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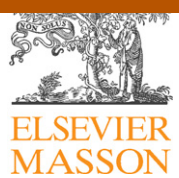

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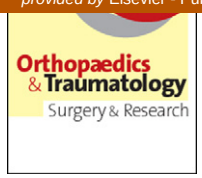

ORIGINAL ARTICLE

Management of the stiff shoulder. A prospective multicenter comparative study of the six main techniques in use: 235 cases

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KEYWORDS
Stiff shoulder;
Treatment;
Rehabilitation;
Self-rehabilitation;
Arthrodistension;
Capsulotomy;
Pain management;
Adhesive capsulitis;
Frozen shoulder;

Summary
Introduction: Stiffness in the shoulder is a frequent symptom associated with a number of clinical entities whose management remains inadequately defined.
Patients and methods: This prospective study of 235 cases of stiffness in the shoulder compared six therapeutic techniques with a mean follow-up of 13 months (range, 3—28 months) (T1: 58 cases, conventional rehabilitation under the pain threshold, T2: 59 cases, self-rehabilitation over the pain threshold, T3: 31 cases, T2 + supervision, T4: 11 cases, T1 + capsular distension, T5: 31 cases, T1 + locoregional anesthesia, T6: 45 cases, T1 + T5 + capsulotomy). The therapeutic power of each technique and its impact on the result were assessed at each self-rehabilitation and rehabilitation session during the first 6 weeks and then at 3 months, 6 months, and at the final revision depending on subjective criteria (pain, discomfort, and morale) and objective criteria (Constant score, goniometric measurements).

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Algodystrophy;
Therapeutic
education

Results: Conventional rehabilitation (T1) is less effective than self-rehabilitation over the pain threshold (T2 & T3) during the first 6 weeks ($P < 0.05$). Self-rehabilitation stagnates between the 6th and 12th week except when it is supervised by a therapist (T3). Anesthesia (T4) and capsular distension (T5) do not lead to significantly different progression beyond 6 months. Capsulotomy does not demonstrate greater therapeutic power but its failure rate (persisting stiffness at 1 year) is 0% versus 14—17% for the other techniques ($P < 0.05$).
Discussion: The techniques are complementary and therapeutic success stems from an algorithm adapted to the individual patient with, over the first 3 months, successive self-rehabilitation and conventional rehabilitation, possibly completed by capsular distension or anesthesia between the 3rd and 6th months. In case of failure at 6 months, endoscopic capsulotomy can be proposed. Therapeutic patient education and active participation are the key to treatment success or failure.
Level of evidence: Level III, case—control, prospective comparative.

Introduction

Stiffness, in the shoulder, is a symptom that reveals interlinking pathologies that participate in many clinical pictures (''simple stiffness'', primary or secondary ''adhesive capsulitis'', ''frozen shoulder'', ''algodystrophy'') [1—7] whose etiologies are complex and multifactorial [8—17] and the therapies often empirical and combined [5,18—23]. The prevalence of shoulder stiffness is estimated at more than 5% in the general population [24,25]. The objective of this study was to assess and compare the true therapeutic power of the main therapeutic methods used to manage shoulder stiffness, without prejudging the clinical picture or etiology that might be present [7,23].

Patients and methods

The authors conducted a prospective multicenter comparative study including 235 patients presenting a significant reduction in passive amplitudes of the shoulder (overall passive arm flexion less than 150° vs 180°, passive external rotation less than 40° vs 60°, and reduction of internal rotation) compared to the healthy contralateral side. All patients presenting stiffness of the shoulder were included, whatever treatments had preceded their inclusion in the study, with the exclusion of patients who had already been operated for stiff shoulder, degenerative bone conditions (malunion, osteoarthritis, osteosynthesis), fractures dating from less than 3 months, and unhealed fractures.

Six populations corresponding to six therapeutic modules were singled out.

Conventional rehabilitation below the pain threshold [26]: T1 (58 cases): this was the reference technique of the study; conventional rehabilitation below the pain threshold conducted by a physical therapist supervised by a rehabilitation physician or a surgeon, with a recommendation for pain less than 6 on the visual analogic scale (VAS) and sessions three to five times a week for 6 weeks to 5 months.

Self-rehabilitation techniques:

- T2 (59 cases): unsupervised self-rehabilitation over the pain threshold (VAS > 6) and patients recommended to be consistent in 5- to 10-minute sessions spread throughout the day for 6—12 weeks minimum based on a series of active and passive exercises in all amplitudes [27];
- T3 (31 cases): self-rehabilitation supervised by a physical therapist over the pain threshold (VAS > 6) recommended to do daily fractionated rehabilitation based on the identical series of exercises as in T2 but associated with one to three physical therapy sessions during the 6- to 12-week period [26,27].

Combined medical-surgical techniques:

- T4 (11 cases): locoregional anesthesia and conventional rehabilitation below the pain threshold (VAS < 6) [28,29]. Installation of an interscalene catheter for 7 days with hospitalization followed by care in a rehabilitation center for 3 weeks;
- T5 (31 cases): capsular distension with conventional rehabilitation below the pain threshold (VAS < 6) performed by a radiologist with injection of an anti-inflammatory and analgesic followed by two or three rehabilitation sessions per week for 6—12 weeks [30—33];
- T6 (45 cases): endoscopic circumferential capsulotomy associated with mobilization under anesthesia, then locoregional anesthesia with catheter for 72 hours and conventional rehabilitation below the pain threshold (VAS < 6) in a rehabilitation center or with a physical therapist [34—39].

The clinical examination of the stiff shoulder was performed with the patient in the dorsal decubitus position on a hard surface, with the examiner performing passive anterior arm elevation with the second hand on the shoulder stump, then a passive external rotation movement with the second hand now maintaining the elbow close to the body so as to limit the risk of compensation (ascension of the shoulder stump, abduction of the arm, and tilting of the spine. The exam is bilateral and comparative [40—42].

