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TREATMENT OF RIGID SHOULDERS BY JOINT DISTENSION DURING ARTHROGRAPHY

By

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Treatment of rigid shoulders aims at curtailing the condition. Since the syndrome is known to disappear spontaneously (*Dickson & Crosby* 1932, *Codman* 1934, *Meulengracht & Schwartz* 1952) it may be difficult to judge the relative value of different therapeutic methods. Complete recovery from the disease is said to be a matter of about one year, rarely more than two. However, of *Simmond*'s (1949) 21 cases of "frozen shoulder" only 6 recovered full range of motion within 3 years. Judging from these figures, treatment to shorten the duration of disability seems urgent.

In most cases of painful shoulder mobility is restricted. Thus, of *Olsson*'s (1953) series of 77 painful shoulders, 70 per cent were rigid. The stiffness of the shoulder is due to adhesive (*Neviaser* 1945) or retractile (*de Sèze* 1961) capsulitis. During arthrographic examination one of us found reduction in the size of the capsule to be an almost invariable phenomenon in stiff shoulders irrespective of the underlying conditions. The arthrographically obliterated capsule always ruptured on manipulation under anesthesia (*Lundberg* 1965). This finding is incompatible with the opinion of *Bloch* (1958), who reported convincing therapeutic results of manipulation on the basis of 2,000 cases of periarthritis humeroscapularis. He said that "brisement" is not associated with rupture of the obliterated capsule. But arthrography was not done during the manipulation.

Once established rigidity seems not to respond to physiotherapy. Radical manipulation may then be the only way to overcome rigidity promptly (*Storck* 1940). An alternative less radical method would, however, sometimes be desirable.

In connection with arthrography in the routine examination of stiff-

ness of the shoulders to assess the degree of capsular retraction and to check the conditions of the rotator cuff, one of us (*Andrén*) introduced distension of the joint during arthrography. This procedure has proved to be of diagnostic as well as therapeutic value also in the treatment of other joints with restricted mobility. The technique and some illustrative results are described below.

METHOD

The needle is inserted into the joint space lateral to the coracoid process and a local anesthetic is injected. The needle is connected via a tube with the syringe. Contrast medium (20 ml Urografin® 30 per cent) is then slowly injected until resistance is offered. The fluid is then allowed to flow back into the syringe. This procedure is repeated several times. The patient is instructed to move his arm carefully between the injections. If distension requires a larger amount of fluid, normal saline is added. During such treatment the range of movement of the shoulder gradually increases. The procedure is continued until the capsule ruptures, as a rule, in the wall of the subscapular bursa. Sometimes rupture occurs early, but then the result is usually less favourable. During the injection the typical shoulder pain, often radiating down the arm or to the neck, is frequently reproduced and disappears on return of the fluid into the syringe.

RESULTS

The material consisted of 64 rigid shoulders. Of these, 11 had a rupture of the rotator cuff and in 15 the rigidity had occurred after fracture of the shoulder joint. The remainder were "genuine" frozen shoulders. Treatment was followed immediately by increased mobility in all except 2. Of the 26 patients in whom the stiffness was moderate (total elevation exceeding 120°), two thirds immediately recovered full mobility of the joint. Of those with more pronounced rigidity, 38 cases, one fifth recovered full mobility, while improvement in the remainder was only partial. This group included the 2 above-mentioned cases in which the joint could not be distended because of immediate rupture of the capsule.

At re-examination 2 months after distension the favourable effect of treatment was found to have persisted in the two thirds of the shoulders with a primarily moderate loss of mobility. The results achieved in the primarily most rigid group were less favourable. One fifth of the patients made a complete recovery. On the remainder, half improved. In the rest the initial improvement were off. In many of this last group repeated treatment produced favourable results, while others were treated by manipulation.

