HAUTE AUTORITÉ DE SANTÉ

CLINICAL PRACTICE GUIDELINES

Post-operative rehabilitation after rotator cuff tear surgery or shoulder arthroplasty:

Inpatient or outpatient care?

GUIDELINE

January 2008

The full scientific report (in French) for this guideline may be downloaded from
www.has-sante.fr

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Table of contents

Abbreviations

Table 1. Most common abbreviations

Description	Abbreviation
Long-term condition (*affection de longue durée*)	ALD
Accident at work	AW
Therapeutic patient education	TPE
Haute Autorité de Santé	HAS
Occupational disease	OD
Physiotherapist	PT
Physical and Rehabilitation Medicine	PRM
Rehabilitation centre or post-care medical centre	SSR

Guideline

1. Introduction

1.1 Subject and aims of this guideline

This clinical guideline on '*Post-operative rehabilitation and referral to outpatient or inpatient rehabilitation centre care after rotator cuff tear surgery or shoulder arthroplasty after rotator cuff tear surgery and shoulder arthroplasty*' has been drafted by the Haute Autorité de Santé (HAS) and supplements the HAS guideline of March 2006.[1] The latter guideline was issued in accordance with the Social Security Funding Act for 2006. The purpose of these various HAS[3] publications is to prevent inappropriate hospitalisation in rehabilitation centres after certain types of orthopaedic or surgical treatment.

► Background

Once shoulder surgery has been indicated[4], the overall aim of rehabilitation after surgery is to achieve a pain-free, mobile and stable shoulder. The functional outcome obtained, however, will vary according to the initial condition, which means that the rehabilitation goals must be adapted to each individual patient.

In 2008 in France, rehabilitation after shoulder surgery may take place

- either with a physiotherapist present (supervised rehabilitation): physiotherapy sessions are under physiotherapist supervision, supplemented if necessary with occupational therapy sessions; outside the physiotherapy sessions, the patient performs the recommended self-mobilisation exercises by him or herself
- or without a physiotherapist present (self-rehabilitation programme): the medical/surgical team presents the patient with a rehabilitation programme which the patient then follows at home alone without professional supervision apart from medical/surgical follow-up. After leaving the surgical department, the patient attends no rehabilitation sessions run by a healthcare professional.

Different forms of rehabilitation are organised and proposed in 2008 in France:

- outpatient rehabilitation: in the patient's home or on the premises of an individual practitioner or technical support centre (public or private healthcare establishment, or group practice)
- inpatient rehabilitation: during the patient's stay in the surgical department, and then if transferred to a rehabilitation centre (SSR). Various systems of care are available in SSRs: standard hospitalisation or weekly or day admission in a specialist physical and rehabilitation medicine (PRM) unit, or standard hospitalisation in multipurpose post-acute medical centres.[5]

[1] For further information, see 'HAS guideline prepared by formal consensus on surgical and orthopaedic procedures not generally requiring hospitalisation for post-operative medical care and rehabilitation in patients for whom physiotherapy is indicated', HAS, 2006 [in French].
[2] The Social Security Funding (2006) Act No 2005-1579 of 19 December 2005 amended Article L. 162-2-2 of the Social Security Code as follows: 'Doctors prescribing physiotherapy should follow the guidelines prepared by the Haute Autorité de Santé when assessing whether the patient should be hospitalised in order to receive the follow-up care or rehabilitation mentioned in Article 6111-2 of the Public Health Code.
[3] See also: 'Criteria for rehabilitation postoperative care and for choosing outpatient or rehabilitation centre care following total knee arthroplasty', HAS 2008, and 'Criteria for rehabilitation postoperative care and for choosing outpatient or rehabilitation centre care following ligamentoplasty of the anterior cruciate ligament of the knee', HAS 2008 .
[4] For further information, see the clinical practice guideline on 'Management of chronic painful shoulder without instability', HAS 2005.
[5] A draft decree on the technical operating conditions applicable to the activities of rehabilitation centres is being prepared and may demand multipurpose structures and specialist structures, particularly for locomotor system conditions.

► Aims of the guideline and questions raised

The aims of this guideline are:

- to help doctors make the right decision when prescribing physiotherapy after rotator cuff surgery or shoulder arthroplasty by enabling them to assess whether the patient should be hospitalised in order to receive such care
- to specify the information that needs to be exchanged between the surgeon and the physiotherapist in order to implement the patient's postoperative rehabilitation, wherever the rehabilitation may take place.

The questions that are addressed by this guideline are the following:

- what are the indications for rehabilitation techniques after shoulder rotator cuff surgery and arthroplasty?
- what are the clinical assessment criteria required for postoperative follow-up and for referral choice?
- what information needs to be exchanged between the surgeon and the physiotherapist in order to implement the patient's postoperative rehabilitation?
- what are the organisational procedures for providing the patient with treatment and follow-up?
- what are the economic and organisational consequences of a possible transfer of activities from one sector to the other?
- Can rehabilitation after shoulder rotator cuff surgery or arthroplasty be performed in the community?[6]

► Limits of the guideline

The guideline does not give details of how rehabilitation techniques should be applied, but sets out the indications for them so as to specify the structures in which they may be implemented.

1.2 Patients concerned

Adults and adolescents, following one of the following surgical interventions:

- surgery following rotator cuff tears:
  - debridement
  - tendon reinsertion or suture
  - reconstruction by means of muscle flaps
- shoulder arthroplasty
  - post-traumatic arthroplasty
  - partial or total anatomical arthroplasty
  - inverted arthroplasty.

1.3 Health professionals concerned

This guideline is principally aimed at health professionals involved in rehabilitation following shoulder surgery or in referring the patient to rehabilitation specialists, in particular:

- primary target groups:
  - orthopaedic surgeons
  - physical medicine and rehabilitation specialists
  - physiotherapists

- secondary target groups:
  - sports medicine specialists
  - general practitioners
  - rheumatologists
  - specialists in medicine and health in the workplace

[6] The March 2006 formal consensus is worded as follows: '… rehabilitation, if indicated, may be performed in the community insofar as it is not incompatible with keeping the patient at home on account of local or regional complications, associated diseases, or social isolation.'