The medical revision sheet included the identification criteria, the patient's history, the progression of stiffness over time, the associated disorders, the contributing circumstances, the goniometric measurement of active and passive amplitudes, and the Constant score criteria [15] (Appendix 1). The documents were completed and the patients were seen again by the surgeon on the day they

Table 1 Population profiles.

	T1	T2	T3	T4	T5	T6
No. of cases	58	59	31	11	31	45
Mean age (years)	50	49.5	57	49.5	54	51
Sex-ratio: females (%)	71	50	69	50	68	63
Dominant side (%)	57	75	66	64	40	72
History in another site (%)	25	30	25	45	25	18
Progression time (months)	12	8	15	31	5	12

were included in the study and then at 6 weeks, 3 months, 6 months, and on the day of the final revision.

A rehabilitation follow-up information sheet (Appendix 2) was completed by the rehabilitation physician or the physical therapist for each session and for each exercise performed on the day of the session. The self-rehabilitation follow-up information sheet was completed by the patient every day for the first 6 weeks then every week for the following 6 weeks, covering, for the same criteria, the eight simple self-rehabilitation exercises selected from the daily movements chosen for the study [27].

The patients who had combined treatments were followed up with the same documents filled in by the different caregivers (surgeons, rehabilitation physicians, physical therapists) and the patients themselves with the same frequency.

An online database consisting of 256 criteria was created (Carl Biostatistics^{TM}), the data were entered on 12 sites by the different personnel involved, completing a total of 2435 data sheets.

A comparative descriptive study of each therapeutic population and each technique was conducted (analysis of variance, Student t tests, and Chi^2, with significance set at $P < 0.05$); then an analysis of the correlations between each therapeutic act and each of the evaluation criteria was carried out (significance level, $P < 0.05$). The therapeutic weight of each technique and the power of each act in cases of combined treatment were studied using factorial analysis.

Results

The overall population (Table 1)

The mean age of the study's 235 patients was 52 years (range, 18—71 years) with a sex ratio of 62% females and the dominant side involved in 61% of the cases. Fifty percent of the cases of shoulder stiffness were considered to be spontaneous, with the mean progression extending over 12 months, for 3 months post-traumatic (31%) and 9 months following surgery (12%). The contributing circumstances retained were endocrine (20%), neurodystrophic involving other sites (15%), rheumatological (10%), medication-related (5%), and neurological (5%). The mean time to the patients' inclusion in the study was 16 months (range, 5—30 months).

There were no significant clinical and etiological differences between the various populations except a more frequent history of algoneurodystrophy problems (45%, $P < 0.05$) in the T4 population (anesthesia and conventional rehabilitation), which also had the longest progression time (30 months, $P < 0.05$), and in the T6 capsulotomy group, which had the greatest overall functional damage ($P < 0.05$) and the most severe post-traumatic and postoperative history (35%, $P < 0.05$). The mean time to the final revision was 13 months (range, 3—21 months).

Comparative results of overall functional progression

Functional rehabilitation (T1) provided constant improvement in the overall shoulder function value for the first 12 weeks ($P < 0.05$); then, when the frequency of loading was reduced or stopped, a plateau in the progression was observed and then a secondary progressive gain in flexibility, providing functional improvement that continued beyond 1 year (Fig. 1). This same sequencing was found for elevation, external rotation, and pain.

Fig. 2 illustrates the therapeutic power of technique T1 as a percentage of the progression compared to the final result. Initial efficacy can be observed in terms of pain and passive elevation in the first 6 weeks then in external rotation between 6 weeks and 3 months of therapy (Fig. 2: T1).

Adding distension (T4) to conventional rehabilitation can significantly improve functional recovery in the first few weeks ($P < 0.05$) but then has no impact on clinical progression. Locoregional anesthesia added to conventional rehabilitation (T5) presents identical progression to the

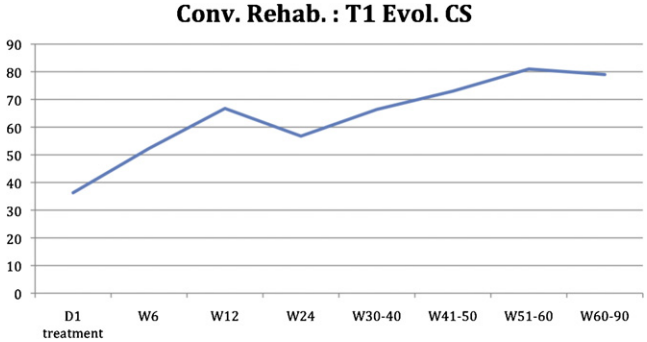

Figure 1 T1, progression of function over time.

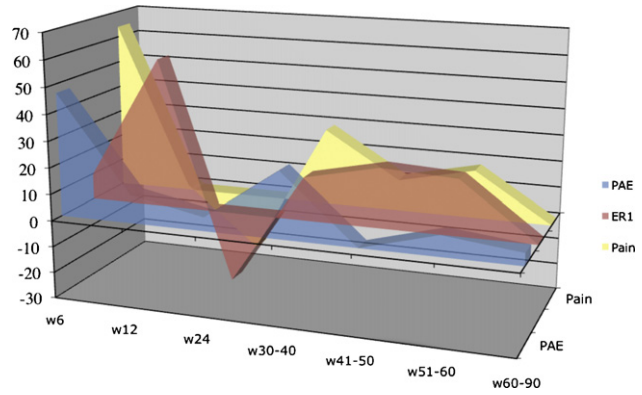

Figure 2 T1, therapeutic power.

population treated with conventional rehabilitation alone but for a population that was more disabled when treatment began (Fig. 3).

