

THE TREATMENT OF FRACTURES OF THE CLAVICLE

A STUDY OF 422 CASES OBSERVED IN THE OUT-PATIENT DEPARTMENT
OF THE ROOSEVELT HOSPITAL OF THE CITY OF NEW YORK

BY CHARLES W. LESTER, M.D.

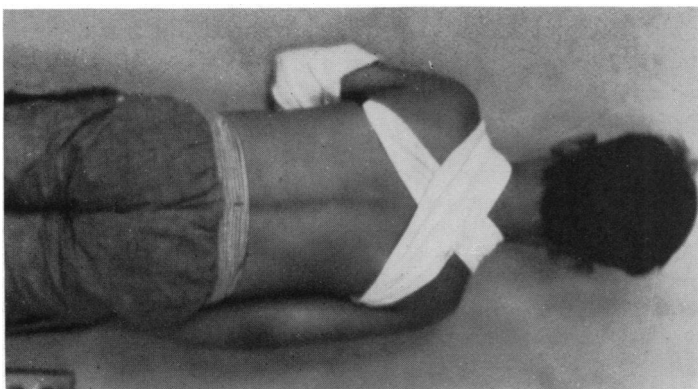
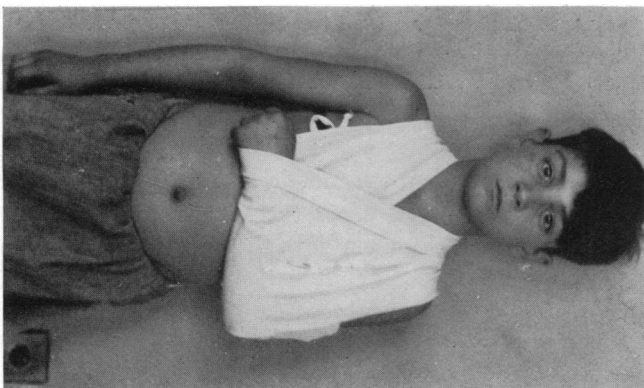
OF NEW YORK, N. Y.

FRACTURE of the clavicle is one of the most common fractures that comes to treatment, being second only to Colles's fracture in its incidence. So much has been written regarding its treatment that Kreisinger, writing in 1927, found descriptions of over two hundred devices for its treatment. Most of these come under the head of reducing dressings; *i.e.*, dressings designed to reduce the fragments or to hold them in alignment. Yet nearly all authors on the subject from Hippocrates to date admit that reduction is almost impossible to maintain and that a certain amount of deformity is to be expected. This deformity does not interfere with the function of the arm and tends to subside in time. With these facts in mind the value of complicated uncomfortable dressings is questionable. Certainly in cases of incomplete fracture, or fracture of the outer third without displacement, there can be no doubt that these dressings are more nuisance than they are worth, both to the surgeon and to the patient. The supporting dressing disregards the position of the fragments and merely aims to make the patient comfortable. It seems to be the logical dressing to use. To determine its value as compared with the reducing dressing a study of 422 cases treated in the Out-Patient Department of the Roosevelt Hospital between 1914 and 1927 was made. These cases were, of course, all ambulatory cases, and were treated by both reducing and supporting dressings.

A sling and binder or Velpeau bandage make no attempt at reducing the fracture or holding it reduced. They do support the weight of the arm and keep it from moving, thereby eliminating the two chief causes of pain and discomfort from the injury. Healing takes place as quickly with this form of dressing as with the others and the deformity is no greater as a study of the late results will show. It is, therefore, the dressing of choice in the great majority of cases.

Stimson, Scudder, Brewer, and other authors of text-books on fractures consider that a simple supporting dressing is sometimes the best form of treatment. Gibbon, quoting the observations made by Lucas-Championnière on jockeys, in whom fracture of the clavicle is a frequent injury, advises against any retentive dressing. He uses a simple figure-of-eight bandage between the shoulders with the arm supported by a sling and states that he has had excellent results when the sling alone was used. Colson, in reporting a large series of cases which occurred among children, advises the use of a simple sling entirely.

TREATMENT OF FRACTURES OF THE CLAVICLE



Figs. 1, 2, and 3.—Method of application of sling. The tapes are passed through rubber drainage tubes so that they will not cut the skin of the patient. A body binder not depicted here is used with this type of dressing.

The sling is easily applied. It should extend beyond the elbow and be drawn snugly so that it will lift and support the arm. The ends should not be tied back of the neck, but rather crossed over the back, carried around under the axillæ and tied over the sternum. (Figs. 1, 2, and 3.) The tapes should be broad or else they should be well padded so as to prevent cutting the skin. A rubber drainage tube with the tape of the sling threaded through it makes a good protection. The weight of the arm is then borne by the shoulders and not by the back of the neck. A simple swathe around arm and thorax keeps the arm from moving except within narrow limits. After a week or ten days the swathe may be dispensed with, the patient wearing the dressing inside the clothes which act as sufficient binder. In from two weeks to eighteen days the sling may be worn outside the clothes and discarded entirely in from three to four weeks. When worn outside the clothes the sling may be knotted behind the neck.