- occupational therapists.

1.4 Grading of the guidelines

The proposed guidelines have been rated as grade A, B or C according to the following criteria:

- a grade A guideline is based on scientific proof established by studies with a high level of evidence, such as powerful comparative randomised trials with no major bias, or meta-analysis of randomised comparative trials, or analysis of decisions based on well-conducted studies (level of evidence 1);
- a grade B guideline is based on scientific presumption obtained from studies with a moderate level of evidence, such as less powerful comparative randomised trials, well-conducted non-randomised comparative studies, and cohort studies (level of evidence 2);
- a grade C guideline is based on studies with a poorer level of evidence, such as case-control studies (level of evidence 3), retrospective studies, case series or comparative studies with considerable bias (level of evidence 4).

In the absence of any studies, guidelines are based on expert consensus within the working group convened by HAS, after discussion with the review group. The absence of any level of evidence does not mean that the guidelines are not relevant or useful. It should, however, encourage investigators to conduct additional studies. Some proposals are shown in Appendix 1.

2. Indications for rehabilitation

Rehabilitation is recommended for all patients after shoulder arthroplasty or rotator cuff surgery, regardless of the surgical technique proposed (grade C).

Current evidence of the benefits of rehabilitation after surgery are based on numerous case series documenting clinical progress before and after surgery, followed by rehabilitation. No study has compared the results of surgery with or without rehabilitation.

► After shoulder rotator cuff tears surgery

It is recommended that rehabilitation after shoulder rotator cuff tears surgery should be performed with a physiotherapist (supervised rehabilitation) (grade C).
Rehabilitation may be performed by the patient him or herself (self-rehabilitation) (grade C) only where the following conditions are effectively satisfied (professional consensus):

- the patient is presented with the self-rehabilitation programme prior to the surgery and accepts its principles
- the medical and surgical follow-up procedures are specified and made known to the patient
- the self-rehabilitation programme procedures are presented to the patient and thoroughly mastered
- the patient understands any possible complications
- postoperative pain is brought under control before discharge from hospital, so that the patient can commence the programme under a physiotherapist's supervision during the postoperative period of hospitalisation on the surgical department.

Rehabilitation programmes conducted by a physiotherapist have been compared with self-rehabilitation programmes performed by the patient following shoulder rotator cuff surgery, whether open or arthroscopic, for acromioplasty or tendon repair (4 studies, level of evidence 4); all of these studies were conducted outside the context of France. It is not currently possible to conclude from the literature data whether one rehabilitation approach is better than the other or whether the data can be transposed to a French population. Self-rehabilitation is currently being developed in France, and the clinical experience of the professionals implementing it in France in 2008 shows that it requires specific conditions, which are detailed in the guideline.

► After arthroplasty

It is recommended that rehabilitation after shoulder arthroplasty be performed by a physiotherapist and supplemented if necessary with the work of an occupational therapist (grade C). Self-rehabilitation is not recommended after shoulder arthroplasty (professional consensus).

Studies of rehabilitation programmes following shoulder arthroplasty have only evaluated programmes performed with a physiotherapist, either in association with an occupational therapist or not, and only in the form of uncontrolled case series (level of evidence 4). These programmes may comprise self-mobilisation exercises. However, no study has evaluated a self-rehabilitation programme. The clinical experience of professionals in France in 2008 confirms that rehabilitation following shoulder arthroplasty should be systematically supervised by a physiotherapist, during the initial stages at least. Five studies have been conducted in PRM departments and one in outpatients for planned arthroplasties.

► Indications for occupational therapy

Occupational therapy is only indicated when readaptation is required, particularly to help the patient regain independence in daily activities or return to work (professional consensus).

No study has evaluated the effects of occupational therapy. The professionals brought together by HAS confirm its value both in the early postoperative period, with a view to enhancing the patient's independence in the activities of daily life, and before the patient returns to work, with a view to retraining him or her in the movements required at work or considering possible adaptations in the workplace, in liaison with workplace doctor.

3. Rehabilitation programmes and techniques

On the basis of the literature search and the compilation of professional practices described by the professionals brought together by HAS in 2007, and in light of the expected outcomes aside from any complications, it has been possible to establish the following by means of professional consensus:

- the various stages in a rehabilitation programme
- the general physiotherapy and rehabilitation objectives in each one
- the criteria for moving from one stage to the next
- the criteria for ending rehabilitation and the factors requiring adaptation of these programmes.

The individual aims of rehabilitation should be adapted to the patient's goals, which may be limited, and subsequent clinical assessments. All the guidelines in this section are based on professional consensus. They are summarised in the table below.

Table 2. Rehabilitation programmes and objectives according to the stage of care.

Rehabilitation stage	Primary objectives	Indications	Expected outcomes and end criteria
Preoperative	Inform Restore passive mobility Learn to perform self-mobilisation	Planned surgery Preoperative stiffness	Restoration of subnormal ranges of motion Patient's adaptation to postoperative conditions
Initial postoperative Immediately following the intervention Duration depends on the anatomical structures repaired (surgical decision)	Restore passive mobility Solicit contraction of unrepaired muscles Supervise clinical evolution (support device, pain, complications)	All patients	Subnormal passive mobility gradually improving
Secondary postoperative From the end of the period of relative immobilisation, with the surgeon's or PRM specialist's agreement to start active work	Wean off wearing arm support device Restore active mobility against gravity By 3 months restore arm function for all sedentary activities of daily living, excluding resistance activities	All patients	Pain-free passive and active ranges of motion in a physiological pattern, resulting in functional independence, bearing in mind the patient's context and goals Stop at the end of the 4th month at the latest, unless there are complications
Tertiary postoperative After the end of the 4th month in cases of tendon repair	Gradually restore previous physical and working activities, including load-bearing activities Readjust the patient to stress and specific work- or sport-related movements	Only if resuming previous activities demands maximum physical fitness	Resumption of the working, sport or leisure activity is possible No further progress in muscle functions or movement-related functions Stop at the end of the 6th month at the latest.