Exclusive self-rehabilitation over the pain threshold provides more rapid pain-free nights and then days than the other therapy options ($P < 0.05$) (43% of the patients without pain at night after 7 days of treatment), with overall functional progression equivalent to conventional rehabilitation (T1) in the first 6 weeks. From the 6th week to the 3rd month, exclusive self-rehabilitation stagnates and function no longer progresses and then improves again beginning

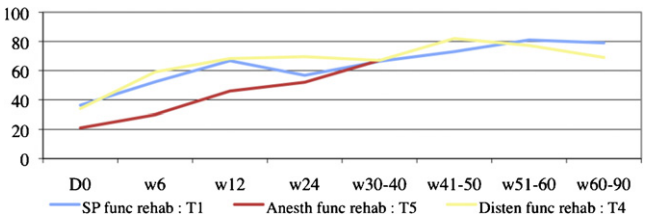

Figure 3 T1, T4, and T5: progression over time compared to function in the rehabilitated populations.

at the 3rd month, giving significantly better results than the other techniques up to 1 year of treatment, with an equivalent final result. Self-rehabilitation with encouragement to go beyond the pain threshold (T3) significantly improves the functional result compared to T2 between the 6th and 12th week of treatment.

Capsulotomy (T6) demonstrated no significant differences on overall function or the final result.

Fig. 4 shows progression compared to function in the rehabilitated and operated populations.

There was no significant difference at the final revision between the six techniques compared. The therapeutic power of each technique during the follow-up is presented in Fig. 5. Figs. 6—11 present compared progression for pain, passive elevation, and external rotation for the different techniques.

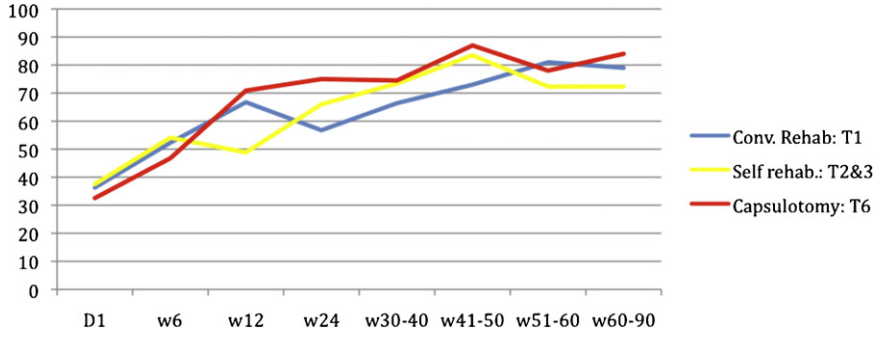

Figure 4 Progression over time compared to function in the rehabilitated and surgical populations.

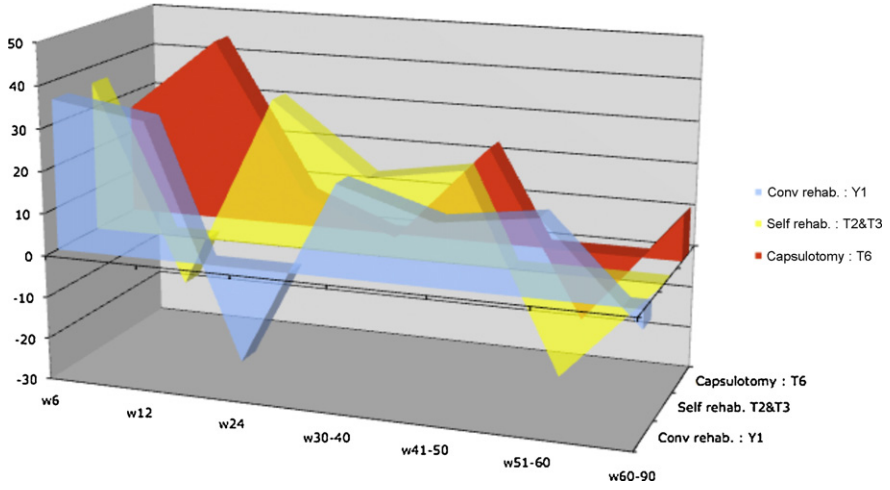

Figure 5 Progression over time of therapeutic efficacy for each technique in terms of function.

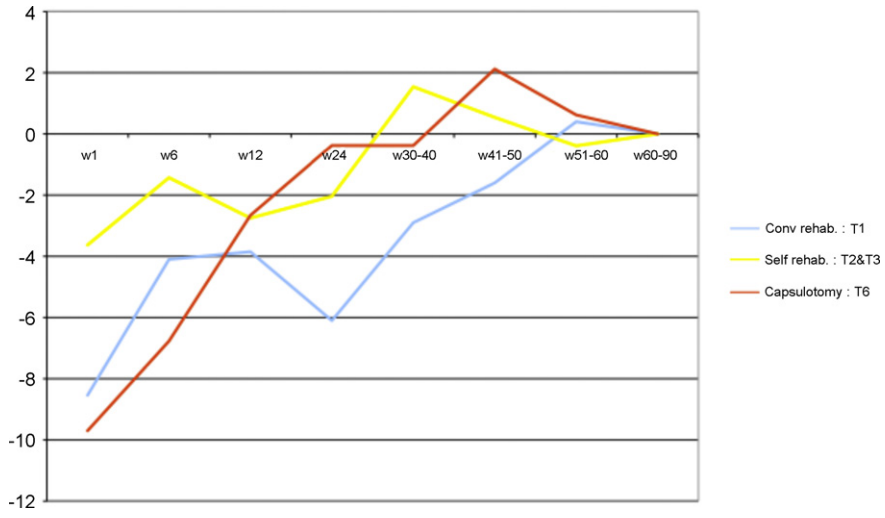

Figure 6 Progression over time compared to pain.

