraction.

Case Report

A 25 year- old achondroplasia female patient underwent staged lower limbs lengthening procedures using Ilizarov frame (circular fixator). Her initial height was hundred and six centimeters. The first stage was bilateral leg lengthening in 2002. This added 6 cm length to both legs. The procedure went smooth and the fixators were removed after six months.

On March 2006, she had had the second stage bilateral femoral lengthening by the same technique (Ilizarov frame). The proximal femoral arches were fixed with six millimeter half pins introduced from the anterolateral aspect of the thigh. Wires were not used in the proximal arches. The distal rings were fixed with single 1.8 millimeter tensioned wire passed from lateral to medial and four 6 millimeter half pins. The half pins were introduced from the anterolateral aspect of the distal thigh. The corticotomies were performed at the proximal femur. The first postoperative week was unremarkable and the patient didn't complain of unusual pain. Distraction started on the 6th day postoperative. On the 5th week of bilateral femoral distraction, she complained of mild low back pain radiating to the posterior aspect of both lower limbs including both feet. Straight leg raising (SLR) test was painful at 70 degrees. There was no neurological deficit at the lower limbs. On the 6th week of distraction the pain was severe and was not responding to non steroidal anti-inflammatory drugs (diclofenac 50 mg twice daily). Radiological evaluation of the lumbosacral spine and pelvis were unremarkable. Both femora showed a gap of 40mm with early callus formation which were matching with the rate of femoral distraction. Pin site were dry and clean. She was commenced on gabapentin 300 mg twice daily following pain control consultation. On day 45 of distraction, the pain was intolerable and femoral distraction was stopped. MRI of the lumbosacral spine was unremarkable. Clinical evaluation revealed bilateral hypoesthesia at L5S1, distribution and SLR

test was less than 30°. Electrophysiological tests to evaluate the tibial and the common peroneal nerves showed normal motor conduction velocities. One week later, pain was less in severity and distraction was resumed. Within two days of distraction, the pain was severe and a decision was made to compress the lengthening site. Five days following compression at the rate of 0.25mm four times daily, she had considerable pain control and she was able to perform 70° of SLR with no pain. At that stage, compression and gabapentin were stopped and she was kept without distraction for seven days. Distraction was resumed on day 67 and the pain appeared on 3rd day of distraction. This was an indication that sciatic nerve stretching was induced by femoral distraction. Recompression for three days revealed complete recovery of her pain. At that stage it was decided to stop distraction and plan removal of the fixators at consolidation. She remained asymptomatic after the removal of the fixator and for the remaining two years.

Discussion

In this case, sciatic nerve neuropraxia which was induced by femoral distraction has made the chances for femoral lengthening for both femora impossible.

Limb lengthening, particularly lower limbs lengthening has become a common procedure for short stature patients like achondroplasia cases. It has positive effect on the concerned patients, their families and the community. It was demonstrated clearly by Ilizarov and others that limb distraction at the rate of 0.25mm four times daily permits physiological lengthening effect on bones and soft tissues, particularly the neurovascular structures. Distraction at a faster rate could result in poor callus formation, deformities and joints contractures. In the reported patient, the rate of distraction was performed by experienced nurses. It seems that the sciatic nerves were subjected to tensile forces that lead to traction on the nerves rather than lengthening. This was reversed by compression at lengthening site.

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