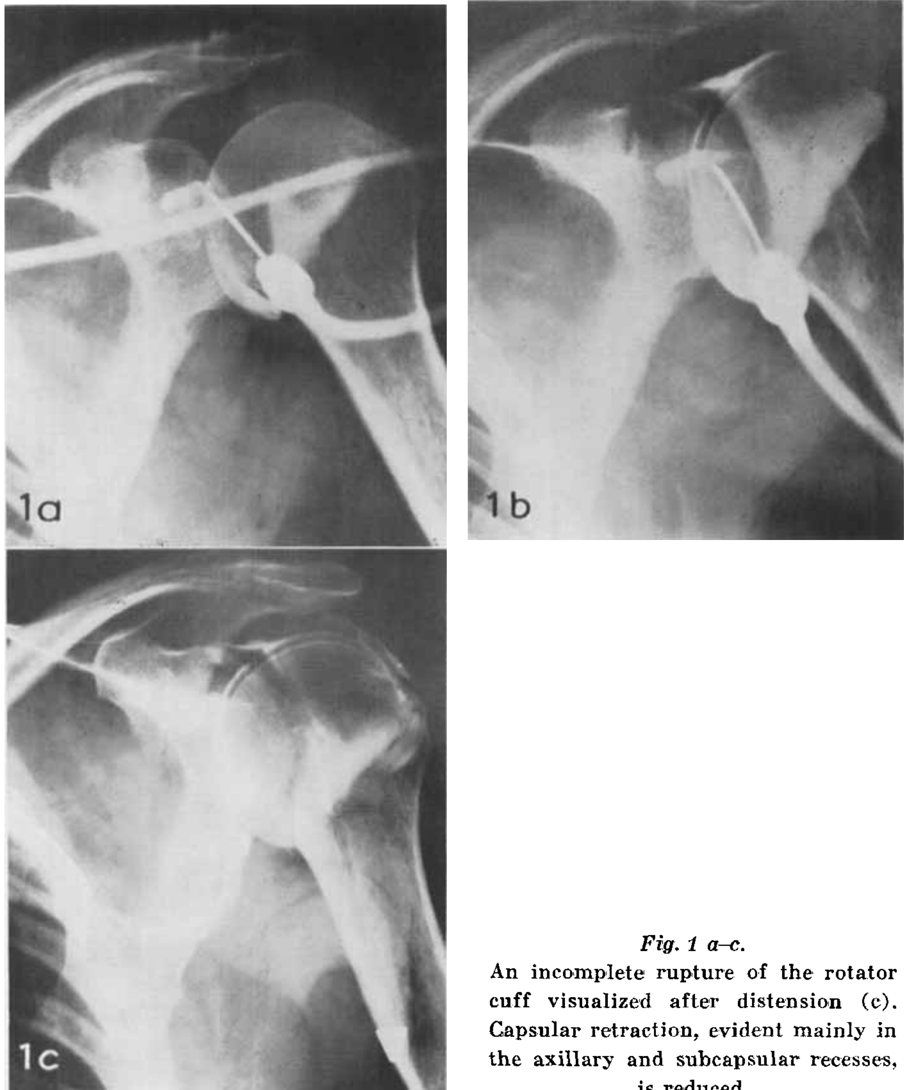

Fig. 1 a–c.
An incomplete rupture of the rotator cuff visualized after distension (c). Capsular retraction, evident mainly in the axillary and subcapsular recesses, is reduced.

DISCUSSION

The degree of shoulder rigidity varies with the degree of retraction of the capsule. The method described is designed to distend the capsule and thereby increase the range of motion. Such distension may also reveal incomplete rupture of the cuff, which is not always demonstrated by ordinary arthrography (Fig. 1).