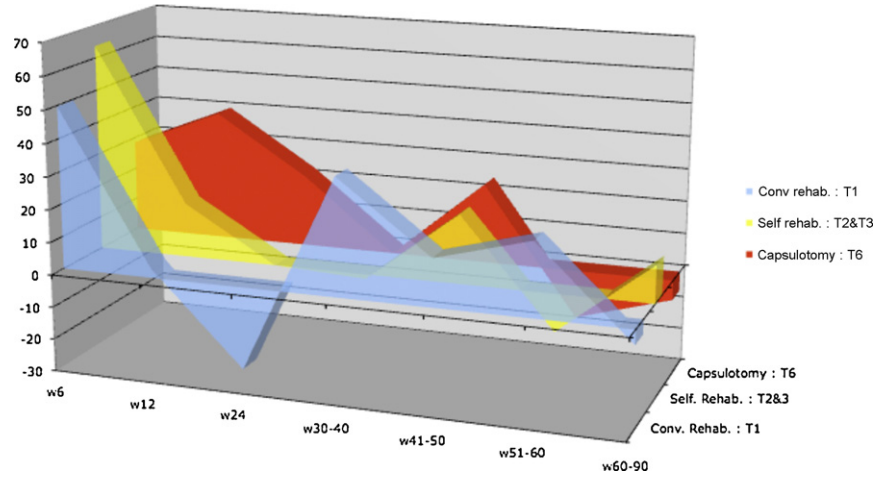

Figure 7 Progression over time of therapeutic efficacy for each technique in terms of pain.

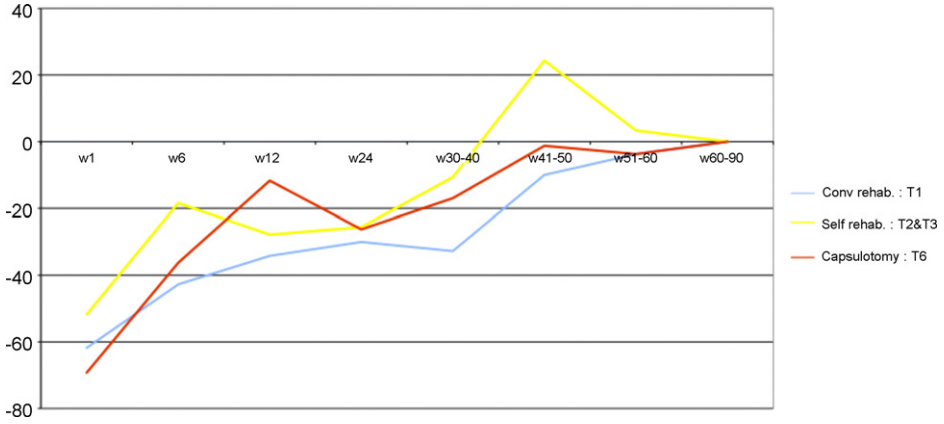

Figure 8 Progression over time compared to passive elevation.

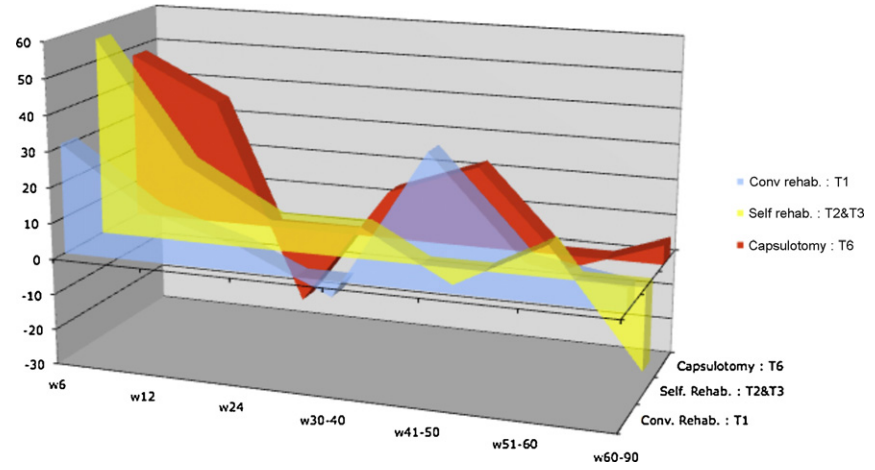

Figure 9 Compared progression of therapeutic efficacy for each technique in terms of passive elevation.

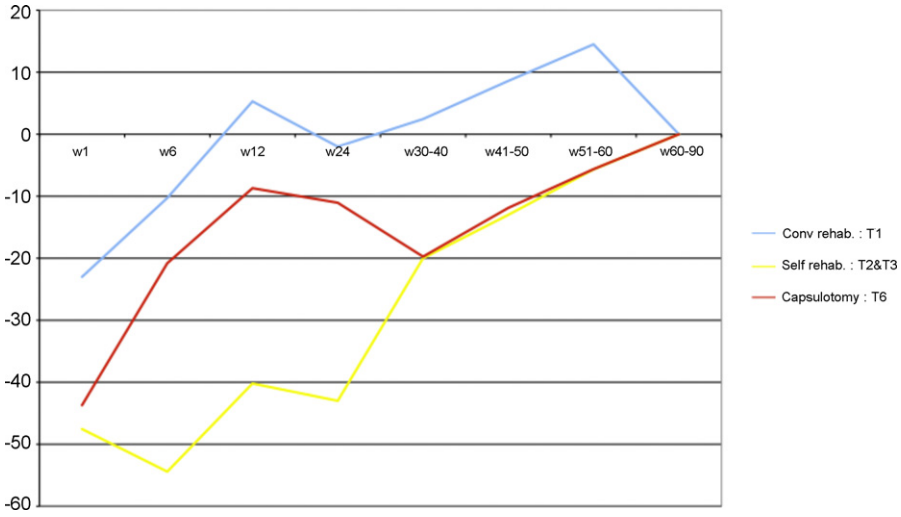

Figure 10 Progression compared to external rotation 1.

