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## IS THE LENGTH OF HOSPITALIZATION FOR PATIENTS WITH FEMORAL SHAFT FRACTURES SHORTENED BY INTRAMEDULLARY NAILING?

*By*

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As a rule, it is difficult to analyse the length of hospitalization for patients with femoral shaft fractures in regard to different methods of treatment owing to the influence of many factors not directly connected with the fracture treatment. Consequently, any comparison should be made with caution.

In *Lauritzen's* series (1950) the mean period in hospital was 91 days for 30 patients with nailed fractures, and for 43 whose fractures had been treated with other methods it was 131 days.

At L. Böhler's Clinic, *J. Böhler* (1951) reported a mean hospitalization of 45 days for closed nailing of 35 closed femoral fractures. Twenty-six patients with open fractures treated with intramedullary nailing were hospitalized for an average of 68 days.

In *Aronsson's* insurance series (1956) the length of stay in hospital was 4½ months on the average for closed methods, 4½ months for intramedullary nailing, and 5½ months for other methods of internal fixation.

*Palmer* (1957) gave 49 days as the mean period of hospitalization for 59 patients with nailed femoral fractures in whom the late course was not wholly dominated by multiple injuries or disease. If 2 cases of infection were excluded, the period was 45 days. The author expressed the view that this time in hospital should suffice after correct intramedullary nailing.

### MATERIAL

The present investigation is a study of the length of hospitalization of different methods of treatment for fractures of the femoral shaft

TABLE 1  
*Distribution of Patients with Closed Fractures According to Length of Hospitalization.*

Method of treatment	Hospitalization in months																		Total
	1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-18	> 18					
<b>Closed methods</b>																			
Traction .....	1	9	52	48	34	16	13	7	8	4	2	4	3	-	-	-	-	201	
Others .....	3	-	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	6	
<b>Open methods</b>																			
Intramedullary nailing	28	91	76	57	25	15	7	6	6	3	1	4	11	8	8	8	8	338	
Encircling wire .....	2	9	13	5	13	8	7	5	3	3	1	2	4	4	4	4	4	79	
Plate and screws .....	2	-	10	10	5	2	2	3	-	1	-	-	1	-	-	-	-	36	
Others .....	2	2	9	4	6	6	5	2	1	-	3	-	4	-	-	-	-	44	
Transfixation .....	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	2	
<b>Total.....</b>	38	111	160	126	83	48	34	24	18	11	7	10	24	12	12	12	12	706	

TABLE 2  
*Distribution of Patients with Open Fractures According to Length of Hospitalization.*

Method of treatment	Hospitalization in months																	Total
	1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-18	> 18				
<b>Closed methods</b>																		
Traction .....	-	-	4	1	6	6	1	2	1	-	1	1	2	2	2	2	27	
Others .....	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	
<b>Open methods</b>																		
Intramedullary nailing	2	6	2	4	3	4	4	2	-	1	3	1	2	1	-	35		
Encircling wire .....	-	-	-	1	1	1	-	-	-	-	-	1	-	-	-	4		
Plate and screws .....	-	-	2	1	-	1	-	1	-	-	1	1	-	-	-	7		
Others .....	-	-	-	-	2	-	-	-	-	1	-	-	2	4	-	9		
Transfixation .....	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	2		
<b>Total.....</b>	2	6	9	7	13	12	5	5	1	3	5	4	6	6	7	85		