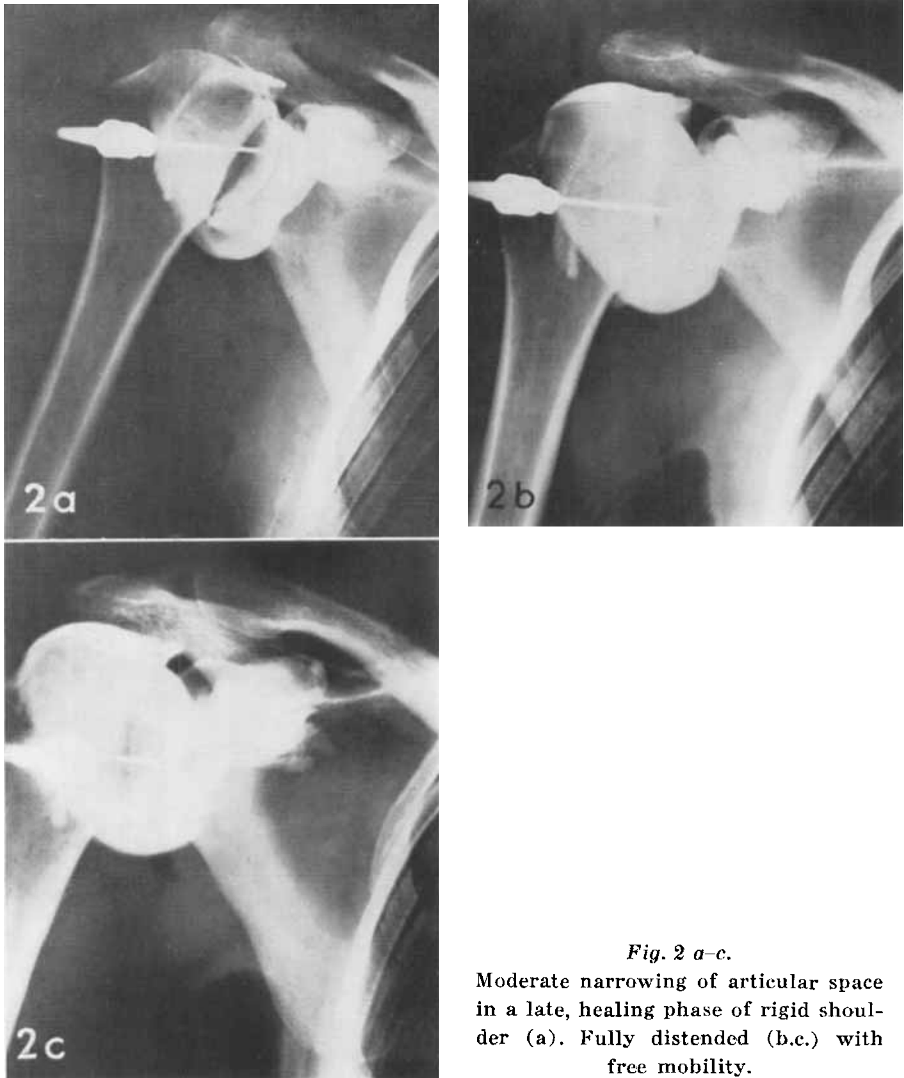

Fig. 2 a–c.
Moderate narrowing of articular space in a late, healing phase of rigid shoulder (a). Fully distended (b.c.) with free mobility.

The method appears most useful in the treatment of slight or moderate rigidity. The distending effect is good in this group, probably owing to greater elasticity and more uniform strength of the shrunken capsule (Fig. 2). Without these properties of the capsule, the result is less favourable, especially when rigidity is absolute. For then the pressure of the fluid is not always able to distend the severely retracted capsule because of early rupture (Fig. 3). Such rupture with leakage