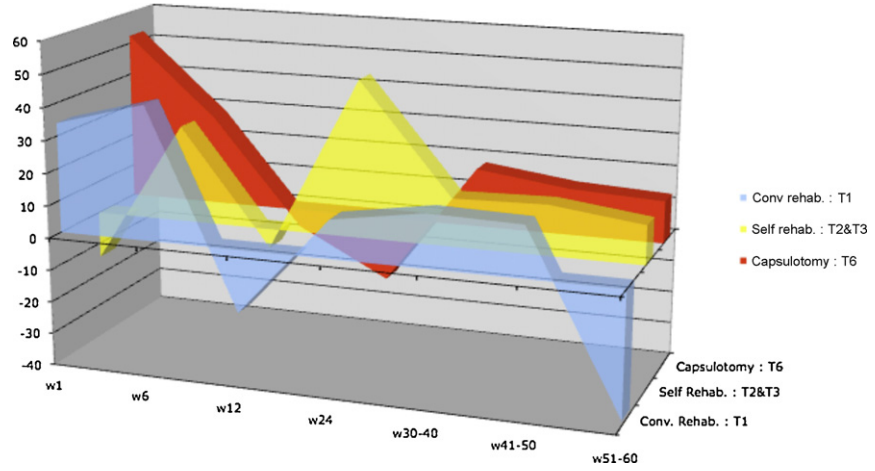

Figure 11 Compared progression of therapeutic efficacy for each technique in terms of external rotation.

Analytical study of each technique's therapeutic power when used in combined treatment

If the conventional rehabilitation group is considered to be the reference population (level 0), doing exercises beyond the pain threshold, in the rehabilitation process, improves the final functional result by 10% (Constant score), by 12% if the work beyond the pain threshold is associated with exclusive self-rehabilitation and by 15% if raising the pain threshold is associated with self-rehabilitation supervised by a trained physical therapist. Distention and locoregional anesthesia only contribute 3 and 6%, respectively, of the final result; capsulotomy in itself contributes 15% more compared to isolated conventional rehabilitation. These percentages are not cumulative.

Failures (Table 2)

The criteria for failure at 1 year or at revision were passive forward flexion less than 140°, external rotation less than 20° compared to the contralateral shoulder, and a functional result less than 80 points on the Constant score.

Conventional rehabilitation (T1) and self-rehabilitation (T2 and T3) presented failure rates between 14 and 17.6% at 1 year and at revision, respectively ($P < 0.05$). These failures occurred exclusively in the post-traumatic and post-surgical populations. Patients treated with capsulotomy, anesthesia, and conventional rehabilitation (T6) presented no failures based on these criteria ($P < 0.05$).

Discussion

Symptoms

Limiting the variables and reducing the shoulder stiffness management to a simple but significant symptom of the diagnosis and the clinical progression allows a factual and simple study that is reliable and provides objective and comparable results.

The standardized exam, with the scapula locked, with monitoring and neutralization of the analgesic compensations and reflexes of the shoulder is an essential preliminary step in any clinical examination of the shoulder [7,23,40].

The populations studied

Contrary to previously published work [2,3,5,6,20,22,43], we did not define the populations based on etiology or disease stage the day patients began treatment. The uniqueness of each patient's clinical progression and the lack of pronounced statistical differences between the different populations reinforces the utility of limiting the study variables to the stiffness symptoms.

The population in this study was in accordance with the data reported in the literature [43—45], but two population profiles stood out clearly: one population of younger patients who were active, with a relatively high socioprofessional level, with no particular history of shoulder pain and a healthy rotator cuff, and a second population of older patients who were not very active, with a lower socioprofes-

Table 2 Failures (%) by criterion, population, and time to revision.

	FF < 140° 1 year	FF < 140° Revision	ER1 < 20 °CL 1 year	ER1 < 20 °CL Revision	Constant < 80 pts 1 year	Constant < 80 pts Revision	Constant < 70 pts 1 year	Constant < 80 pts Revision
Conv rehab (T1, T4, T5) (%)	14.3	0	0	0	83.3	0	28.6	0
Self-rehab (T2, T3) (%)	17.6	7	29.4	6.7	17.6	17.6	5.9	6.7
Capsulotomy (T6) (%)	0	0	0	0	0	0	0	0

Conv rehab: conventional rehabilitation; self-rehab: self-rehabilitation; FF: forward flexion; ER: external rotation; pts: points.

sional level, with less pain but more often with a history of shoulder problems, particularly more frequent rotator cuff rupture. We believe that these two populations should be treated differently with in the first a manageable symptom that often warranted only common sense and individual work, whereas the other presents several chronic pathologies that require more substantial medicalization.

The impact of the different techniques

There have been no prospective comparative studies of the different treatments for shoulder stiffness with daily and then weekly follow-up. This methodology has made it possible to isolate the respective impact of each treatment more precisely. Given the natural history of shoulder stiffness [25], comparison with an untreated control population would have allowed us to better calibrate the contribution of each technique, but this could not be done within a clinical study. The lack of significantly different results between the various techniques for most of the criteria, in particular functional criteria, during most of the follow-up period and most particularly at the final revision, raises the problem of the objective value of these different therapies and their human and socioeconomic cost [46—48].

In this study, self-rehabilitation over the pain threshold improves symptoms and in particular pain during the first 6 weeks and then stagnates, whereas conventional rehabilitation continues to be useful even if it is less effective beyond 6 weeks. The effect of conventional rehabilitation runs out with patients who may regress once therapy is reduced, whereas patients in self-rehabilitation are more efficient over durations longer than 6 months.

The respective roles played by rehabilitation and self-rehabilitation are poorly known because analytical and comparative studies have been insufficient [27,47—53]. The analysis reported herein shows that patients in exclusive self-rehabilitation are less diligent after a few weeks, once the major part of the result has been obtained; then, because of education and an absence of dependence on the therapist, they can complete the gain in flexibility in the shoulder themselves after a few months, a time when the population treated by conventional rehabilitation is embarked on a laborious task because they tend toward dependency. Supervised self-rehabilitation (T3) neutralizes the effect of patient lassitude in exclusive self-rehabilitation. Medical and surgical acts (T4, T5) contribute no significant long-lasting benefits, but capsulotomy (T6) guarantees the absence of failure and recurrence.

