

GENERAL STAFF MEETING  
UNIVERSITY HOSPITALS  
UNIVERSITY OF MINNESOTA

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# CASE OF FRACTURES

American College of Surgeons

## Hospital Standardization Report

For the year 1931 - page 26.

Nation-wide propaganda, continuous efforts of the Committee on the Treatment of Fractures of the American College of Surgeons, and the hospital survey have been most effective in improving the care of fractures. Better results are definitely assured when the recommendations of the Committee have been fully carried out. These recommendations are minimum and have to do mainly with transportation, treatment, and supervision of fractures, and are as follows:

- (a) That all general hospitals be equipped to care for fractures; that the minimum equipment for the transportation and emergency treatment of fractures be the following or its equivalent:

Thomas upper extremity splints; Thomas lower extremity splints with traction straps, slings, and buckle straps; Hodgen splints; coaptation splints, assorted sizes; Cabot wire splints; straight pieces of wood (of assorted length, width and thickness) for splints; plaster of Paris bandages; some form of overhead frame for suspension; suitable x-ray apparatus, including a portable machine, if practicable.

- (b) That it is highly desirable that one individual surgeon be responsible for the supervision of the care of fractures in each hospital service.

- (c) That special record sheets be used for fracture cases.

- (d) That a close follow-up be maintained on all fracture cases for such time as necessary to establish an accurate knowledge of end-results.

## II. FRACTURE SURVEY OF UNIVERSITY HOSPITALS (Exclusive of Health Service)

January 1, 1928 to November 30, 1931.

Our records were analyzed by using the form devised by the A. C. of Surgeons.

241 fractures were collected from the cross index. This represents approximately 200 patients. The difference in number between fractures and patients comes about because some patients have multiple fractures. Only acute fractures, fractures with malunion and fractures with no union are included. Cases of old fractures coming here for secondary arthritis or osteomyelitis or other remote reasons are not included. This latter group represents about 50 cases which are not reviewed.

### A. Division in order of frequency:

1.	Femur	57 (24%)
2.	Humerus	30 (13%)
3.	Radius and ulna	21
4.	Skull	18
5.	Tibia and fibula	13
	Ribs	13
	Mandible	13
6.	Vertebra	11
7.	Pelvis	10
	Radius	10
8.	Tibia	9
9.	Ulna	7
10.	Fibula	5
	Clavicle	5
11.	Nose	4
	Zygoma	4
	Hand	4
12.	Foot	2
	Maxilla	2
13.	Scapula	1

### B. Age.

Varies from newborn to 92 (femur), 3 in newborn: skull 2, humerus 1

By groups	Total	Under 15	15 to 60	Over 60
Femur	57	13	19	25
Humerus	30	14	12	4
Radius & ulna	21	10	7	4
Skull	18	6	10	2
Tibia & fibula	13	2	8	3

	Total Under			Over
	15	15 to 60	60	60
Ribs	13	0	11	2
Mandible	13	3	10	0
Spine	11	0	11	0
Radius	10	3	4	3
Tibia	9	1	7	1
Ulna	7	1	5	1
Fibula	5	0	5	0
Clavicle	5	1	1	3

The first three groups are of interest. Dividing the total number equally into decades, in the femur, the division would be: under 15, 10; 15 to 60, 28; over 60, 19. Apparently there is a predilection for the extremes of life but the predominance for old age is not markedly noticeable. Treating the humerus group in the same manner, the average distribution should be under 15, 5; 15 to 60, 15; over 60, 10. Here, there is a very marked preference for the preadolescent group and a diminution in the old age group. The same holds true for fractures of the radius and ulna.

Considering all the fractures in the old age group (total 50), 50% occur in the femur in contrast to a frequency of 24% for the series of 241.

### 3. Sex.

#### Entire series:

Male	169	70%
Female	72	30%

#### Fractures of femur:

Male	34	60%
Female	23	40%

32% of all fractures in females occur in femur in contrast to 24% for entire series.

In the entire series of 57 femurs, 40% were in the neck (or intertrochanteric) whereas in females, 70% were in the neck (or intratrochanteric.)

In the group of fractures in females when only adults (over 20) are considered, 33% are in the femur in contrast to 32% for all females but 90% of fractures of the femur are in the neck or intratrochanteric in contrast to 70%.

### 1). Occupation.

No noteworthy comment can be made. The occupation usually is that of the housewife, farmer or laborer.