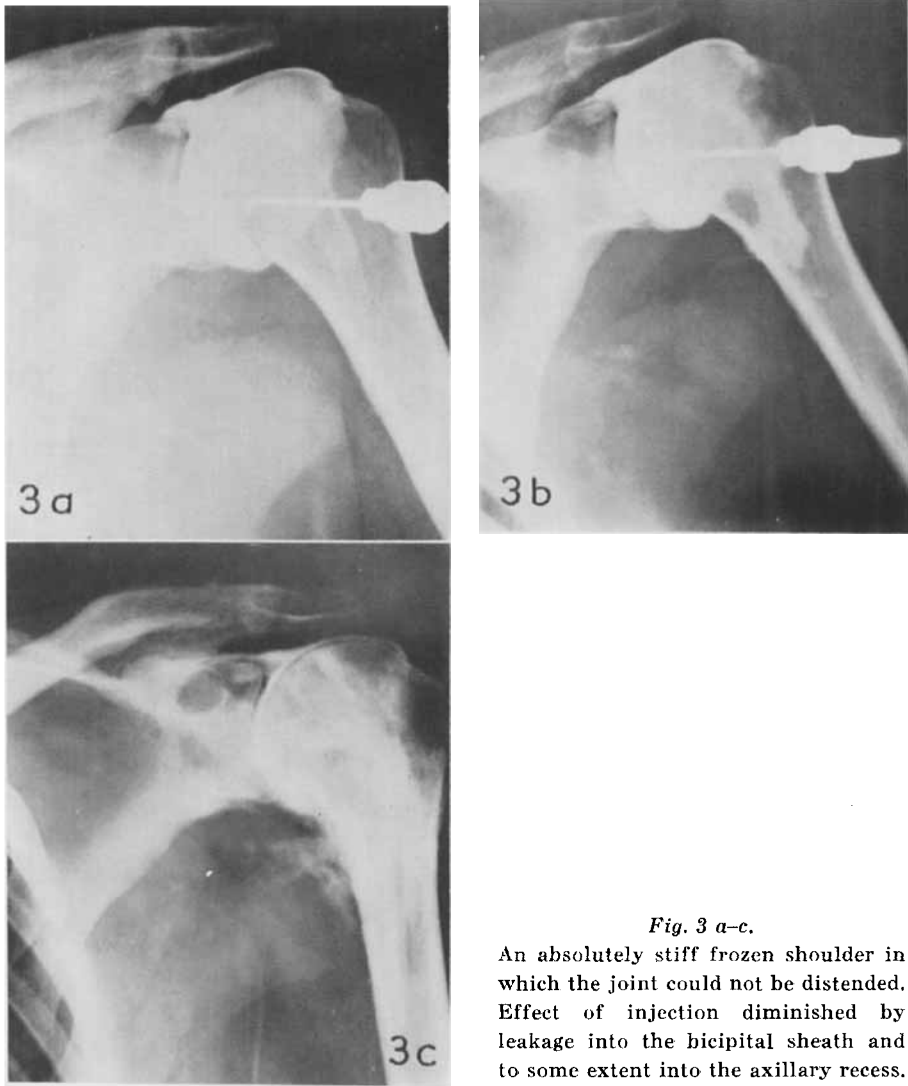

Fig. 3 a–c.
An absolutely stiff frozen shoulder in which the joint could not be distended. Effect of injection diminished by leakage into the bicipital sheath and to some extent into the axillary recess.

is liable to occur even in successfully treated cases, but then later. Prompt relief is, however, not always followed by permanent improvement. Since this therapy is mainly symptomatic, the further course is probably dependent on the activity of the disease. Repeated later intra-articular injections under pressure may, however, gradually restore free mobility (Fig. 4).

Relief from pain is sometimes attained despite unchanged rigidity.

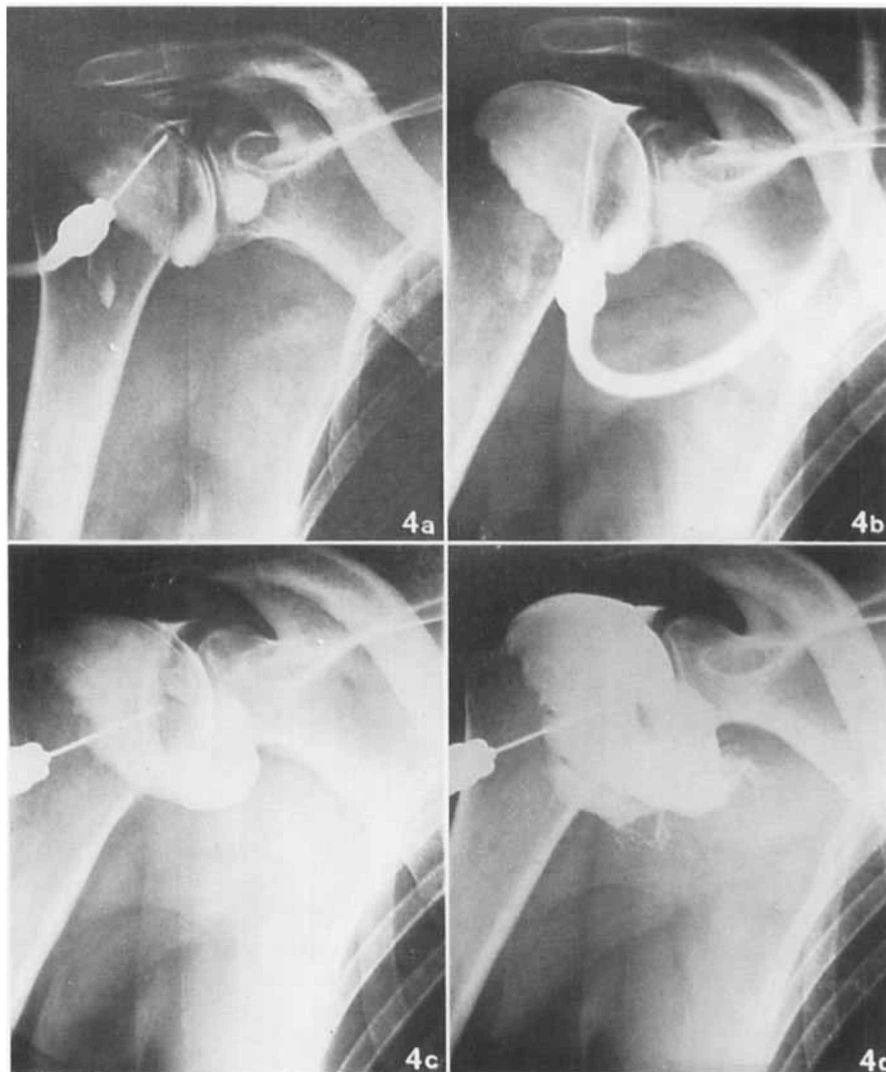

Fig. 4 a–d.
First attempt to distend a highly frozen shoulder (a–b) followed 14 days later by more successful distension (c–d). Function restored.

