# Stress fracture in club foot

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## Abstract

Stress fracture is rare in children. It is mostly described in adolescent involved in sports, athletics or dancing. Stress fracture in club foot is extremely rare; it might be due to the altered anatomy and may be a source of pain. We present a 6 year old girl with bilateral relapsed club feet with stress fracture of the proximal third of the fourth metatarsal on the left side. Correction of the deformity, cast immobilization and non-weight bearing led to the union of the fracture. Early correction of the deformity is justified to prevent recurrence of fractures.

**Key words:** Stress fracture, Children, Club foot, Relapse, Deformity

**Key message:** In children with relapsed or recurrent club foot, pain over the foot on walking and activity should be evaluated for possibility of a stress fracture. An early correction of the deformity is required to treat stress fractures.

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## Introduction

Stress fractures are extremely rare in the first decade of life in children. Most of the cases reported in children are in adolescents involved in sports, athletics and dancing. Most common site of stress fractures in children are the tibia and fibula. Involvement of metatarsals is less common and is mostly described in metatarsal adductus, osteoporosis and neuropathic foot. Fourth metatarsal in a rare site for stress fracture. Stress fracture in relapsed Congenital Talipes Eqino Varus (CTEV) is even rarer. We report a case of stress fracture in a 6 year old girl with bilateral relapsed clubfoot.

## Case Report

Six year old girl was brought to us with pain in the left foot since 2 months. She was treated for bilateral congenital talipes equino varus at birth with serial manipulation and casting, starting from the first month of life. After manipulations, tendoachilles tenotomy was done and the deformity was fully corrected. Her correction was maintained with foot abduction orthosis. Her feet remained fully corrected till 1.5 years, following that she was lost to follow-up. She presented at 6 year of age with a relapsed deformity of both feet (left more than right). Dull aching pain in the left foot started insidiously and increased more on walking, running and playing at school. No histories of any trauma or physical exertion were noted. The deformity progressed after the age of 2 years. Bilateral deformity of hind foot varus and equinus, forefoot adduction and cavus were noted on clinical examination. Left side deformities were not passively correctable. There was callosity over the later border of both feet. There was no tenderness anywhere in the left foot. Her Body Mass Index (BMI) was 17 kg/m2 (normal for her age). Neuro vascular examination was normal. Radiographs of both feet showed a fracture of the proximal third of the fourth metatarsal of the left foot (Fig. 1). The appearance was characteristic of a stress fracture.

She was treated with postero-medial soft tissue release on left side with tibialis anterior tendon central transfer on the right side. She was immobilized in an above knee cast for 8 weeks. The correction of the deformity was maintained with ankle foot orthosis. Radiographs at 2 months showed union of the fourth metatarsal stress fracture (Fig. 2). The girl returned to her normal activities after 3 months following surgery.


**Fig. 1: AP (a) and lateral (b) radiographs of feet showing a complete transverse fracture at the proximal third of fourth metatarsal of left foot**

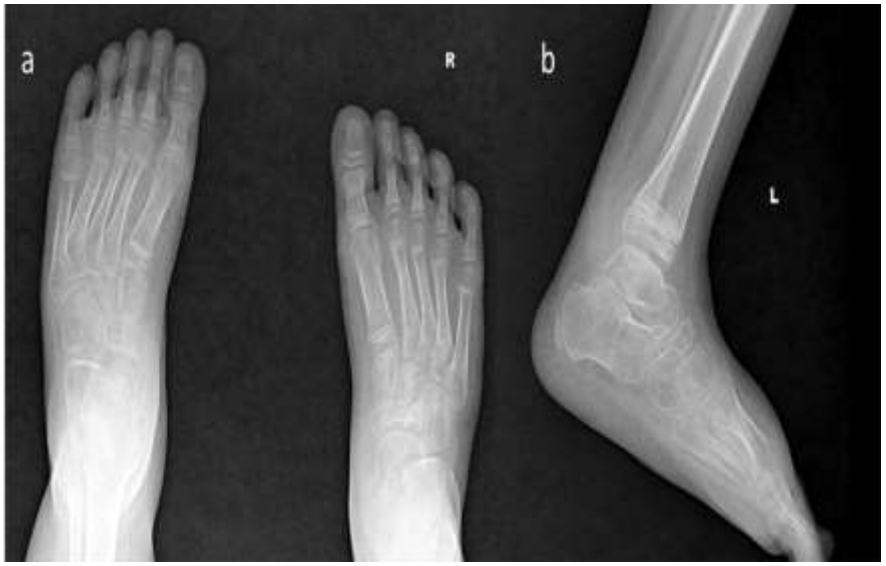


**Fig. 2: AP (a) and lateral (b) radiographs of feet taken two months post-surgery showing healed fracture at the proximal third of fourth metatarsal of left foot**

## Discussion

Stress fractures are extremely rare in the first decade of life in children. Most of the cases reported in children are in adolescents involved in sports, athletics and dancing. Stress fractures can be either a fatigue fracture or an insufficiency fracture[1]. Fatigue fracture results from excessive repetitive strain causing micro fractures to a bone with normal structure. Insufficiency fractures are result of normal stress to an abnormal or weak bone. Most of the stress fractures seen in adults, especially athletes are fatigue fractures[1]. Weakened bone structures due to metabolic bone disease or osteoporosis are prone for insufficiency fractures. The pathogenesis of stress fractures is multifactorial. It can be related to training, footwear, gender, race fitness level, Bone Mineral Density (BMD), bone geometry, hormonal and nutritional status and anatomical variations to the limb like, limb length discrepancy, genu valgum, genu varum and increased Q angle[1]. Congenital anomalies of foot like metatarsal adductus and rigid pes planus have been reported as cause for stress fractures of tarsal bones and metatarsals[2,3].

Stress fractures in children can mimic infection and malignancy[4]. Most common sites of stress fractures in skeletally immature patients are the tibia and fibula. In the foot second and third metatarsals are the common sites. Stress fractures of fourth metatarsal is uncommon[2,4,5,6,7]. Only very few cases of proximal fourth metatarsal fracture has been reported to date. They are associated with altered anatomy or a weakened bone like in osteopenia, osteoporosis and neuropathic foot.

Even though Stress fracture of the foot due to underlying uncorrected deformity in adults and adolescents are reported[8], only one similar case with

stress fracture in relapsed or residual clubfoot in a child has been reported[9]. Our case showed similar deformities and fracture pattern with the earlier reported case. BMI of earlier reported case was on the higher side (22.3 kg/m2) but it was normal in our child (17 kg/m2).

Stress fractures in the lateral rays of the foot can be explained by the altered biomechanics of the foot with undue mechanical overload over the lateral rays. Residual varus, cavovarus, metatarsal adductus deformities are common deformities. The excessive stresses along with the rigid anatomy of the fourth metatarsal combine to play a role in these stress fractures. Pain in recurrent/ relapsed club foot may be attributed to the severe deformity, footwear problems, and callosities. Stress fractures should be ruled out by radiographic examination if pain is not subsiding with rest and conservative management. Stress fractures if detected in children can be managed conservatively with cast and non-weight bearing but operative treatment has been reported for failure of conservative treatment, severe deformity, and unstable fractures.

The deformity which has led to the stress fracture has to be corrected for fracture healing and prevention of recurrence. We believe in early correction of relapse/ recurrence of club foot to prevent such complications.

**Competing interests**: None

**Conflicts of interest**: All the authors declare that there are no conflicts of interest.

**Patient Consent**: Obtained

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