### E. Cause

Fall	88	(36%)
Automobile Accident	67	(28%)

While falls and car accidents could involve the female as often as the male (and these two constitute 64% of all the causes of our fractures) yet only 30% of the fractures of the entire series occur in women.

4 cases were pathological fractures, 1 bone cyst, 1 carcinomatous infiltration, 2 osteomyelitis. (Note: Anyone on the surgical or x-ray service can recall several pathological fractures. Probable explanation is that the diagnosis is not entered for cross-index.)

Only one case resulted from an old-fashioned "run-away" (showing the trend of our times).

3 cases were due to gunshot wounds and 1 skull fracture was the result of a "political argument."

37 of the 57 femur cases were due to falls; 11 of the 21 skull fractures were due to car accidents.

### F. Site.

#### Humerus (30).

Anatomical neck	1
Surgical neck	5
Shaft	14
Supracondylar or condylar	10

#### Femur (57)

Neck	12
Intratrochanteric	11
Upper shaft	6
Lower shaft	25
Condyles	3

#### Spine

Cervical	4
Thoracic	5
Lumbar	3

## 6. Types.

The division into spiral, transverse, oblique, etc. is not of special interest (chiefly in treatment)

Non-union	12
Mal-union	5
<u>Compound</u>	27 (11% of total series)

### Fractures of spine

Compression Fracture	6
dislocation	4

## 4. Examination

In 36 cases, (15%) there was a very sketchy or no description of the examination of the injury. Note: Probably due to dependance on x-ray.

### I. Position of Fixation or Traction.

In 26 cases (11%) it was impossible to tell in what position the fracture was held. This is very liberal because a description such as "put up in traction" or "cast applied" was charted as a positive description. When present, the brown operative sheet proved quite satisfactory.

### J. Type of Treatment.

#### a. Skull (18).

- 16 supportive treatment
- 2 decompressions

#### b. Face (15)

- 13 Mandible - 11 wired
- 2 bite blocks
- 1 Zygoma - operative reduction
- 1 Zygoma and maxilla - operative reduction

#### c. Spine (11)

- 4 (fracture - dislocations)- traction and then Thomas Collars.
- 2 laminectomy
- 2 manipulation and cast
- 2 no active treatment
- 1 body cast alone

#### d. Pelvis (10)

- 6 bed rest or adhesive strapping
- 3 (acetabular fractures) - traction on leg.
- 1 (multiple fractures) - cast

## e. Humerus (30)

- 1 Anatomical neck (open reduction, fixation by screws)

### 5 Surgical neck

- 2 manipulation and cast
- 2 Traction and cast
- 1 open reduction and cast

### 14 Shaft

- 5 Manipulation and cast
- 5 Traction and cast
- 3 Open reduction (all for nonunion)
- 1 Amputation for gas gangrene

### 10 Condylar

- 5 Manipulation and cast
- 4 Open reduction and cast (1 malunion) (1 nonunion)
- 1 No treatment (malunion)

## f. Ulna (7)

- 5 Manipulation and cast
- 1 Open reduction
- 1 No active treatment

## g. Radius (10)

- 6 Manipulation and cast
- 4 Open reduction (1 malunion) (1 nonunion)

## h. Radius and ulna (21)

- 15 Manipulation and cast
- 6 Open reduction (5 nonunion)

## i. Femur (57)

### 23 Neck and Intratrochanteric

- 16 Manipulation and cast
- 4 No active treatment
- 2 Traction and cast
- 1 Open reduction (nonunion)

### 6 Upper shaft

- 4 skin traction and cast
- 2 skeletal traction and cast

### 25 Lower shaft

- 8 Manipulation and cast
- 8 Skin traction and cast
- 6 Open reduction and cast
- 4 Skeletal traction
- 2 Overhead suspension

(Difference between 25 total number and 28 treatments cited is due to multiplicity in some cases, i.e., skin traction, then skeletal traction, then open reduction.)

