

SOME ASPECTS OF FRACTURE OF THE NECK OF THE FEMUR IN CHILDREN

A PRELIMINARY REPORT BASED ON 28 CASES

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Text books on fractures devote little space to this subject, usually classifying it with similar fractures in adults. Reports in the literature are scanty and from them one gets the impression that these fractures are difficult to treat and the end results are either non-union, coxa vara or avascular necrosis.

AIM

The aim of this paper is to present details of four cases and suggest where this fracture behaves differently from similar fractures as reported previously.

MATERIAL

Since 1960 twenty-eight cases of this fracture have been seen between Professor Hodgson and me. In order to have uniformity in treatment and follow-up, it was decided that one of us should manage the cases; as such all were admitted or transferred under my care as soon as their condition permitted.

TABLE I

Data on 28 Cases	
Age:	5 Years to 16 Years.
Sex:	Males 22 Females 6
Side involved:	Left 21 Right 7

TABLE II

Site of Fracture	
Transepiphyseal (Subcapital)	2
Transcervical	11
Cervico-Trochanteric (Basal)	12
Inter-Trochanteric	3

TABLE III

Age and Number of Cases	
5 Year Old	4
6 Years Old	2
7 Years Old	2
8 Years Old	3
11 Years Old	2
12 Years Old	2
13 Years Old	3
14 Years Old	2
15 Years Old	4
16 Years Old	4

TABLE IV

FRACTURE OF THE NECK OF FEMUR IN CHILDREN

No. of Cases as Reported in English Literature

Author	Year	Cases Reported
Cromwell	1885	1
Russell	1898	2
Whitman	1890 - 1909	31
Bland - Sutton	1918	2
Greig	1919	6
Seddon	1936	1
Mitchell	1936	10
Wilson	1940	10
Carrell & Carrell	1941	12
Allende & Lezama	1951	8
Ingram & Bachynski	1953 (4 Pathological)	24
McDougal	1961 (1944 - 1958)	24
Hamilton	1961	9
Kite	1962 (17 personal Cases)	33
Ratliff	1962 (19 personal Cases)	71
Total		244

We feel that though our series is comparable to many of the reported series (Table IV) it is not large enough statistically for us to draw any conclusions as to the pattern of the natural history of the injury. Further our follow-up is of such a short period that whatever is said can be no more than a preliminary report.

MECHANISM OF INJURY

All our cases have been caused by severe violence and I am in agreement with Ratliff when he said (that it may be concluded) that fracture of the femoral neck in a child is usually produced in different circumstances from those causing the common fracture in the elderly woman.

CASE I

L.T.Y. F/5

History: Fell from third floor on 15.2.62.

Sustained multiple injuries with concussion and Cervico-trochanteric fracture of neck of left femur.

Treatment: Immobilised in plaster hip spica.
Plaster hip spica removed after 8 weeks.

Picture No. 1 On Admission.

Picture No. 2 Eight weeks later — P.O.P. removed.

Picture No. 3 Two years later.

This case is presented to suggest the following:—

1. In the very young, even a gross degree of trauma will produce a minimal degree of displacement.
2. That conservative treatment is adequate in the undisplaced fractures.
3. That these undisplaced fractures heal rapidly.

CASE II

C.S.L. F/8

History: Found unconsciousness on road outside flat ? Fell from fourth floor.

Admitted 31.8.61.

Sustained Concussion

Fractured left clavicle
Fractured pelvis
Multiple abrasions.

Patchy pneumonic consolidation of right middle and lower lobes. Cervico-trochanteric fracture of neck of right femur.

Picture No. 1 On Admission.

Picture No. 2 Closed reduction. Immobilisation in P.O.P. spica.

Picture No. 3 Eight weeks. Off P.O.P. spica. Evidence of avascular necrosis.

Picture No. 4 Sixteen weeks. Non-weight bearing. Fracture uniting.

Picture No. 5 Nine months. Fracture united in coxa vara. Avascular segment revascularising.

Picture No. 6 Thirty-one months. Remodelling has corrected the coxa vara to a great extent. Avascular segment revascularised.