While the arm is inside the clothes a Velpeau bandage may be used. Some surgeons object to its use on the grounds that it increases the deformity. It was used in forty-seven cases in this series but no untoward deformity was noted at the end of the treatment.

One case in this series may be quoted as an example of the value of the sling and binder.

The patient was a man of twenty-one years who was thrown over the handlebars of his bicycle, striking the pavement on his shoulder. He sustained a comminuted fracture of the middle third of his clavicle which might be considered a double fracture. There were two principal lines of fracture which separated a middle fragment about three-quarters of an inch long. All fragments were overriding and piled on top of one another, the inner fragment being lowest and the outer fragment uppermost. In view of the marked deformity the Dwight modification of the Sayre dressing was applied with considerable tension. The dressing caused so much discomfort that the patient cut it down almost as soon as he left the hospital. He returned next day with the arm loosely supported by the diagonal strip of the dressing. The same type of dressing was reapplied and cut down about as promptly by the patient. On his third return, next day, it was decided to make no attempt at further reduction although the deformity was still in its original state. Accordingly he was treated by a sling and binder. Union took place and he was discharged thirty days after his injury with good function of the arm but with marked deformity and three-quarters inch narrowing of the injured shoulder. He was seen four years later. At that time the deformity was slight and the measurement of the width of the shoulders showed the injured side to be no narrower than the other. Function was complete. By simply keeping the arm at rest the fracture had united and in the course of time the reparative processes of the body had so far overcome the deformity as to make it unnoticeable without close inspection. This is not an isolated case as the other late results show similar cases, although not so striking.

Even without treatment fracture of the clavicle will heal although the resulting deformity is apt to be greater. Three such cases came to the clinic after the union had taken place and were given no treatment. One case would not keep any appliance on and amounts to an untreated case.

The number of times the various dressings were used in this series can be seen by referring to Table I.

TREATMENT OF FRACTURES OF THE CLAVICLE

TABLE I.

Type of Dressing.

A. Cases Completing Treatment

Dressing	Complete	Incomplete	Comminuted
Dwight-Sayre	125	29	4
Sling and binder	19	15	2
Velpeau	25	23	
Figure-of-eight	8	6	
Cross	2		
Harness	1		

B. Cases Abandoning Treatment After Ten Days or More

Dwight-Sayre	30	4
Sling and binder	3	2
Velpeau	6	5

It will be seen that the Dwight modification of the Sayre dressing was the most popular. In considering this type of dressing it must be borne in mind that the patients were dispensary patients who were not seen more than twice a week and frequently only once a week. Hence, between dressings there was more or less slipping of the adhesive with consequent loss of the dressing's efficiency.

The average length of time required for the treatment was twenty-five days in the complete fractures and twenty days in the incomplete fractures. The dressing used seemed to make little difference in the time. The greatest time required was one hundred days. This was in the case of a man who applied to the hospital for treatment twelve weeks after his injury, during which time his arm had been kept immobilized by his local doctor. Another case in which the fracture was badly comminuted required three months. The remaining cases which needed more than six weeks to complete the treatment (eleven cases) had associated injuries to the shoulder which prolonged the treatment. Most of the cases needing more than a month received baking and massage. The others did not need it.

TABLE II.

Site of Fracture.

Outer third.....	65
Middle third *.....	250
Inner third.....	14
Not stated.....	93

Results.—In general it can be said that fracture of the clavicle will heal and give a good functional result. Even the four untreated cases had good function although the deformity was marked in three. The fourth was an incomplete fracture. So with the remainder of the cases in the series. Of

* Includes those of junction of middle and outer, and middle and inner thirds.

CHARLES W. LESTER

those cases which did not abandon treatment before four weeks there were only two with non-union.

One was in a man who remained under treatment eighty-four days. He had a four plus Wassermann reaction. At the time the last note was made on his record he had fibrous union and was getting antiluetic treatment. The other was in a girl of sixteen who abandoned treatment after thirty days. She also had fibrous union at the time. Attempts to trace both these cases have been unsuccessful.

TABLE III.
Type of Fracture.

Complete.....	241
Incomplete.....	112
Comminuted.....	7
Not stated.....	62

One hundred and eleven patients abandoned treatment before ten days and fifty abandoned treatment between ten days and three weeks. Such a large number of eloped cases is decidedly unusual in our other fracture cases and the reason for it is probably that they had no more symptoms rather than that they were displeased with the treatment. In many of our follow-up inquiries we came upon cases which had abandoned treatment because they thought they were all well and who had good results. One boy abandoned treatment after a week but returned a year later with a fracture of the other clavicle; he also abandoned treatment for the second fracture in a week and when seen in the follow-up had perfect function with the minimum of deformity. Undoubtedly some sought treatment elsewhere, either because they disliked us or because they lived too far away.