3.1 Rehabilitation programmes

► Expected outcomes after a rehabilitation programme

The expected outcomes after a physiotherapy and rehabilitation programme, in the absence of any complication, are:

- restoration of arm function for all sedentary activities of daily life after 3 months (average time)
- gradual restoration of previous physical and working activities, including load-bearing activities, after 6 months (average time).

These outcomes should be attained gradually and systematically over three consecutive stages of physiotherapy and rehabilitation. These three stages may possibly be preceded by a preoperative stage of rehabilitation.

► Preoperative rehabilitation

Preoperative rehabilitation is recommended prior to rotator cuff surgery if there is joint stiffness in the shoulder.

Preoperative rehabilitation may be proposed before planned surgery so that

- the patient may learn the postoperative exercises
- the general sequence of postoperative rehabilitation may be explained, including the adaptations that may be required (perhaps a splint, appropriate clothing, etc.)

► Initial postoperative rehabilitation

Initial postoperative rehabilitation commences immediately after the intervention. Its primary aim is to restore the ranges of joint motion. The duration of this stage will depend on the bones or tendons repaired, and therefore cannot be specified *a priori*. The surgeon will decide on the duration. It will range between 2 and 6 weeks, or more in the case of a fracture.

Immediate postoperative rehabilitation in the surgery department is recommended in order to:

- check that the sling or thoracobrachial orthosis is properly fitted
- monitor and treat pain as well as trophic and circulatory problems
- commence mobilisation and self-mobilisation exercises,[8] provided there are no surgical contraindications, particularly in the event of associated fracture
- give the patient all the information that may be useful for him or her to adapt to wearing the sling or thoracobrachial orthosis in daily activities and to understand the surgical and rehabilitation instructions for the postoperative period
- check whether the self-rehabilitation programme is fully mastered, when this is the course envisaged after rotator cuff tears surgery.

On discharge from the surgery department, rehabilitation during the initial postoperative stage is recommended in order to:

- supervise progress in terms of pain, and treat it if necessary (pain in the shoulder or cervicothoracic region of postural origin associated with immobilisation of the arm)
- restore passive mobility of the shoulder within the angular range authorised by the surgeon
- solicit contraction of unrepaired muscles without resistance
- monitor the possible appearance of secondary complications.

The patient should be referred to the surgeon or prescribing doctor in the event of:

[7] Sedentary activities are daily activities excluding load-bearing, working or leisure activities.
[8] Self-mobilisation consists of passive or assisted active mobilisation exercises on the operated side performed by the patient him or herself with the aid of the other arm. Self-mobilisation can, once learned, be performed outside physiotherapy sessions, supplementing the manual mobilisations performed by the health professional, or as part of a self-rehabilitation programme.
[9] The term rehabilitation refers to rehabilitation sessions conducted by a healthcare professional or by the patient, if the conditions for a programme of self-rehabilitation are effectively met (see section 2). In this case, the monitoring requirements are satisfied during the medical and surgical follow-up.

- recurring or increasing pain by day or night
- ranges of motion that do not progress any further and remain below the results usually expected for that aetiology[10]
- a suspected complication, involving the healing process, an infection, neurological problems, complex regional pain syndrome type 1, etc.

To move on to the next stage of rehabilitation, it is recommended that the physiotherapist, and the occupational therapist where occupational therapy is prescribed,

- comply with the timetable[11] set by the surgeon or the PRM specialist[12] for relative immobilisation and for starting active work
- ensure that there are no complications.

► Secondary postoperative rehabilitation

Leading on from the initial stage of rehabilitation for all patients, the secondary stage of postoperative rehabilitation usually lasts until the end of the third month postoperative; in the absence of tendon repair or osteosynthesis it may be shortened to 6 weeks or 2 months postoperative on medical or surgical advice. Its main objective is to achieve independence in the daily activities specified in the patient's goals.

Secondary postoperative rehabilitation is recommended in order to:

- gradually wean the patient off wearing the sling or thoracobrachial orthosis while keeping the shoulder pain-free
- continue restoring the ranges of passive joint motion
- restore the shoulder's active mobility against gravity without pain and in a physiological pattern of scapulohumeral kinesis.
- restore arm function for all daily activities, excluding resistance activities

It is recommended that this secondary rehabilitation stage should end when:

- the passive and active ranges of motion against gravity are functional and afford independence in daily activities, bearing in mind the patient's context and goals
- active raising and lowering of the arm are pain-free and in line with the physiological pattern of scapulohumeral kinesis.

Patients who have had arthroplasty for rheumatoid arthritis, fractures or severe rotator cuff tears may not be able to progress beyond these criteria.

It is recommended that secondary postoperative rehabilitation should not extend beyond the end of the 4th postoperative month, except:

- following complex fractures or muscle transfers
- where complications have delayed the course of rehabilitation, particularly complex regional pain syndrome type 1.

► Tertiary postoperative rehabilitation

Following on from the secondary rehabilitation stage for certain patients, the tertiary stage of postoperative rehabilitation is indicated, where prescribed, only where the resumption of working, sport or leisure activities demands maximum physical fitness, in particular a complete recovery of the ranges of joint motion, muscle strength and endurance, and cardio-respiratory capacity. At the same time, it is worth considering, in conjunction with the specialist in medicine and health in the workplace, what benefits may be derived from rearranging the patient's working conditions with a view to his or her return to work.

After tendon repair, this stage should not commence before the end of the 4th postoperative month.

[10] See evidence review.

[11] In cases of rotator cuff debridement or repair, the timetable proposed will generally depend on achieving a global passive elevation greater than or equal to 150° or it will set a specific duration, usually between 2 and 6 weeks depending on the aetiology and type of surgery.

[12] The working group notes that the surgeon or PRM specialist is usually consulted during the second postoperative month.

Tertiary postoperative rehabilitation is recommended in order to:
- restore full active ranges of motion
- restore full muscle function
- readjust the patient to stress and specific work- or sport-related movements.