This cases suggests that:—

1. McDougal was right in calling attention in children to the natural tendency of fractures to unite, especially those of the neck of femur.
2. Revascularisation of an avascular segment can take place.
3. Remodelling will correct to a great extent the coxa vara that follows union of the fracture.

CASE III

L.K.H. M/5

History: Case of Cervico-trochanteric fracture of the neck of right femur untreated for one month. Seen in O.P.D. 14.12.61. Referred to Orthopaedic Clinic 28.12.61.

Treatment: Open reduction and bone graft (Iliac crest, autogenous graft) 2.1.62.

Fragment reduced and held with Steimann's Pin and P.O.P. Spica.

Steimann's Pin and Hip Spica removed 12 weeks later.

Picture No. 1 Fracture one month old when first detected in O.P.D.

Picture No. 2 Open reduction and bone graft done with autogenous iliac crest bone. Eleven weeks post-operative.

Picture No. 3 Twelfth week — Immobilisation removed.

Picture No. 4 Four and half months after treatment. Clinically hip function good.

CASE I.



Fig. 1.



Fig. 2.

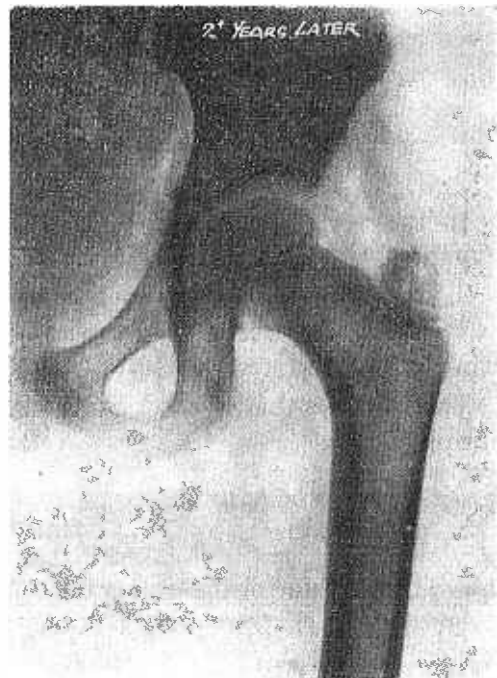


Fig. 3.

CASE II.



Fig. 1.



Fig. 3.



Fig. 2.



Fig. 4.

CASE II.



Fig. 5.



Fig. 6.

CASE III.



Fig. 1.



Fig. 3.

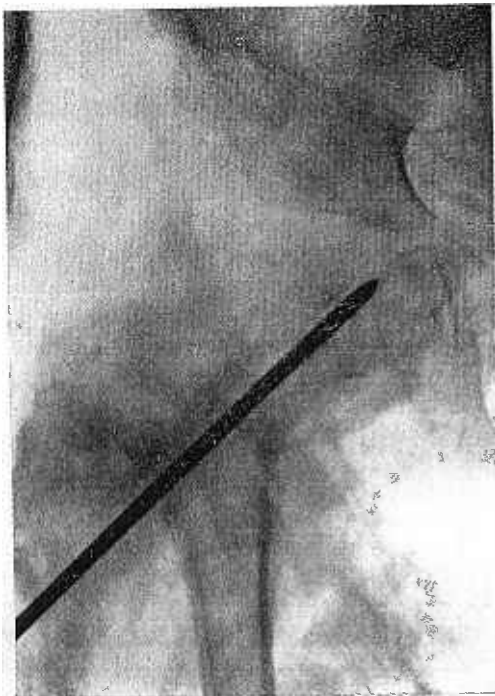


Fig. 2.



Fig. 4.

CASE IV.



Fig. 1.

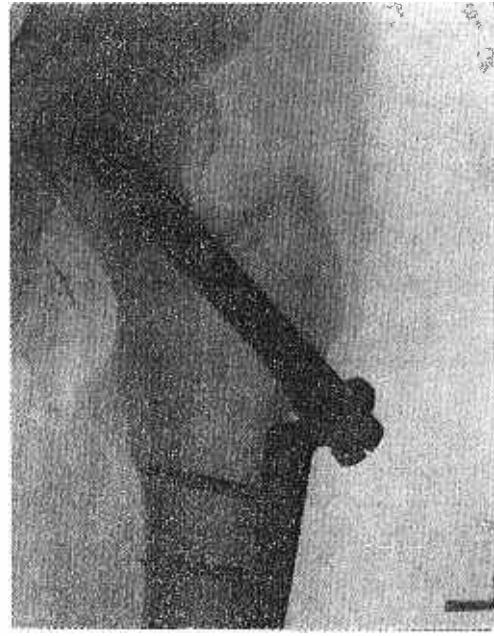


Fig. 3.