The results obtained by the different therapies are very similar. Taken individually, they match the data reported in the literature [4,6,25,44,50,54]. We also believe that the sequencing of these different techniques is the key to a reliable final result.

Failures

The limits of the possibilities of complete functional recovery for the durations studied are illustrated by the rates of what we have defined as failures [4,35,45,49,54], which confirms that shoulder stiffness should be considered a ''disease'' and that 1 year of follow-up is warranted and can be proposed to the patient. The fact that clinical improvement is systematically correlated with the time spent and the intensity of the self-rehabilitation exercises demonstrates the importance of the patient's active participation in his functional recovery. This also enlists his own responsibility in the failure of the treatment despite the medical procedures adapted to his case. The failures in this series are directly correlated with the patient's insufficient mobilization of the joint, which brings out not only the importance of the notion of patient therapeutic education, but also the analysis of the patient's capacity and willingness to mobilize the shoulder, in particular in a context of secondary benefit or a medical-legal process. We believe that the practitioner cannot be held responsible for stiffness if there is no mechanical foundation for this stiffness (malunion, etc.) and if the usual treatment techniques have been implemented associated with clear patient therapeutic education.

Pain management

Self-rehabilitation techniques over the pain threshold have rapidly shown that they are the most effective for night-time and then daytime pain relief. We believe that pain managed by an active patient improves the quality of the result, whereas pain dreaded by a passive patient dependent on the therapist will alter the result [54].

Proposal for a three-step algorithm for managing the stiff shoulder (Fig. 12)

The principle of this algorithm is to compile the data from the literature [6,20,22,27,48] with the results from this study. It was designed to be applied identically to all patients the day their treatment begins, whatever treatments and duration, they may have undergone before the study. After a complete clinical and radiological workup:

- first step: 3 months of intensive self-rehabilitation, if possible checked and supervised by a trained physical therapist who will stimulate and relieve the patient and then progressively introduce the conventional rehabilitation exercises;
- second step: 3 months to 6 months:
  - if progression is favorable, supervised self-rehabilitation should be continued,
  - if progression is unfavorable and it is certain that the patient is doing her best, performing a distention or locoregional anesthesia with intensified conventional rehabilitation may be warranted,
  - if progression is unfavorable and there is doubt as to the patient's work or willingness, rehabilitation should continue but without proposing additional intervention,
- third step: 6th month:
  - if progression is favorable, the shoulder is considered to be normal and care is terminated,
  - if progression is unfavorable and there is certainty that the patient is doing his best, a capsulotomy (T6) can be proposed,
  - if progression is unfavorable and there is doubt on the patient's work or willingness, a clinical and radiological workup must be done to look for a hidden problem (an

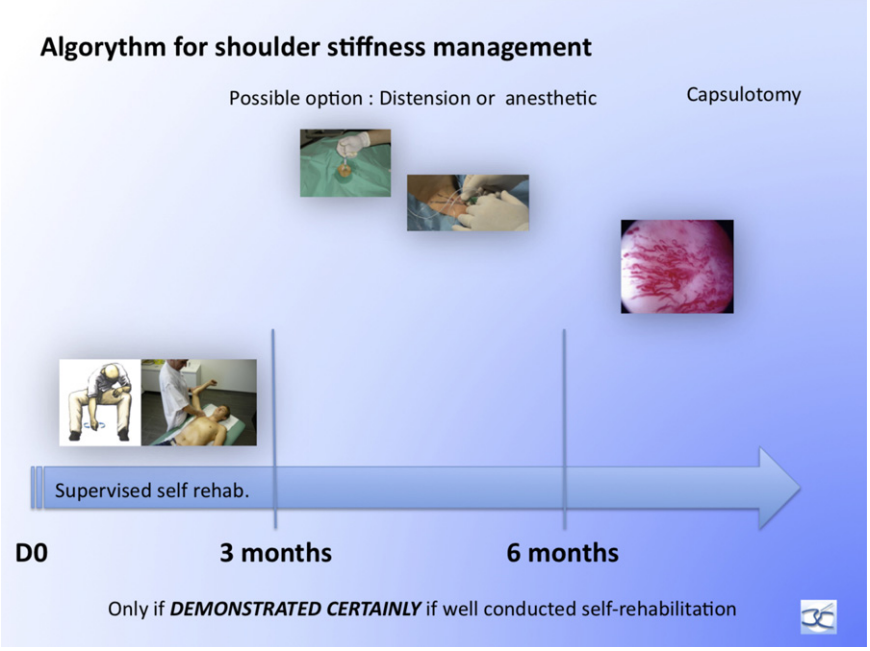

Figure 12 Algorithm for shoulder stiffness management.

unusual patient profile, a physical therapist ''limiting'' recovery, but also an undetected organic disorder, etc.).

After the third step, if there is no certainty that the patient has done her best to complete her share of the work, doubt as to her willingness to mobilize the joint is warranted and we believe that it is legitimate to stop needlessly medicalizing a clinical picture that can be considered to be maintained by the patient. Capsulotomy, in this case, is contra-indicated.

Conclusion

Shoulder stiffness is best revealed by a standardized clinical exam and should be managed with a single strategy whatever the patient's etiological or nosological situation. The main therapeutic techniques used to treat shoulder stiffness have a nearly equivalent therapeutic potential with very different levels of medicalization, risks and benefits, and costs. We believe that each of these techniques has its place but that this place should be clearly defined. The algorithm that we propose herein provides for the indispensable involvement of the patient associated with progressive and well-adapted medical care up to the 6th month. If progression is not favorable at the 6th month of this treatment process and if the patient has demonstrated his active participation and willingness to increase flexibility in the joint without a possible doubt, capsulotomy will provide the solution.

