Bilateral traumatic distal femoral physeal slips: A very rare case presentation

Anil Mehtani, Jatin Prakash, Suresh Chand, Abhinav Sinha, Ajeet Singh, Harvinder Dev

ABSTRACT

Introduction: Salter–Harris type 1 injuries of distal femur are very rare accounting for a mere 7.7% of all distal femoral injuries. No report of bilateral slips in otherwise normal child has been ever reported.

Case Report: We herein present a case of a six-year-old boy with one month old trauma that caused bilateral distal femoral physeal slips. Patient was managed conservatively to avoid any further physeal damage. The slips healed completely with excellent range of motion. Due to late presentation, the fracture was already in stage of healing and was not frankly mobile and therefore open reduction or closed manipulation of physis was not possible without causing additional injury to growth plate. Therefore, slips were managed conservatively.

Conclusion: This case presents a number of unique features. Salter–Harris type 1 injury is uncommon in the age group presented in our case. Secondly, bilateral distal femoral slips in otherwise normal child have never been reported. Thirdly, it further shows that remodeling of slips presenting late is possible if the physeal damage is prevented and open reduction in late presenting slips is not required.
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ABSTRACT

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Keywords: Paediatric, Trauma, Distal femur, Physeal

INTRODUCTION

The distal femoral epiphysis is the largest and fastest growing epiphysis in the body. There is no inherent protection to the physis with all muscles and ligaments inserting directly to the epiphysis. Distal femoral injuries account for 7% of all pediatric trauma [1]. Distal femoral physeal injuries are even more rarer accounting for 1–6% of all physeal injuries and less than 1% of all fractures. Among these most common is Salter–Harris type 2 injuries. Salter–Harris type 1 injuries of distal femur are very rare accounting for a mere 7.7% of all distal femoral injuries [2, 3]. Also these injuries are common in newborns or adolescents [3]. Direct trauma to distal femur is uncommon mode of injury but may occur in road traffic accident or with falls. Such injuries are mostly seen in adolescents. In newborns, it is mostly due to birth trauma secondary to breech injury. Indirect injuries are most common mode of injury, mostly varus or valgus strains resulting in simultaneous compression of one side with distraction of other cause physeal separation. Most typically these are Salter–Harris type 2 with separation beginning in tension side and exiting from metaphysis of compression side. In most cases patients present with history of trauma with inability to bear weight on
affected extremity. The knee is typically in flexion owing
to hamstring spasm. Mostly the epiphyseal displacement
is in the coronal plain producing a varus or valgus
deformity. This is confirmed by a plain radiograph and
treatment consists of closed manipulation followed by a
long leg cast till fracture healing. In fractures which fail to
reduce or with unstable reductions may be taken up for
open reduction with 4.0 or 6.5 mm screws.

A bilateral distal femoral Salter–Harris type 1 injury
has never been reported in literature. Multiple slips have
been reported in metabolic disorders like scurvy, [4]
or conditions causing generalized bone weakening like
leukemia or myelodysplasia. However, we herein present
one case of a six-year-old year male child with bilateral
traumatic distal femoral slips with normal metabolic
parameters.

**CASE REPORT**

We herein present a case of a six-year-old boy,
presented to us with mild knee and thigh swelling of left
side and inability to walk for one month. Child’s parents
gave history of fall from height of about 4–5 meter, 1
month back, following which patient was unable to stand
and complained of pain in bilateral knee. There was
history of massage and visits to professional bone setter.
No history of any medical intervention was elicited. No
history of bracing or plaster cast immobilization was
given.

On examination, tenderness was present in bilateral
thigh. Patient was bed ridden for one month. No abnormal
mobility or crepitation was seen. There was swelling
in bilateral distal thigh, left more than right. Range of
motion at hip was normal. There were bilateral flexion
deformity of about 20 degrees with further movement
painful and attempt of any movement caused muscle
spasm (Figure 1).

Radiographs of bilateral knees were taken (Figure 2).
These demonstrated bilateral Salter–Harris type 1 physeal
injuries. Routine laboratory investigations were essentially
normal except for anaemia (hemoglobin 9.8) and mildly
raise alkaline phosphatase (ALP-564). Calcium profile was
normal, so were serum vitamin C levels (0.84 mg/dL).

Since patient came to us after one month of injury,
fracture was already in the stage of healing and was
not mobile. Therefore, closed manipulation could
not re-align the physis. Open reduction could further
damage the physis in the growing child. So the child
was managed conservatively on long leg cast and non-
steroidal anti-inflammatory drugs (ibuprofen 100 mg
b.d.) for two weeks. After pain decreased, patient was
given intermittent skin traction for flexion deformity with
range of motion exercises. Both slips healed within four
months. Even these completely displaced slips remodeled
very well. At six month of follow-up, all the slips were
completely remodeled without obvious deformity
(Figure 3). Patient gained bilateral excellent range.