It is recommended that this tertiary rehabilitation stage should end when:
- resumption of the working, sport or leisure activity becomes possible
- there is no further progress in arm function or muscle strength and endurance.

It is recommended that tertiary postoperative rehabilitation should not extend beyond the end of the 6th postoperative month.

3.2 Rehabilitation techniques

All the guidelines given in this chapter are based on professional consensus, since very few studies have evaluated rehabilitation techniques specifically in the context of rehabilitation following shoulder tendon tears surgery or arthroplasty.
A combination of rehabilitation techniques is recommended and should be accompanied by therapeutic patient education (TPE).
When choosing among the techniques, the physiotherapist or occupational therapist will bear in mind:
- the medical prescription
- the stage in the rehabilitation programme
- any contraindications associated with the surgical technique
- the treatment goals drawn up with the patient after a clinical assessment (see section 4).

► Therapeutic patient education

The aim of TPE is to prevent avoidable complications and to help the patient acquire the skills required for self-mobilisation and adapting to functional limitations. These limitations result from the instructions given for the postoperative period and from wearing a sling or thoracobrachial orthosis, particularly when the surgery was on the dominant arm.

Within the context of pre- and postoperative rehabilitation for shoulder surgery, we recommend that the physiotherapist and the occupational therapist, where prescribed, help the patient to develop the skills that will enable him or her to:
- recognise, understand and comply with the movements that are not allowed and the resulting functional restrictions
- acquire the movements or technical aids that will make up for these functional restrictions, while following the rules for protecting the surgical repair
- play an active part in the rehabilitation process (through self-mobilisation, applying cryotherapy, regularly keeping the upper limb raised, and gradually resuming activities with the operated limb once they are allowed)
- prevent avoidable complications (e.g. compression on the thoracobrachial orthosis)
- make lifestyle changes (adapting to specific rules for personal hygiene and for keeping a thoracobrachial orthosis clean, where one is worn; and to an initial ban and then restrictions on driving and on working or leisure activies, etc.)
- involve family and friends in managing the postoperative treatment and the effects it will have.

► Massage

Massage techniques are proposed in combination with active or passive physiotherapy techniques to facilitate:
- making contact with the patient, because of their pain-relieving effect
- relieving muscle contractures, particularly in the cervico-dorsal and scapular muscles
- circulatory drainage.

Massage techniques are not recommended in isolation.

► Physiotherapy

Cryotherapy is recommended as a supplement to pharmaceutical analgesic treatment to reduce postoperative pain.

Continuous cryotherapy applied 24 hours a day has proved effective against immediate postoperative pain (2 studies with level of evidence 4). Its application is constraining crucial compared to the benefits it brings.

Discontinuous cryotherapy using a cold air blast has been evaluated by only one clinical study; its results cannot be reliably interpreted.

Ice-pack cryotherapy is widely used but has not been evaluated; the professionals brought together by HAS note that in their clinical experience it has pain-relieving benefits and is very easy to apply compared with 24-hour continuous cryotherapy.

Iontophoresis and ultrasound are not recommended.

The lack of evidence regarding their efficacy, their contraindication in cases of implants, and the risk of burns associated with iontophoresis are grounds for not using these forms of physiotherapy after shoulder surgery.

Other electrotherapy techniques for pain relief or muscle stimulation and other forms of physiotherapy are rarely used and have not been evaluated following shoulder surgery.

► Balneotherapy

Balneotherapy is proposed as a supplement to passive or active physiotherapy techniques.

Balneotherapy has not been evaluated in the context of shoulder surgery. The professionals consulted by HAS note that in their clinical experience balneotherapy promotes the recovery of first passive and then active ranges of joint motion and provides pain-relieving benefits. This form of treatment should be adapted to the patient's overall physical abilities.

► Passive mobilisation and passive self-mobilisation

Passive mobilisation is recommended at all stages of rehabilitation in order to restore joint mobility, keeping within the allowed ranges of joint motion.

When passive mobilisation is performed manually by the physiotherapist, it must keep strictly to the physiology of the joint or the kinesis of the prosthetic implant, whether the prosthesis is anatomical or inverted. In the case of an inverted shoulder prosthesis, the directions in which the joint glides during movement are modified.

Self-mobilisation is systematically recommended for all patients, unless there is any duly justified contraindication.[13]

Mechanically assisted passive mobilisation (pulley therapy or continuous passive mobilisation by machine) is not recommended.

The professionals brought together by HAS believe that the benefit/limitation ratio of passive mobilisation machines does not justify recommending their use following shoulder surgery.

One study showed a statistically greater joint improvement after machine use but, because this improvement was given as a score, the benefits produced cannot be clinically interpreted or converted into angular degrees of motion (level of evidence 2). A second study showed no difference either in range of motion or in function at 3 months (level of evidence 4). The contraints to achieving a greater benefit than the other passive mobilisation techniques are considerable (at least 4 hours per day on the machine for at least 3 weeks).

The professionals brought together by HAS believe that self-mobilisation using pulley therapy provides no additional benefit compared to two-handed self-mobilisation techniques, which are simpler to perform, and it is not a substitute for manual work when this is required.

[13] For example, associated cognitive disorders, patient's failure to keep to the rules, or situations where self-mobilisation cannot be reliably limited to the ranges of motion specified by the surgeon.

► Assisted active followed by unassisted active mobilisation

Assisted active mobilisation, gradually moving on to unassisted active anti-gravity mobilisation without associated mechanical resistance is recommended as the main technique during the secondary stage of rehabilitation after removal of the sling or thoracobrachial orthosis.

Prioritising global active mobilisation of the arm while keeping to physiological movement patterns, and soliciting two-handed functional activities are recommended.

No clinical study was found that addressed the effect of assisted active followed by unassisted active mobilisation in shoulder rehabilitation after rotator cuff surgery or arthroplasty. The practice described in the literature and by the professionals brought together by HAS prioritises muscle solicitation by means of global movements under voluntary or proprioceptive control, and not by means of analytical mobilisation.