Management of shoulder stiffness is an exemplary diagnostic and therapeutic exercise in that it is based on the patient recuperating her joint, on the energy and movement recovered with the therapeutic education provided, her will, and the trust that she will have developed in her therapists who must know how to provide the patient with reasoned rehabilitation and a healthy restraint in the therapeutic endeavor. Fear of shoulder stiffness is needless, and this symptomatic ailment is benign and can most often be cared for within a few weeks.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

Appendix 1. Revision sheet.

SOCIETE FRANCAISE D'ARTHROSCOPIE
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First Consultation Sheet – *Shoulder stiffness SFA 2010*

Name ☐ Date ☐☐☐☐☐☐

First name ☐ Center ☐☐☐
(ex: COlmar Gleyze= COG)

Sex (1=M, 2=F) ☐ Evaluating physician ☐☐
(initials)

Date of birth (d/m/y) ☐☐☐☐☐☐

Side (1=R, 2=L) ☐

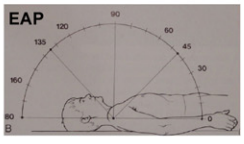
Dominance (1=dom, 2=nondom) ☐

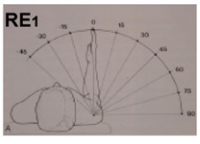
Contralateral shoulder
(0=normal, 1= history of capsulitis, 2=abnormal) ☐

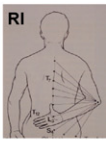
Activity
(1=heavy manual, 2=light manual, 3=active, 4=inactive) ☐

Type of treatment:
(1= conventional rehab, 2= self-rehab > pain threshold, 3= supervised self-rehab 4= anesth + rehab, 5= Distention, 6= Capsulotomy w/anesth.) ☐

Mobility







Passive	***Effect***	***Contraolat.***
Forward flexion (supine, goniometer, arc 0–180°, no abduction)	☐☐☐	☐☐☐
ER1 (± and degree, supine)	☐☐☐	☐☐☐
ER2 (supine)	☐☐	☐☐
RI (end of thumb, th=thigh, po=pocket, bu=buttocks, S1, L5, etc.)	☐☐	☐☐
Active forward flexion (AFF)	☐☐☐	☐☐☐
Ascension shoulder stump (FF)	(0=no, 1=yes)	☐

Type of injury

- Spontaneous (arthropathies excluded) (0=no 1=yes) ☐
  - if yes - mode (1=progressive, 2=sudden, 3=after overwork) ☐
  - time (months) ☐☐

- Post-traumatic (malunion excluded) (0=no, 1=yes) ☐
  - if yes - date of injury (d/m/y) ☐☐☐☐☐☐
  - type of injury (1=contusion, 2=fract., 3=dislocation) ☐
  - pain-free interval? (months) ☐☐

- Postsurgical (protheses, osteosynthesis excluded) (0=no, 1=yes) ☐
  - if yes - date of surgery (d/m/y) ☐☐☐☐☐☐
  - type of surgery
    (1=open rotator cuff, 2=rotator cuff, 3=open instability, 4=instability, 5=other (explain) _____) ☐
  - pain-free interval? (months) ☐☐

Associated shoulder pathology (documented)

Rotator cuff problem (0=no, 1=calcif., 2= noncalcif tendinopathy, 3=rupture) ☐

Other (explain) _____ (0=no, 1=yes) ☐

Predisposing circumstances

Endocrine (0=no, 1=yes) ☐
If yes (1=diabetes, 2=thyroid prob, 3=other) ☐

Rheumatological (0=no, 1=yes) ☐
If yes (1=RA, 2=PMR, 3=other) ☐

Neurological (0=no, 1=yes ☐
If yes (1=Parkinson, 2=hemiplegia, 3=other) ☐

Surgical (0=no, 1=yes) ☐
If yes (1=sein, 2=abdomen, 3=other) ☐

Medication-related (0=no, 1=yes) ☐
If yes (1=barbiturates, 2=Isoniazid, 3=other) ☐

History of algodystrophy other site (0=no, 1=yes) ☐
(Location, explanation) _____

Other (0=no, 1=yes) ☐
(explain) _____

Associated signs

Dupuytren sign, hand (0=no, 1=yes) ☐

Cervical problem (0=no, 1=cervical pain, 2=CBPS) ☐

Syndrome épaule-main (0=no, 1=moderate, 2=severe)

Occupational situation

(0=none or retired, 1=employed, 2=sick leave, 3=leave from work) ☐

If leave, how long? (months) ☐☐

X-rays

(0=normal, 1=demineralized head, 2= spotty aspect) ☐

Scores

- Constant score (points)

	Side	*Contraolat.*
Pain (/15)	☐☐	☐☐
(**mean** of grade 0 to 15 and type of onset grade with 0= rest, 5= minimum effort, 10= great effort, 15= none or climate-related)		
Activity (/20)		
1-Occupational disability. (0 pts ≥ 4 pts)	☐☐	☐☐
2-Disability for leisure activities (0 pts ≥ 4 pts)	☐☐	☐☐
3-Discomfort during sleep (0 pts ≥ 2 pts)	☐☐	☐☐
4-Level of work with hand (10 pts) size: 2, xyphoid:4, neck: 6, head: 8, above :10	☐☐	☐☐
Active mobility (/40)		
→ Active flexion (10 pts): *0 ≥ 30° (0 pts), 30 ≥ 60° (2 pts), 60 ≥ 90° (4 pts), 90 ≥ 120° (6 pts) 120 ≥ 150° (8 pts), 150 ≥ 180°(10 pts)*	☐☐	☐☐
→ Active abduction (10 pts) *0 ≥ 30° (0 pts), 30 ≥ 60° (2 pts), 60 ≥ 90° (4 pts), 90 ≥ 120° (6 pts) 120 ≥ 150° (8 pts), 150 ≥ 180°(10 pts)*	☐☐	☐☐
→ Active external rotation (10 pts) (ER1) *- hand behind head, elbow forward (2 pts), back (2 pts) - hand on head, elbow forward (2 pts), elbow back (2 pts) - hand above head (2 pts)*	☐☐	☐☐
→ Active internal rotation (10 pts) (end of thumb on: thigh (0), buttocks (2), sacrum (4), L3 (6) Th12 (8), Th7 (10)	☐☐	☐☐
Strength (/25)	☐☐	☐☐
Total (/100)	☐☐☐	☐☐☐

- SSV (%)

☐☐☐ ☐☐☐

Comments:

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Appendix 2. Rehabilitation follow-up information sheet.