In the immediate results deformity is usual, especially in the complete fractures. Deformity also occurs in the incomplete fractures when there is angulation. In this series, however, marked deformity was noted in only fifty-three cases. Five of the seven comminuted fractures were discharged with marked deformity, one with moderate deformity and the other abandoned treatment. Three of the four untreated cases had marked deformity, the other being incomplete. Dressings designed to reduce the fracture as well as the simple supporting dressings were used. These cases are tabulated in Table IV. Apparently the deformity existing at the time treatment

TABLE IV.
Marked Deformity at Discharge.

Dressing	Complete	Incomplete	Comminuted
Dwight-Sayre.....	27	4	3
Sling and binder *.....	5	2	2
Velv eau.....	4	1	
No Treatment.....	3		
Not stated †.....	1		

* Two cases untreated for a week.

† One additional case in which type was not stated.

TREATMENT OF FRACTURES OF THE CLAVICLE

is instituted has more to do with the resulting deformity than the type of dressing used.

Late Results.—Follow-up inquiries were made only in those cases whose injury was subsequent to the summer of 1923. Clinic patients are inclined to be nomadic and usually move in less than five years leaving no address. There were sixty-one cases traced which were examined or reported by letter. The last case of the series was injured in February, 1927. Hence the cases in which the late results are given are all over twenty months old.

Function was complete in all of these cases, as would be expected from the immediate results. Two complained of a slight amount of pain at times but the pain was so slight that it did not interfere with the patients' activity. Thus from the point of view of function and comfort the results were nearly 100 per cent. perfect.

It is generally believed that the deformity resulting from a fracture of

TABLE V.
Cases without Late Deformity.

	Number of Cases	Type of Fracture			Dressing	
		Complete	Incomplete	Comminuted	Supporting	Reducing
Adults.....	11	8	1	2	7	4
Children.....	43	27*	13	0	29	14

the clavicle persists. The results in these cases indicate the opposite. Of the sixty-one cases only seven showed noticeable deformity. Those without deformity are from all classes; adults and children; complete, incomplete, and comminuted fractures. They were treated by supporting dressings as well as by dressings which strove to maintain reduction (Table V). Those who had late deformity have been tabulated individually. Four were in adults and three in children. In only three was the deformity marked. One of these

TABLE VI.
Cases with Late Deformity.

Age	Type of Fracture	Dressing	Deformity	Remarks
60	Complete	Sling	Moderate	Three-quarter inch shortening; deformity hidden by fat.
42	Complete	None	Marked	Would tolerate no dressing.
28	Complete	Sayre	Marked	
21	Comminuted	Sling	Slight	Three-quarter inch shortening at discharge; none in late result.
13	Complete	Figure-of-eight	Slight	
6	Incomplete	Sling	Marked	Incomplete fracture followed by re-fracture, also incomplete, two weeks after discharge.
5	Complete	Sayre	Slight	

* Three cases in which type of fracture was not stated.

was an untreated case. One was in a refracture through the previous line of fracture, both fracture and refracture being incomplete. The other case was treated by a dressing whose aim is to maintain reduction. These figures show forcibly that uncomfortable and intricate dressings designed to hold the fragments in alignment (whether they do or do not) are of no more value than a simple, comfortable, supporting dressing.

BIBLIOGRAPHY

- Adams, Francis: *The Genuine Works of Hippocrates*. Wm. Wood & Co., New York, vol. ii, pp. 98-101, 1891.
- Brewer, George E.: *A Text-book of Surgery*, Third Edition, Lea & Febiger, N. Y. and Phila., pp. 828-831, 1915.
- Colson, Georges: *Les Fractures de la Clavicule chez l'Enfant*. Thèses de le Faculte de Medicinè de Paris, 1921.
- Gibbon, John H.: *Lucas-Championnière and Mobilization in the Treatment of Fractures*. Surg., Gyn., & Obs., vol. xliii, p. 271, 1926.
- Kreisinger, V.: *Sur le Traitement des Fractures de la Clavicule*. Rev. de Chir., Paris, vol. xlv, p. 376, 1927.
- Sayre, Lewis A.: *A Simple Dressing for Fracture of the Clavicle*. The Amer. Pract., vol. iv, p. 1, July, 1871.
- Scudder, Charles L.: *The Treatment of Fractures*. Ninth Edition, W. B. Saunders & Co., Phila., pp. 146-159, 1922.
- Stimson, Lewis A.: *A Practical Treatise on Fractures and Dislocations*. Eighth Edition, Lea & Febiger, N. Y. and Phila., pp. 214-229, 1917.