Distension of the joint may have the same effect on the condition as manipulation.

No complications occurred. The pressure exerted in the joint can cause moderate pain radiating from the region of the shoulder and is

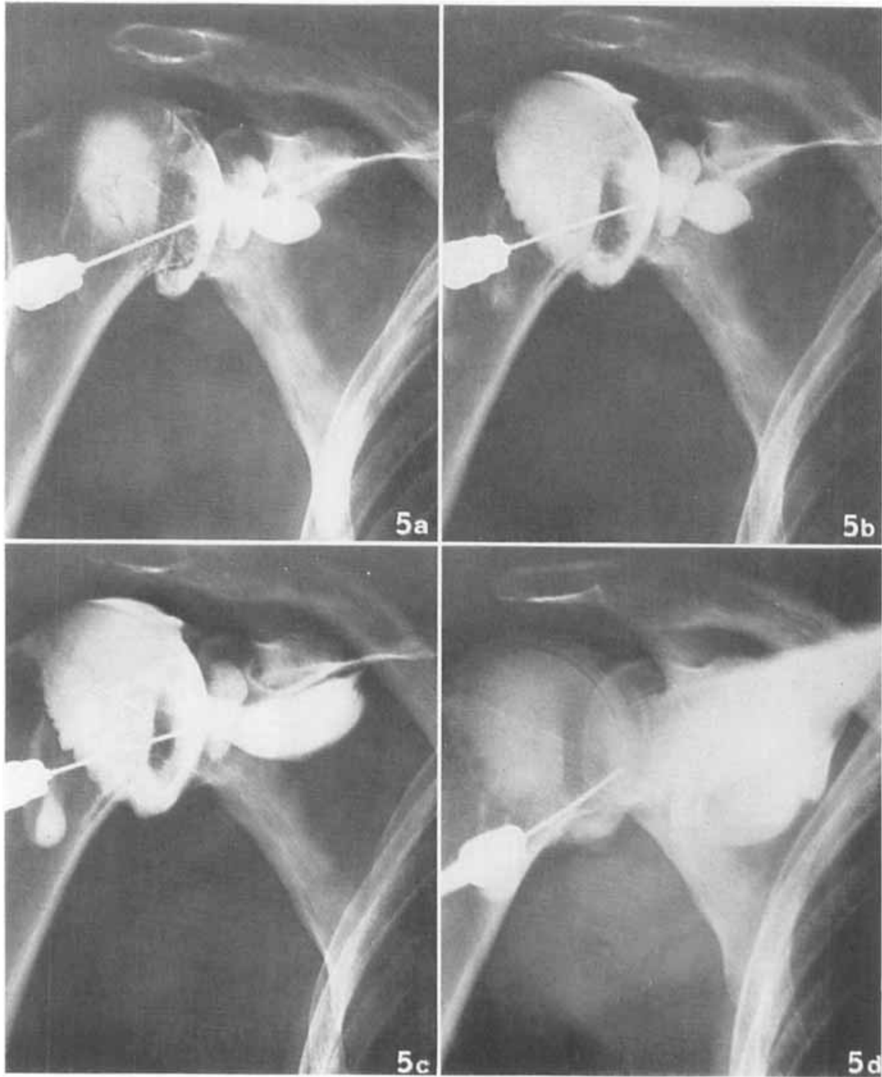

Fig. 5 a–d.
A frozen shoulder, immobile and with very narrowed joint space (a), which is well distended under pressure (b–c) until contrast medium escapes through the subcapsular recess (d). Immediately afterwards, full function.

recognized as typical by the patient. The radiating pain in a rigid shoulder originates from the affected joint and is not due to cervical rhizopathy.