3 Condyles

- 2 Skin traction
- 1 Skeletal traction

j. Fibula (5)

- 3 Bed rest
- 1 Cast
- 1 Transferred

k. Tibia (9)

- 5 cast
- 2 Open reduction (condylar fractures)
- 1 no treatment (malunion of condyle)
- 1 Transferred to private physician

l. Tibia and fibula (17)

- 13 Cast and Manipulation
- 3 skeletal traction
- 1 open reduction (nonunion)

11 Ulna and radius

- 6 nonunion
- 4 for position
- 1 malunion

## Summary of Total (36)

- 17 for position
- 12 nonunion
- 3 malunion
- 2 decompression
- 2 laminectomy

Internal fixation (15 times)

- 4 bone graft
- 3 suture
- 2 bone pegs
- 2 bone screws
- 2 plates
- 1 sliding graft
- 1 band
- 1 intramedullary impaction

Note: 1 band and screw combined.

Time of Treatment

In the group of acute fractures of the extremities only 17 were not actively treated on the day of admission. These included cases of debilitated aged individuals and those with acute swelling or haemorrhage into the area.

K. Open Operations.

Total number of cases 36 (18%)

## Bones and indication:

- 2 skull decompression
- 2 spine laminectomy
- 2 Zygoma reduction
- 2 Tibia displacement of condyles
- 1 Tibia and fibula nonunion
- 7 Femur
  - 2 malunion
  - 2 interposition of tissues
  - 2 failure to maintain position otherwise
  - 1 nonunion
- 9 Humerus
  - 5 for position
  - 4 nonunion
  - 1 malunion

Internal fixation was removed subsequently in 2 cases because of infection. Infection in operative cases occurred 5 times (14%). One of these was due to gas bacilli

## L. Mortality (15 cases - 8%)

- 6 Skull (severe brain injuries)
- 5 Femur (see below)
- 2 Spine (high complete paralysis)
- 1 Mandible (developed pneumonia)
- 1 Tibia & fibula (admitted with gas gangrene)

## Deaths in fractures of femur

	Age	Treatment	Days in Hosp.	Cause
1.	49	cast	50	debility
2.	66	cast	12	cerebral
3.	72	traction	16 hrs.	cerebral
4.	82	traction and cast	26	debility
5.	92	cast	3 1/2 hrs.	shock (?)

Gas bacillus infection (4 cases):  
(1 death)

- 2 Tibia and fibula
- 1 Humerus
- 1 Postoperative

Results: (Follow-up)Average Hospital Staya. 18 Skull (6 deaths)

2 cases seen in Out-Patient Dept.  
 (1 under observation now - improved)  
 (1 lost sight of - improved when last seen)  
 10 cases - unknown

b. 7 Spine (2 deaths)

3 cases followed (all fracture - dislocation)  
 (1 discharged from O.P. - cured)  
 (1 under observation - practically cured)  
 (1 much improved - now in Hospital for other condition)  
 2 cases unknown

c. Humerus (no deaths)

14 cases unknown  
 12 followed in Hospital, in O.P.D. or by readmission through period of total protection only.  
 7 followed long enough to judge result  
 (6 good functional result)  
 (1 fair)  
 4 followed through period of total and partial protection.

30 Last x-ray report (anatomical result)

17 good  
 7 poor  
 6 fair

Average Hospital stay - 25 days  
 (varies from 1 to 59 days)

d. Radius and Ulna 33 cases - no deaths

11 seen in O.P.D. for 1 or more visits  
 5 cases followed through period of total fixation  
 3 cases followed through entire period

Last x-ray report (anatomical result)

20 good  
 9 fair  
 4 poor

ulna 34 days (varies 10 - 99 days)  
radius 7 days (varies 1 - 26 days)  
radius  
 and ulna 19 days (varies 1 - 83 days)

e. 57 Femur (5 deaths)

17 cases followed through period of total fixation in hospital in O.P.D. or by readmission  
 4 cases followed through entire period  
 3 cases seen at 1 or more visits of O.P.D.

Last x-ray report (anatomical result)

32 good  
 10 fair  
 5 died  
 5 unknown  
 4 poor  
 1 nonunion

Average stay in Hospital - 52 days  
 (varies 3 to 316 days)

f. Tibia and fibula (31)

7 cases seen in O.P.D.  
 5 cases followed through period of immobilization  
 2 cases followed through entire period

Last x-ray report (anatomical result)

19 good  
 5 unknown  
 4 fair  
 2 poor  
 1 nonunion

Average Hospital Stay:

Fibula - 5 days  
 Tibia 22 days (varies 8 to 55 days)  
 Tibia &  
 fibula 24 days (varies 1 to 61 days)

Note: Of this group of 180 cases, we have record of the final outcome in approximately 35 cases, (15 by death, 20 by follow-up). The reason for very low number of patients who can be followed completely by the available records is probably two fold.