► Active mobilisation against resistance

Activities against resistance are allowed in the context of functional rehabilitation activities[14] after the 4th postoperative month, unless the surgeon specifically contraindicates them.

Analytical muscle strengthening against resistance for repaired muscles and load-bearing work are not recommended before the 6th postoperative month in cases of tendon repair, and the surgeon or PRM specialist should be consulted before they are commenced.

No clinical study was found that addressed the effect of active mobilisation against resistance in shoulder rehabilitation after rotator cuff surgery or arthroplasty.

Authors mostly mention the use of elastic resistances, which make it possible to:

- gradually increase the resistance
- use functional resistance patterns
- stop immediately in the event of pain.

Authors who use isokinetics introduce this method of muscle strengthening at different times[15] depending on the surgical technique, but no clinical study has examined the benefit-risk ratio for patients. The professionals brought together by HAS note that in their clinical experience resuming analytical muscle strengthening against resistance before the 6th month leads to a resurgence of pain.

► Neuro-sensory-motor facilitation and functional recovery

In parallel to the recovery of active ranges of motion in a physiological pattern of kinesis, neuro-sensory-motor facilitation techniques are recommended with a view to restoring arm stability during functional activities according to each patient's specific needs.

No clinical study was found that evaluated the results of proprioceptive shoulder rehabilitation after rotator cuff surgery or arthroplasty. The professionals brought together by HAS consider that in their clinical experience it improves arm function.

► Technical aids and environmental adaptations

Technical aids or adaptations of the living environment are recommended if they help the patient attain a higher level of independence.

Adaptation of the workplace is recommended, with the involvement of the workplace doctor, if the patient's condition is likely to have a substantial and lasting effect on his or her working life once the rehabilitation programme is over.

[14] For example, closed-chain muscle strengthening, gradual relearning of work-related movements, gardening, DIY, etc., apart from heavy work.

[15] Isokinetic strengthening is introduced:
- between the 4th and the 10th week after acromioplasty
- after the 6th week just on unrepaired internal rotator muscles where the rotator cuff has been repaired
- after the 10th week, possibly submaximally at first, after surgical repair of rotator cuff tendons.

These adaptations should be chosen by the occupational therapist in conjunction with the physiotherapists and doctors in charge of the patient. These recommendations, aimed at promoting the return to work, should be discussed and agreed with the patient and implemented in close liaison with the specialist in medicine and health in the workplace.
Such collaboration is not always feasible because of the difficulties in referring patients to occupational therapists. A social worker may help to obtain the financial aid that exists.

3.3 Factors requiring adjustments to the rehabilitation programme

It is recommended (professional consensus) that rehabilitation be adapted to:

- the individual characteristics of the patient
- the surgical technique
- the postoperative arm support device (sling or thoracobrachial orthosis)
- any intraoperative or postoperative complications.

In the available studies, the prognostic factors that influence postoperative results and the main elements that require adjustments to the rehabilitation programme are the following:

- the individual characteristics of the patient
  - whether the affected side is dominant or not
  - underlying cause (e.g. fracture, repeat surgery)
  - pathological factors (e.g. lesion size, fatty degeneration)
  - comorbidities, particularly those limiting functional abilities or depressing the patient's general state (such as rheumatoid arthritis or neurological conditions)
  - the patient's goals
- surgical technique and postoperative immobilisation methods
  - time since the operation
  - type of intervention, approach used, bone or soft tissue surgery, surgical material implanted in the case of a prosthesis
  - tendons repaired and healing time before they are put under active or passive tension
  - range of joint motion that may be forbidden or limited, and the length of time this instruction must be obeyed
- intraoperative or postoperative complications
  - intraoperative fractures, neurological lesions, infections, complex regional pain syndrome type 1, and joint stiffness, repeated tears and medical complications associated with poor general condition.

4. Clinical patient assessment and follow-up

It is recommended that the surgeon or PRM specialist provide regular medical follow-up in collaboration with the primary care doctor and any doctors who were monitoring the patient before the operation.[16]

In the context of prescribing rehabilitation, the clinical assessment and follow-up performed by the physiotherapist or occupational therapist[17] serve two different purposes:

- the professionals can use information from the patient's profile (history and physical examination) to develop their diagnostic approach and choose the rehabilitation techniques to put into practice, in accordance with the prescription
- the professionals can measure the patient's clinical evolution during rehabilitation[18] with the aid of validated measurement tools, if any.

[16] Rheumatologists, for example.
[17] When occupational therapy is prescribed.
[18] Clinical evolution will vary with the type of surgery and the aetiology. See chapter 4 of the evidence review for the scores usually achieved by the end of treatment.

Except where indicated, all the recommendations in the following paragraphs are based on professional consensus and concern the clinical assessment and follow-up performed by the physiotherapist or occupational therapist.
These elements have been classed according to the International Classification of Functioning, Disability and Health (ICF).

4.1 Body functions and body structures

► Pain

Pain should be monitored by means of a validated scale, visual analogue scale, simple verbal scale or functional pain scale.

A medical doctor shoud be consulted when pain is not controlled although the patient is complying with the prescribed medication.

The patient should be asked about the topography, intensity, time and triggering factors of the pain so that the rehabilitation techniques may be adjusted.

► Functions of the skin

Examination of the skin, particularly the wound scar, is recommended once the dressings have been removed.
The purpose of this examination is to:

- ensure there are no local healing complications or oedema
- choose rehabilitation techniques to restore tissue mobility.

► Sensory functions

A sensory examination is recommended to reveal any rare neurological complications, particularly in the axillary, ulnar and musculo-cutaneous territories and when a thoracobrachial orthosis is worn.
In fact, neurological complications are rare (< 2% of interventions) but need to be picked up.

► Functions of the joints and bones

Monitoring of passive and then active range of motion by means of goniometry or inclinometry is recommended.