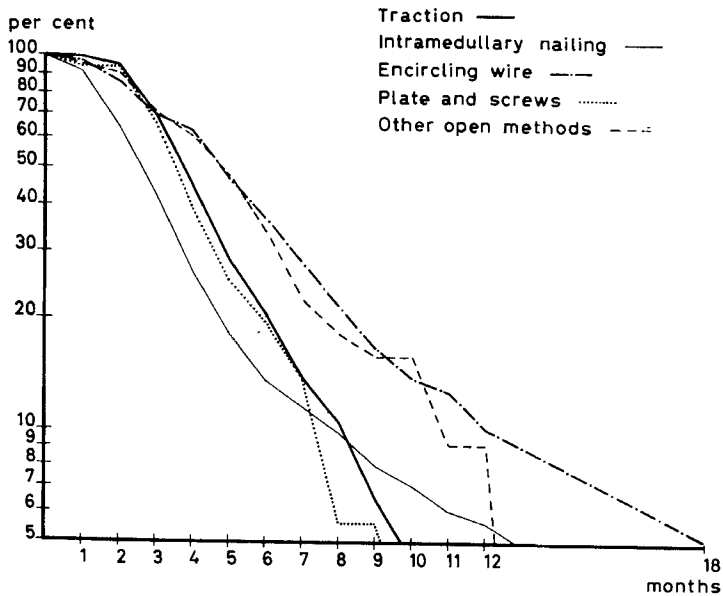


DIAGRAM 1

*Length of Hospitalization in Different Treatment Groups of Closed Fractures.*

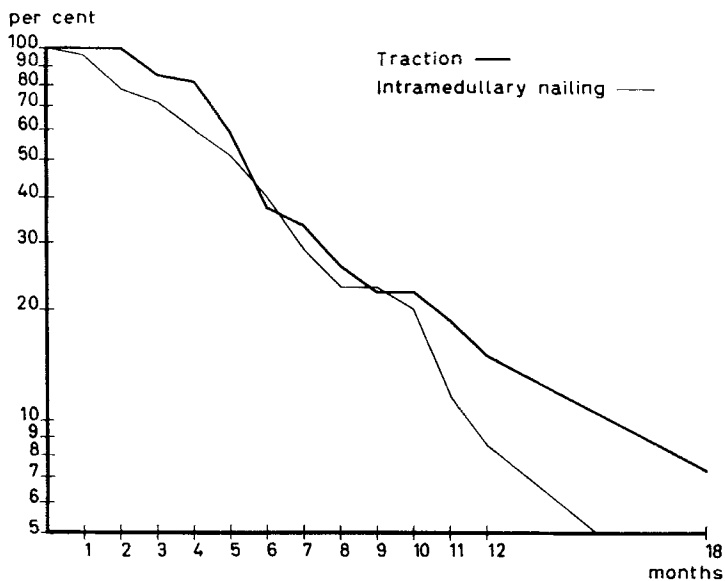


DIAGRAM 2

*Length of Hospitalization Following Traction and Intramedullary Nailing of Open Fractures.*

applied at all except 4 Swedish hospitals during the three-year period 1952 to 1954. The lowest age at the time of injury was 17 years. Fractures caused by primary or metastasizing tumours are excluded. Otherwise, all cases are included. After rejecting cases in which multiple injuries, diseases, or other factors affected the patient's stay in hospital there remain 706 closed and 85 open fractures in which the length of hospitalization was dependent only upon the fracture and its treatment.

The duration of the stay in hospital in regard to different methods of treatment is given in Tables 1 and 2, as well as in Diagrams 1 and 2.

It may be seen in Diagram 1 that half the patients with *closed fractures* treated with traction were hospitalized for less than  $3\frac{3}{4}$  months, and 10 per cent for over 8 months. In the nailed closed fracture group this period was under  $2\frac{1}{2}$  months in 50 per cent of the cases, and more than 8 months in 10 per cent. As will be seen in Diagram 2 the time spent in hospital was of approximately equal length in *open fracture cases* treated with traction and in those fixed with an intramedullary nail.

The hospitalization was more than 12 months in 7 cases of fracture treated with traction—in 5 due to delayed bone union, in 1 to non-union, and in 1 to refracture.

Twenty-two patients with nailed fractures were kept in hospitals for over 12 months—in 10 due to infection, in 6 to delayed bone union, in 5 to non-union, and in 1 to refracture.

In the encircling wire group the length of hospitalization exceeded 12 months in 8 cases—in 4 due to non-union, in 2 to delayed bone union, and in 2 to infection.

One patient whose fracture had been treated with a plate was kept in hospital for more than 12 months owing to non-union.

Ten patients with fractures treated with other open methods were hospitalized for over 12 months. In 7 instances the reason was delayed bone union or non-union, and in 3 infection.

#### DISCUSSION

The length of time in hospital for intramedullary nailing has frequently been short (*Böhler 1951, Palmer 1957*). In the present series, too, this period was relatively short for most patients with nailed fractures—for half of them with closed fractures it was less than  $2\frac{1}{2}$  months. The mean period of hospitalization is usually given. As a result, the range limits are often unclear. In my investigation the number of patients who spent long periods at hospital after intramedullary nailing was considerable. Nineteen patients with nailed closed fractures (6 per cent) stayed for over 12 months. This was often necessitated by infection. The fact that most of the patients were hospitalized for only

relatively short periods after nailing must be weighed against the extensive time required for a small proportion.