**DISCUSSION**

Distal femoral injuries account for 7% of all pediatric
trauma [1]. Salter–Harris type 1 injuries are very rare
accounting for only 7.7%. [2, 3] It is most often seen in
two age groups, newborns and adolescents [3]. We here
have presented a neglected case of bilateral slips in a six-
year-old child. The mechanism of injury has been mostly
a road traffic accident, sports injury or a fall from height.
In our case it was a fall from height on bilateral knee in
flexed position.

Bilateral slips have been noted in scurvy in literature
[4]. However, our case did not show any evident metabolic
abnormality. The case had normal calcium profile, and
serum vitamin C levels.

The recommended treatment in acute slips has been
close reduction with pinning. Closed reduction under
general anesthesia with long leg casts has been tried for
displaced fractures. However, series have reported rates
of 43–70% of distal femoral fractures treated without
internal fixation have displaced [5]. Unless a fracture is
truly nondisplaced and stable, immobilization without
fixation is no longer the treatment of choice [6].
However, Salter et al. have stated that when excessive manipulation appears to be necessary to achieve acceptable reduction, it is better to maintain growth potential and perform corrective osteotomy at a later date than to overstress the physis and cause more injury [7, 8]. Also, it has been recommended that a reduction should not be performed more than 10 days after the original injury. Since the injury was one month old a closed manipulation was not possible. Any attempt could have damaged the physis and this could have led to growth disturbances and angular deformities. In a younger child, acceptable alignment includes up to 20 degrees of angulation in the sagittal plane, less than 5 degrees of varus or valgus angulation, and no rotational deformity. Since the child in our case was young, had a sufficient remodeling potential, we managed the child conservatively. Once the pain subsided, the child was started on aggressive range of motion exercises, with intermittent skin traction for flexion deformity and lesion healed in four months.

CONCLUSION

This is a rare case report both in terms of presentation and management. Unusual presentation at six years of age with bilateral slips is not reported in literature to date. Also internal fixation had been treatment of choice in such cases. But excellent results in above case with conservative management demonstrates that if physeal damage is prevented, the bone has a great remodelling potential and open reduction might not always be required, especially in late presenting cases.

Author Contributions
Anil Mehtani – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published
Suresh Chand – Acquisition of data, Revising it critically for important intellectual content, Final approval of the version to be published
Abhinav Sinha – Acquisition of data, Revising it critically for important intellectual content, Final approval of the version to be published
Ajeet Singh – Acquisition of data, Revising it critically for important intellectual content, Final approval of the version to be published
Harvinder Dev – Acquisition of data, Revising it critically for important intellectual content, Final approval of the version to be published
Jatin Prakash – Acquisition of data, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor
The corresponding author is the guarantor of submission.

Conflict of Interest
Authors declare no conflict of interest.
REFERENCES


ABOUT THE AUTHORS

Anil Mehtani is Head of Department at Lady Hardinge Medical College, New Delhi India. He has published over 20 research papers in national and international academic journals and authored several books. His research interests include arthroplasty and paediatric orthopaedics.

Jatin Prakash is Senior Resident at Lady Hardinge Medical College, New Delhi, India. He earned the undergraduate degree MBBS from MAMC, New Delhi and postgraduate degree from MS from Lady Hardinge Medical College, New Delhi. His research interests include arthroplasty, arthroscopy and paediatric orthopaedics. He intends to pursue arthroplasty fellowship in future.

Suresh Chand is Junior Resident at Lady Hardinge Medical College, New Delhi, India. He earned the undergraduate degree postgraduate degree from MS from LHMC, New Delhi. His research interests include arthroplasty, arthroscopy and paediatric orthopaedics. He intends to pursue arthroplasty fellowship in future.
Abhinav is Senior Resident at Lady Hardinge Medical College, New Delhi, India. He earned the undergraduate degree postgraduate degree from MS from LHMC, New Delhi. His research interests include arthroplasty, arthroscopy and paediatric orthopaedics. He intends to pursue arthroplasty fellowship in future.

Ajeet Singh is Senior Resident at Lady Hardinge Medical College, New Delhi, India. His research interests include arthroplasty, arthroscopy and paediatric orthopaedics. He intends to pursue arthroplasty fellowship in future.

Harvinder Dev is Senior Resident at Lady Hardinge Medical College, New Delhi, India. He earned the undergraduate degree postgraduate degree from MS from LHMC, New Delhi. His research interests include arthroplasty, arthroscopy and paediatric orthopaedics. He intends to pursue arthroplasty fellowship in future.
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