The surgeon or PRM specialist should be consulted, if he or she is not already involved in the patient's medical postoperative care plan, when:

- the global passive ranges of motion of the shoulder at 6 weeks are less than 90° elevation in the plane of the scapula or a deficit of more than 30° in lateral rotation compared with the opposite side, and are making no further progress
- global active antigravity elevation at 3 months is less than 90° and making no further progress
- the joint is unstable (clinically detectable subluxation or luxation following arthroplasty).

► Muscle functions

Muscle function, particularly contractility and tonicity, should be monitored from the immediate postoperative stage onwards. Testing strength against resistance and muscle extensibility is not recommended before the end of the 3rd month in cases of tendon repair.

The evaluation of functions relating to muscle tonus (hypotonia, contractures, particularly of the cervico-dorsal muscles) and muscle endurance is useful in choosing rehabilitation techniques. There are no validated tools for measuring them.

After the end of the 3rd month, muscle strength can be evaluated (unless surgically contraindicated) on composite scales such as the Constant score or on a 5-point manual muscle strength evaluation scale. After the 6th postoperative month, instrumental and particularly isokinetic measurements are possible but only in restricted indications.

► Movement functions

Regular evaluation of the overall movements of the upper limb, two-handed coordination and the supportive function of the arm is recommended once active mobilisation is allowed, based on criteria tailored to the patient's previous abilities and his or her goals.

► Functions of the cardiovascular and respiratory systems

Evaluation of exercise tolerance functions is useful for patients aiming to resume working or sport activities requiring high levels of cardiovascular ability and for those whose deficient cardiorespiratory function affects their daily activities.

► General signs suggesting complications

The surgeon or PRM specialist should be consulted at the onset of signs of secondary complications (fever, inflammation phenomena, oedema of the hand, neurological signs, weeping or opening of the surgical scar, etc.).

4.2 Activities, participation, quality of life

Information should be collected on the patient's functional abilities[19] before and after the operation and on his or her goals and living environment in order to adapt:

- the advice given on how to compensate and on adaptive equipment (clothing, technical aids, etc.) enabling the patient to remain independent in daily activities (personal hygiene, dressing and meals)
- possible household rearrangements to allow the patient to return home
- referral of the patient to rehabilitation in an outpatient or inpatient setting
- the end-of-care criteria according to the patient's personal situation, particularly with a view to his or her return to work.

This information must be collected as early as possible by the hospital team and then updated by the physiotherapist during the diagnostic assessment.

The progress made in the activities and quality of life specific to the shoulder should be monitored by using validated tools such as the DASH questionnaire[20] (grade B). The Constant score is of little use for monitoring an individual patient in the immediate postoperative period.

Numerous validated functional scales exist, some of them specific to a given population (such as sportsmen and women, or wheelchair users). The DASH outcome measure is the only validated self-report questionnaire in French; it is simple for the patient to use and takes 5 to 15 minutes without the healthcare professional being present (see Appendix 2). The Constant score has been considered the reference score in Europe by the European Society for Surgery of the Shoulder and Elbow since 1990; it is recommended by ANAES[21] in the monitoring of unoperated painful shoulder, and therefore its value in the preoperative period is well known (see Appendix 3). Although it is reliable in the early months postoperatively in those cases where it can be used, it is rarely possible to use it during the first three months on account of the frequent contraindications to measuring muscle strength against resistance.

[19] The activities liable to be affected in the postoperative period include everyday ones and also working and leisure activities. According to the ICF classification, everyday activities include mobility [changing and maintaining body position (lying down, standing, transferring oneself, etc.); carrying, moving and handling objects; walking and moving (including moving around outside the home); moving around using transportation], self-care (washing oneself, dressing, toileting; drinking, eating; looking after one's health), and domestic life [acquisition of necessities (shopping, etc.); household tasks (preparing meals, doing housework, etc.)].

[20] DASH: Disabilities of the Arm, Shoulder and Hand outcome measure; this self-report questionnaire comprises 30 items in the fields of pain and other symptoms (5 items), functional abilities (21 items) and social and emotional effects (4 items) (see Appendix 2).

[21] See the clinical practice guideline 'Pathologies non opérées de la coiffe des rotateurs et masso-kinésithérapie, ANAES, 2001 [in French].

The progress made in moving activities should be monitored with validated tools such as the Timed Up and Go (TUG) test and Tinetti's test, when the patient is at fall risk.[22]

5. Referring the patient after surgery

The methodological weakness of the few published studies comparing the various methods of organising rehabilitation after shoulder surgery means that all the recommendations in this chapter are based on professional consensus subsequent to an analysis of the literature, the PMSI data for 2004-2005 supplied by the French Technical Agency for Hospital Information (ATIH), and economic comparisons made when it was possible and acceptable to switch from one method of organising rehabilitation to the other. The recommendations are summarised graphically in Appendix 4.

5.1 Economic comparison of referral procedures

Economic analysis is a secondary referral criterion provided that both outpatient and inpatient rehabilitation are feasible and acceptable.

Based on the clinical data analysed and on professional consensus:

- referral for hospitalisation in a PRM department is proposed following shoulder arthroplasy, with a view to commencing rehabilitation
- rehabilitation after surgery for shoulder rotator cuff tears, whatever the surgical technique used, does not generally require hospitalisation for follow-up and rehabilitation care in patients for whom physiotherapy is indicated.

Consequently, an economic analysis was performed in the case of rehabilitation following surgery for rotator cuff tears. The purpose was to evaluate the difference in cost between the outpatient and inpatient rehabilitation . The aim of this economic evaluation was to identify the amounts reimbursed and not reimbursed by the national Health Insurance scheme and the potential savings it made on an individual scale where care was transferred to inpatient to outpatient postoperative care, as well as the out-of-pocket. The analysis addressed the first five weeks after surgery and compared rehabilitation in a specialised rehabilitation centre (full hospitalisation or day hospital) with rehabilitation in an outpatients setting. Other rehabilitation options are possible in the postoperative period (e.g. a short stay in a rehabilitation centre followed by self-rehabilitation) but were not evaluated.
For both types of postoperative care, patients in an equivalent state of health were compared (patients with complications were excluded).