The immediate improvement creates great expectations for the

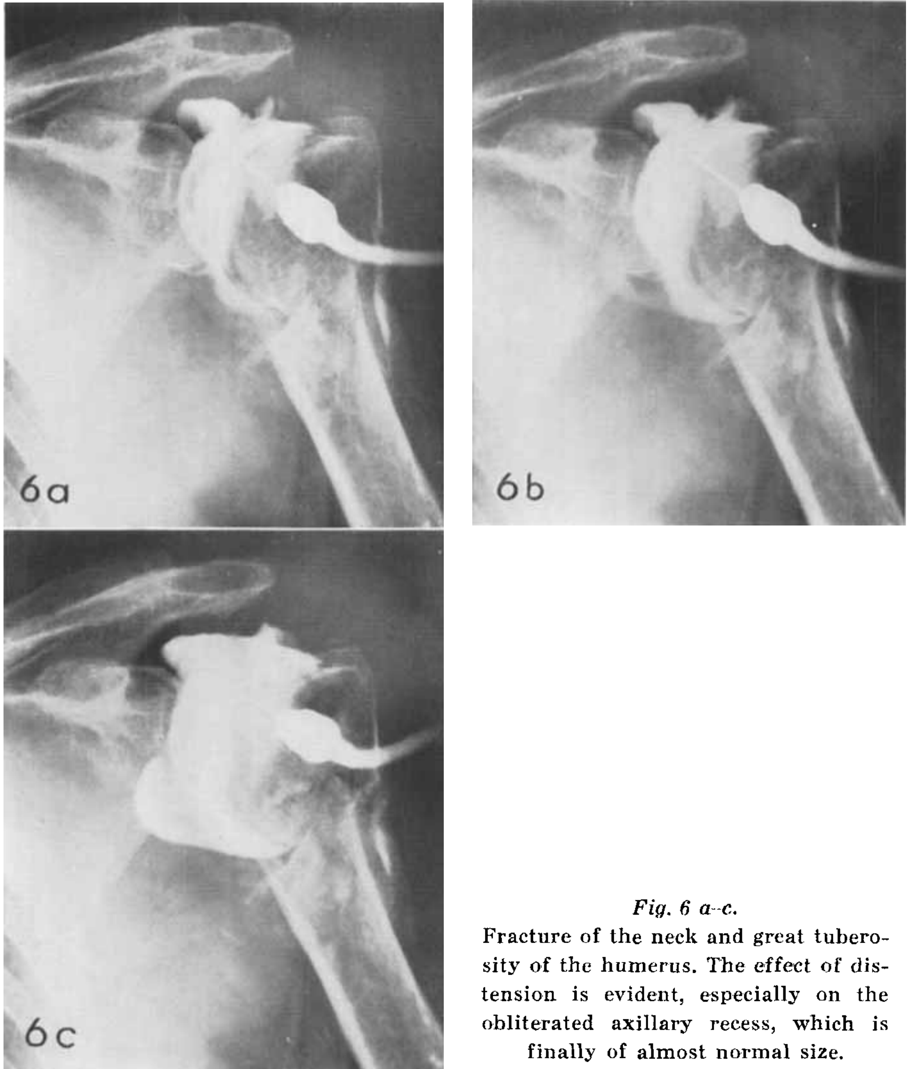

Fig. 6 a–c.
Fracture of the neck and great tuberosity of the humerus. The effect of distension is evident, especially on the obliterated axillary recess, which is finally of almost normal size.

patient, but this is usually followed by a few days' pain and immobility before recovery starts again. Since it is not possible to predict the effect of distension in a given case and since no contraindications appear to exist, the method can be used in all cases of capsular retraction. As mentioned above, a favourable response can be expected most often when restriction of mobility is only slight or moderate. On the other hand, therapeutic success is of greater value when rigidity is pro-

nounced. Even though the outcome is less predictable in such severe cases, one or more attempts are recommended (Fig. 5).

Fractures affecting the shoulder joint diminish its range of motion mainly by dislocation, callus formation or organized periarticular tissue. However, in our material capsular obliteration was invariably present then as in cases of rigidity of other origin. As in genuine frozen shoulders, it is thus possible to increase mobility by distension (Fig. 6).

SUMMARY

In rigid shoulders intraarticular injection under pressure with consequent distension of the joint capsule will often result in partial or complete recovery of mobility of the joint.

RESUME

Dans les épaules rigides, une injection intraarticulaire sous pression provoquant une distension de la capsule articulaire a souvent comme résultat un rétablissement partiel ou complet de la mobilité de l'articulation.

ZUSAMMENFASSUNG

Bei Schulterversteifung wird die intraartikuläre Injektion unter Druck mit folgender Ausdehnung der Gelenkskapsel oft eine teilweise oder vollständige Wiederherstellung der Beweglichkeit des Gelenkes ergeben.

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