Traction usually led to longer hospitalization than intramedullary nailing. In half the patients with closed fractures the period exceeded  $3\frac{3}{4}$  months. On the other hand, the really long stays in hospital were very few. Only 3 (2 per cent) were kept for more than 12 months.

#### S U M M A R Y

This investigation is a study of the length of hospitalization of different methods of treatment for fractures of the femoral shaft applied at practically all Swedish hospitals during 1952 to 1954. The length of hospitalization was dependent upon the fracture and its treatment in 706 closed and 85 open fractures. Most patients with a nailed closed femoral shaft fracture were hospitalized for a relatively short period; half of them for less than  $2\frac{1}{2}$  months. On the other hand, 6 per cent were kept in hospital for more than 12 months. In the closed fracture group treated with traction the length of hospitalization was longer than  $3\frac{3}{4}$  months in 50 per cent of the cases, but over 12 months in only 2 per cent. Fixation with a plate led to approximately the same period of hospitalization as traction. The longest time in hospital was recorded after fixation with encircling wire and other open methods. Patients with open fractures treated with traction or with intramedullary nailing were kept in hospital for about the same length of time (in around 50 per cent of the cases for less than  $5\frac{1}{2}$  months).

#### R E S U M E

Cette enquête porte sur l'étude de la durée de l'hospitalisation dans les différentes méthodes de traitement des fractures du corps du fémur appliquées dans les hôpitaux suédois entre 1952 et 1954. La durée de l'hospitalisation a dépendu de la fracture et de son traitement, dans 706 cas de fracture fermée et 85 cas de fracture ouverte. La plupart des malades avec une fracture du corps fémoral enclouée, fermée, ont été hospitalisés pour une période relativement courte, la moitié d'entre eux pour moins de 2 mois et demi. Toutefois 6 pour cent ont été gardés à l'hôpital pour plus de 12 mois. Dans les groupes des fractures fermées traitées par traction, la durée de l'hospitalisation dépassait  $3\frac{3}{4}$  mois dans 50 pour cent des cas et 12 mois dans seulement 2 pour cent des cas. La fixation au moyen d'une plaque a conduit approximativement

à la même période d'hospitalisation que la traction. La plus longue durée de l'hospitalisation a été enregistrée après fixation par encerclage et autres méthodes ouvertes. Les malades ayant des fractures ouvertes, traités par traction ou par enclouage intramédullaire ont été gardés à l'hôpital pendant approximativement la même durée de temps (dans pour ainsi dire 50 pour cent des cas pendant moins de 5 mois et demi).

#### ZUSAMMENFASSUNG

Diese Untersuchung hat zum Gegenstand die Länge des Krankenhausaufenthaltes nach verschiedenen Behandlungsmethoden für Oberschenkelschaftbrüche, die praktisch an allen schwedischen Krankenhäusern von 1952 bis 1954 angewendet wurden. Die Länge des Aufenthaltes war von dem Bruche und seiner Behandlung bei 706 geschlossenen und 85 offenen Brüchen abhängig. Die meisten Patienten mit einer genagelten geschlossenen Fraktur waren für eine verhältnismässig kurze Zeit am Krankenhaus, die Hälfte von ihnen weniger als 2½ Monate. Andererseits verblieben 6 Prozent mehr als 12 Monate am Krankenhaus. In der Gruppe der geschlossenen Brüche, die mittels Extension behandelt wurden dauerte der Krankenhausaufenthalt länger als 3¾ Monate in 50 Prozent der Fälle, doch über 12 Monate nur in 2 Prozent. Fixierung mit einer Platte führte zu ungefähr der gleichen Länge des Krankenhausaufenthaltes wie die Extension. Die längste Zeit im Krankenhaus wurde nach Drahtumschlingung und anderen offenen Methoden registriert. Patienten mit offenen Brüchen, die mittels Extension oder intramedullärer Nagelung behandelt waren, wurden für ungefähr die gleiche Zeitspanne am Krankenhaus behalten (ungefähr 50 Prozent der Fälle für weniger als 5½ Monate).

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