In the cases considered, it was found that the amounts reimbursed by the Health Insurance scheme and the out-of-pocket were higher for hospitalisation in a rehabilitation centre (€5 040 reimbursed by the Health Insurance scheme for full hospitalisation, compared with an average of €1 340 in an outpatients setting; and up to €1 800 charged to the patient for full hospitalisation, compared with about €750 on average in outpatients).

In the case of a socially isolated patient, however, the additional expenses – therefore charged to the patient – were considerable because of the cost of a home help and a carer, and they were higher in an outpatients situation than with hospitalisation (an additional €200 for 3 hours of home help up to €1 500 for 6 hours of home help, compared with full hospitalisation).

This evaluation remains extremely theoretical, however, insofar as several hypotheses might be envisaged. A microcosting study based on real usage data would provide a more realistic evaluation, including the consequences of a possible transfer of activities to an outpatients setting.

According to the PMSI data for 2004-2005, 12.1% of rotator cuff surgery patients were admitted to a rehabilitation centre. In addition, literature data on the organisation of healthcare show that transferring

[22] Common clinical situations in cases of arthroplasty for shoulder fractures following falls. See the clinical practice guideline 'Physiotherapy in the preservation of motor abilities in fragile elderly patients at home', HAS, 2005.

patients to rehabilitation centres is justified in many cases. A study based on real data on whether transfers to rehabilitation centres are appropriate or not would also be of interest.

Literature data on the organisation of healthcare also reveal an admissions bottleneck in rehabilitation centres due to a shortage of beds, with the result that patients are staying for long periods in short-stay facilities. In view of the guidelines issued, the flow of patients who have had surgery for rotator cuff tears could be redirected towards outpatients facilities, where available.

5.2 Rotator cuff tear surgery

Rehabilitation after surgery for shoulder rotator cuff tears, whatever the surgical technique used, does not generally require hospitalisation for follow-up or rehabilitation care in patients for whom physiotherapy is indicated.
The patient may be referred for care in the community either

- immediately after the initial surgery, or
- when further rehabilitation is discussed while the patient is hospitalised in a rehabilitation centre.

A decision to send the patient home does not rule out hospitalisation afterwards if care in the community proves impracticable.

Outpatient rehabilitation is generally recommended after surgery for rotator cuff tears, although hospitalisation in a rehabilitation centre may be necessary in the event of:

- local, regional or general complications
- associated diseases
- social isolation that cannot be counterbalanced by a mechanism to help the patient remain at home (e.g. home help services).

Hospitalisation in a PRM department should be considered:

- when the primary aim of admission to a rehabilitation centre is to commence rehabilitation
- if there are specific requirements following a complex surgical procedure (e.g. muscle transfer)
- in one of the following situations:
  - the patient needs help that cannot be put in place by a social organisation within the average time that a patient usually stays in the surgery department
  - outpatient care cannot be arranged (because it is too far away, transport cannot be organised to the physiotherapy venue, the health professionals are unable to make home visits, etc.).

The patient must meet the following criteria to be able to leave hospital (short-stay facility or rehabilitation centre) and return home:

- no fever
- pain controlled by level 1 or 2 analgesics
- understands and takes account of risk situations prior to healing
- sufficient functional independence for daily and domestic activities without putting the consolidating tissues at risk, or assistance provided by family and friends or by a home-care organisation.

5.3 Shoulder arthroplasty

After shoulder arthroplasty, the proposal should be made to the patient to be hospitalised in a physical and rehabilitation medicine (PRM) department to commence rehabilitation, because:

- this is an elderly population often presenting with comorbidities, who have considerable functional impairment in the postoperative period to perform everyday activities
- the four studies on more than 50 patients comparing a group given outpatient rehabilitation and a group that was hospitalised, despite the low level of evidence, provide arguments in favour of a better outcome after hospitalisation (shorter care time and better Constant score after 2 years).

When the patient does not want to be hospitalised in a PRM department, perhaps because he or she lives acceptably close, it is recommended that the hospital leaving criteria listed above be met before the patient is discharged.

Apart from one study evaluating outcomes after planned arthroplasty and outpatient rehabilitation, all the clinical studies evaluating the effect of rehabilitation were conducted on patients hospitalised in specialist rehabilitation (PRM) departments.

The results obtained with day hospitalisation and standard hospitalisation are similar.

Of all arthroplasty patients, 42% are referred to rehabilitation centres (PMSI data for 2005). When the primary aim of admission to a rehabilitation centre is to commence rehabilitation, the professionals brought together by HAS confirm that patients should systematically be referred to a PRM unit. Referral to any other kind of medical post-acute is not justified unless the primary aim of hospitalisation admission is not rehabilitation (e.g. specific comorbidities management). The professionals brought together by HAS who do not systematically refer their patients to rehabilitation centres point out that they would probably do so more systematically if PRM departments had more beds available or were closer to patients' homes, particularly for patients over 70 and in cases of unplanned arthroplasties (prostheses for humerus fractures generally occurring in patients with existing balance difficulties).

6. Information to be exchanged by professionals

All the recommendations in this chapter are based on the french regulations in force in 2007 and professional consensus. They are summarised in master document format in Appendices 5 and 6.

6.1 Medical prescription and correspondence for the physiotherapist

It is recommended that the prescribing doctor send the physiotherapist in charge of carrying out the treatment the mandatory prescription and any additional information without which the treatment cannot be implemented safely:[23]

- date and type of the surgical intervention, particularly the structures repaired
- type and duration of relative immobilisation
- movements forbidden and for how long
- timetable for implementing passive, active and active resistive mobilisation.

This document may be supplemented with other elements so that the treatment plan can best be adapted to the patient's history and environment:

- aetiology, approach route and comorbidities influencing rehabilitation
- preoperative clinical information (active and passive ranges of motion, and any Constant score or DASH measure)
- PRM hospitalisation report, if any.

It is recommended that the hospital physiotherapist send a summary of the physiotherapy diagnostic assessment to the colleague in charge of carrying out outpatient care.