Fig. 2.



Fig. 4.

This case suggests that:—

1. In the displaced fractures especially those of some duration, there may be a place for Open reduction with realignment of the fracture.
2. Bone grafting may facilitate healing of these untreated fractures of some duration.

CASE IV

C.W.Y. F/14

History: Knocked down by a car, 22.11.61.

Sustained: Concussion. Multiple injuries.
Transcervical fracture of the neck of the left femur.

Treatment: Closed reduction with insertion of McLaughlin's pin and plate, 2.12.61.

Bone graft (Dickson's technique with Iliac graft), 21.12.61.

Removal of pin and plate 16.6.62.

Cup Arthroplasty 18.5.63 — done because patient insisted on a moveable hip.

Picture No. 1 On admission.

Picture No. 2 Post-pinning.

Picture No. 3 Five months after grafting.
Admitted for removal of pin and plate.

Picture No. 4 One year after fracture. Onset of pain in hip.

This case suggests that:—

1. The hardness of the femoral head and epiphyseal plate could make pinning difficult and cause distraction of the fracture.
2. Grafting with autogenous bone graft will facilitate union of a fracture of neck of the femur.

SUMMARY

1. A preliminary report of 28 cases of Fracture of the Neck of the Femur in Children is presented.
2. Details of four of these cases are presented and from the results of these cases, it is suggested that:—
 - a. in the very young even severe trauma may produce little displacement of the fracture;

- b. in children there is a great tendency for fractures of the neck of the femur to heal;
- c. revascularisation of an avascular segment can take place;
- d. remodelling may correct to a large extent the complication of coxa vara.

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REFERENCES

1. Allende, G. & Lezama, L. G. (1951) "Fractures of the Neck of the Children." *Journal of Bone and Joint Surgery* 33A, 387.
2. Bland-Sutton, Sir J. (1918) "Spolia Opima." *British Medical Journal* 11, 595.
3. Blount, W. P. (1955) *Fractures on Children*. Baltimore: The Williams & Wilkins Co., London: Bailliere, Tindall & Cox.
4. Carrel, B and Carrell W. B. (1941) "Fractures in the Neck of the Femur in Children with Particular Reference to Aseptic Necrosis." *Journal of Bone and Joint Surgery* 23, 225.
5. Colonna, P. C. (1928) "Fracture of the Neck of the Femur in Childhood." A report of six cases. *Annals of Surgery*, 88, 902.
6. Greig, D. M. (1919) "Fracture of the Cervix Femoris in Children." *Edinburg Med. J.* xx11, 75.
7. Hamilton, C. M. (1961) "Fracture of the Neck of the Femur in Children." *The Journal of the American Medical Association*, 178, 799-801.
8. Ingram, A. J. & Bachynski, B. (1953) "Fractures of the Hip in Children." *Journal of Bone and Joint Surgery*, 35A, 867.
9. McDougall, A. (1961) "Fractures of the Neck of the Femur in Childhood." *Journal of Bone and Joint Surgery* 42B, 16.
10. Ratliff, A. H. C. (1962) "Fractures of the Neck of the Femur in Children." *Journal of Bone and Joint Surgery* 44B, No. 3, 528.
11. Russell, R. H. (1898) "A Clinical Lecture on Fracture of the Neck of the Femur in Childhood." *Lancet* ii. 125.
12. Seddon, H. J. (1936) "Necrosis of the Head of the Femur Following Fracture of the Neck in a Child." *Proceedings of the Royal Society of Medicine (Section of Orthopaedic)*, 210.
13. Whitman, R. (1900) "Further Observations on Depression of the Neck of the Femur in Early Life; Including Fracture of the Femur, Separation of the Epiphysis and Simple Coxa Vara." *Annals of Surgery* 31. 145.