(1). The patient is treated here during the acute stage. When fixation is sufficient to permit transportation, he is returned to his own physician for further care. It is cheaper apparently for the patient to have his home physician watch the progress than for the patient to return here for check up. The cost of transporting a patient in a hip spica cast varies from \$25.00 to \$100.00.

(2). Cases from close by returning to our own O.P.D. perhaps are followed but few notes are to be found in the records of removal of casts, treatment or final functional result. No records of physiotherapy treatments or social service follow-ups are available in our general record room.

#### IMPRESSIONS:

1. 241 fractures were collected from the cross index.
2. The hospital files check very accurately with the cross index.
3. The cross index is incomplete because diagnoses are not written on the cover sheet for indexing. Example: One chart bearing diagnosis of multiple myeloma only, should read diagnosis of (1) multiple myeloma, (2) pathological fracture of humerus.
4. Fractures of femur occur most frequently (24%), those of humerus next (13%).
5. In the preadolescent group fractures of the humerus are most common with those of femur next.
6. In the aged, 50% of fractures occur in the femur.
7. Less than one-third of our fractures are in females. There is a greater frequency of fractures of the femur in the female. In adult women 90% of fractures of the femur are in the upper end.
8. Falls and automobile accidents cause 64% of our fractures. Only 1.7% of the group are pathological fractures.
9. 27 cases are compound; 17 cases are cases of nonunion and malunion.
10. Our records frequently show absence of adequate description of the deformities and soft tissue present and the manner of treatment.
11. Open treatment was carried out 36 times (18%). Fifteen of these operations were for malunion or nonunion.

12. Infection of operative cases occurred 5 times (14% of operations)
13. 15 deaths occurred (8%). Except in 1 case (developed pneumonia) all are quite obviously in severely injured or in very old individuals.
14. Gas bacillus infection occurred 4 times.
15. Almost no information can be obtained from a study of the records regarding time of total disability, functional outcome, or economic status

(A E F rating) anatomical, economic, functional.

This study was made by Pathologic Fellow Koucky, assisted by Internes Affleck, Borland, Hibbard, Raymond, and Spittler.

#### SOCIAL SERVICE ON FRACTURES

In the last year and a half Social Service has known 33 fracture cases. The diagnoses were as follows:

Fracture of femur	14
Fracture of humerus	3
Fracture of rim of acetabulum	3
Fracture of vertebrae	3
Fracture of tibia	2
Fracture of foot	2
Fracture of radius and ulna	2
Fracture of pelvis	2
Fracture of patella	1
Fracture of jaw	1

Of these five had other fractures not listed above as fractures of ribs and clavicle. One fracture of femur ended in amputation. One patient was never in the hospital, but was treated entirely in the Out-Patient Department. Of those in the Hospital 16 left in casts and 8 returned to have the casts removed. Three of the above are still in the Hospital. Twelve cases were followed in the Out-Patient Department.

The average stay in the hospital for these was 43 days--the range being between 11 and 189 days.

Social Service raised the following money for these patients:

Care in a convalescent home	\$458.00
15 pairs of crutches	18.75
6 leg braces	150.00
1 artificial leg	150.00
Ambulance fees	<u>105.00</u>
Total.....	\$881.75

In addition the worker had to raise small sums for x-rays, diathermy, physiotherapy, etc.

The cases were disposed of as follows:

At home and being followed until ready to work.....	10
In convalescent homes or hospitals .....	12
At work or school.....	6
In prison.....	2
Poor farm.....	1
Unadjusted.....	1
Died after leaving hospital.....	1
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33

It takes a long time to make plans for these handicapped people and Social Service would therefore appreciate being told about them as soon as possible after their admission to the hospital. It is impossible for the worker to find these cases unaided by the doctors. Of course, the above outline gives only a small picture of the problems that the social worker attempts to meet with these people and tells nothing about the social adjustments effected by months of careful follow-up.

Respectfully submitted,

Mathilda Mathisen  
Social Service Dept.

#### RECOMMENDATIONS:

1. Keep fracture records on special form.
2. Start follow-up system by sending out card or letter with patient to be filled out by physician at last visit.
3. Meeting at least once a quarter to discuss subject by those interested.

W.A.O'B.