Last name, first name, file number: **GROUP:** **REHABILITATION FOLLOW-UP - p1**

1 Daily functional evaluation sheet / Patient / WEEK

How to answer questions

1° Pain, discomfort, and morale: Score from "0" to "10" ("0" = Zero pain or zero discomfort) (Morale = "0" = morale very low)

2° Exercices ***Pain:*** Severe pain, put "SP", Moderate pain, put "MP", Low pain, put "LP", no pain, put "NP"

Action: Impossible, put "I"; Possible, put "P"; Easy, put "E"

Time: Time spent in minute(s)

WEEK 1 - 2 - 3 - 4 - 5 - 6 - 7- 8 - 9 - 10 - 11 - 12

TO BE COMPLETED BY PATEENT

1st day	2nd day	3rd day	4th day	5th day	6th day	7th day
Pain	**Pain**	**Pain**	**Pain**	**Pain**	**Pain**	**Pain**
Pain during day	*Pain during day*	*Pain during day*	*Pain during day*	*Pain during day*	*Pain during day*	*Pain during day*
./10	./10	./10	./10	./10	./10	./10
Pain at night	*Pain at night*	*Pain at night*	*Pain at night*	*Pain at night*	*Pain at night*	*Pain at night*
./10	./10	./10	./10	./10	./10	./10
Discomfort	***Discomfort***	***Discomfort***	***Discomfort***	***Discomfort***	***Discomfort***	***Discomfort***
./10	./10	./10	./10	./10	./10	./10
Morale	**Morale**	**Morale**	**Morale**	**Morale**	**Morale**	**Morale**
./10	./10	./10	./10	./10	./10	./10
Infiltration	**Infiltration**	**Infiltration**	**Infiltration**	**Infiltration**	**Infiltration**	**Infiltration**
YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
Major antalgesic	**Major antalgesic**	**Major antalgesic**	**Major antalgesic**	**Major antalgesic**	**Major antalgesic**	**Major antalgesic**
YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
TO BE COMPLETED BY PRACTETEONER						
Exercises	**Exercises**	**Exercises**	**Exercises**	**Exercises**	**Exercises**	**Exercises**
Scapular massage	***Scapular massage***	***Scapular massage***	***Scapular massage***	***Scapular massage***	***Scapular massage***	***Scapular massage***
Action	*Action*	*Action*	*Action*	*Action*	*Action*	*Action*
I P E	I P E	I P E	I P E	I P E	I P E	I P E
Pain	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*
SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP
Time spent in min	*Time spent in min*	*Time spent in min*	*Time spent in min*	*Time spent in min*	*Time spent in min*	*Time spent in min*
CervEco-dors mass	***Cervico-dors mass***	***Cervico-dors mass***	***Cervico-dors mass***	***Cervico-dors mass***	***Cervico-dors mass***	***Cervico-dors mass***
Action	*Action*	*Action*	*Action*	*Action*	*Action*	*Action*
I P E	I P E	I P E	I P E	I P E	I P E	I P E
Pain	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*
SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP
Time spent	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*
Overall pass mob	***Overall pass mob***	***Overall pass mob***	***Overall pass mob***	***Overall pass mob***	***Overall pass mob***	***Overall pass mob***
Action	*Action*	*Action*	*Action*	*Action*	*Action*	*Action*
I P E	I P E	I P E	I P E	I P E	I P E	I P E
Pain	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*
SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP
Time spent	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*
Analytic pass mob	***Analytic pass mob***	***Analytic pass mob***	***Analytic pass mob***	***Analytic pass mob***	***Analytic pass mob***	***Analytic pass mob***
Action	*Action*	*Action*	*Action*	*Action*	*Action*	*Action*
I P E	I P E	I P E	I P E	I P E	I P E	I P E
Pain	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*
SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP
Time spent	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*
Sohier recentering	***Sohier recentering***	***Sohier recentering***	***Sohier recentering***	***Sohier recentering***	***Sohier recentering***	***Sohier recentering***
Action	*Action*	*Action*	*Action*	*Action*	*Action*	*Action*
I P E	I P E	I P E	I P E	I P E	I P E	I P E
Pain	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*
SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP
Time spent	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*
Scap throac mob	***Scap throac mob***	***Scap throac mob***	***Scap throac mob***	***Scap throac mob***	***Scap throac mob***	***Scap throac mob***
Action	*Action*	*Action*	*Action*	*Action*	*Action*	*Action*
I P E	I P E	I P E	I P E	I P E	I P E	I P E
Pain	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*
SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP
Time spent	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*
Assisted act mob	***Assisted act mob***	***Assisted act mob***	***Assisted act mob***	***Assisted act mob***	***Assisted act mob***	***Assisted act mob***
Action	*Action*	*Action*	*Action*	*Action*	*Action*	*Action*
I P E	I P E	I P E	I P E	I P E	I P E	I P E
Pain	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*
SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP
Time spent	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*
Act mob + strength	***Act mob + strength***	***Act mob + strength***	***Act mob + strength***	***Act mob + strength***	***Act mob + strength***	***Act mob + strength***
Action	*Action*	*Action*	*Action*	*Action*	*Action*	*Action*
I P E	I P E	I P E	I P E	I P E	I P E	I P E
Pain	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*	*Pain*
SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP	SP MP LP NP
Time spent	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*	*Time spent*

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