6.2 Correspondence for the prescribing doctor

It is recommended that the physiotherapist provide a summary of the updated physiotherapy diagnostic assessment at each surgical or medical consultation connected with the postoperative rehabilitation.

Under current regulations, the physiotherapist must send the prescribing doctor a summary of the initial and final physiotherapy diagnostic assessments for any course of more than 10 rehabilitation sessions. Providing it at the time of medical consultations ensures the best possible coordination of patient care.

[23] This information is usually contained in the surgical report. If the surgical report is not available or the physiotherapist's details are not known when the patient leaves hospital, a follow-up letter or referral sheet should be enclosed with the prescription (see Appendix 5).

It is recommended that the PT diagnostic assessment summary sheet contain:

- the number and frequency of the sessions already held and the procedures and techniques used
- the patient's clinical progress between the start of rehabilitation and the assessment
  - spontaneous pain and pain during rehabilitation
  - passive and active ranges of motion of the shoulder complex
  - arm function and activities (possibly in a DASH questionnaire)
  - any events that justify changing or stopping the treatment
- a proposal to stop or continue treatment, comprising:
  - the rehabilitation targets, taking account of the patient's goals
  - the number and frequency of individual or group sessions
  - the treatment venue
- any additional information thought to be of use for the doctor to adjust the treatment strategy.

Appendix 1. Future action or research

This work has raised a number of points. They could be the subject of future action or research aimed at improving scientific knowledge of the efficacy of rehabilitation programmes or the various methods of organising rehabilitation after shoulder surgery.

► Rehabilitation programmes

In the case of surgery for shoulder rotator cuff tears, some English-language clinical studies with level of evidence 4 show that the results achieved after a supervised rehabilitation programme or a self-rehabilitation programme are similar. In 2007, several teams in France used self-rehabilitation programmes, although their efficacy and benefit/risk ratio had not been evaluated in a French population.

To confirm the indications for self-rehabilitation proposed in this work but with a higher level of evidence than the data known in 2007, it would be desirable to perform some intention-to-treat studies in order to

- specify the clinical situations in a French population for which there is strict equivalence between the two approaches
- specify the clinical situations in which a greater risk is run in one of the two approaches.

► Clinical patient follow-up during postoperative rehabilitation

Whereas the outcome of surgery followed by rehabilitation has been assessed in the medium and long term by a large number of case series or cohort follow-up studies, the patient's clinical progress in the first three months during rehabilitation has not been evaluated at all.

It would be desirable to conduct some cohort follow-up studies to find out what progress is usually made during the early postoperative months in the principal rehabilitation follow-up criteria (pain, passive and active ranges of joint motion, functions and activities). This would allow professionals to detect unsatisfactory clinical progress more objectively.

► Comparison of the methods of organising rehabilitation

Few clinical studies have compared the different methods of organising rehabilitation, and their level of evidence is low. To confirm whether patients who have had an arthroplasty generally require hospitalisation in a rehabilitation centre, but with a higher level of evidence than the data known in 2007, it would be desirable to conduct:

- randomised controlled trials or comparative cohort follow-up studies specifying the criteria for referral to outpatient or inpatient rehabilitation
- microeconomic studies based on real usage data to provide a more realistic evaluation, including the consequences of any transfer of activities to an outpatients setting.

Appendix 2. DASH Questionnaire

It may be downloaded from the Internet at http://www.dash.iwh.on.ca/index.htm
The shorter QuickDASH version may also be downloaded at http://www.dash.iwh.on.ca/index.htm

Developed by:

- *American Academy of Orthopedic Surgeons*
- *Institute for Work & Health, Toronto*
- *American Society for Surgery of The Hand*
- *American Orthopaedic Society for Sports Medicine*
- *American Shoulder and Elbow Surgeons*
- *Arthroscopy Association of North America*
- *American Society of Plastic and Reconstructive Surgeons.*

► Today's date: … / … / …

► Instructions to the patient

INSTRUCTIONS

This questionnaire asks about your symptoms as well as your ability to perform certain activities.
Please answer *every question*, based on your condition in the last week, by circling the appropriate number.
If you did not have the opportunity to perform an activity in the past week, please make your *best estimate* on which response would be the most accurate.
It doesn't matter which hand or arm you use to perform the activity; please answer based on your ability regardless of how you perform the task.

► Ability to do the following activities

Please rate your ability to do the following activities **in the last week**.
(Circle one answer per line only.)

		No difficulty	Mild difficulty	Moderate difficulty	Severe difficulty	Unable
1.	Open a tight or new jar	1	2	3	4	5
2.	Write	1	2	3	4	5
3.	Turn a key	1	2	3	4	5
4.	Prepare a meal	1	2	3	4	5
5.	Push open a heavy door	1	2	3	4	5
6.	Place an object on a shelf above your head	1	2	3	4	5
7.	Do heavy household chores (e.g. wash floors or walls)	1	2	3	4	5
8.	Garden or do yard work	1	2	3	4	5
9.	Make a bed	1	2	3	4	5
10.	Carry a shopping bag or briefcase	1	2	3	4	5
11.	Carry a heavy object (over 10 lbs)	1	2	3	4	5
12.	Change a lightbulb overhead	1	2	3	4	5
13.	Wash or blow dry your hair	1	2	3	4	5
14.	Wash your back	1	2	3	4	5
15.	Put on a pullover sweater	1	2	3	4	5
16.	Use a knife to cut food	1	2	3	4	5
17.	Recreational activities which require little effort (e.g. cardplaying, knitting, etc.)	1	2	3	4	5
18.	Recreational activities in which you take some force or impact through your arm, shoulder or hand (e.g. golf, hammering, tennis, etc.)	1	2	3	4	5
19.	Recreational activities in which you move your arm freely (e.g. playing frisbee, badminton, etc.)	1	2	3	4	5
20.	Manage transportation needs (getting from one place to another)	1	2	3	4	5
21.	Sexual activities	1	2	3	4	5

22. During the past week, to what extent has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours or groups? (Circle number)

1 Not at all 2 slightly 3 moderately 4 quite a bit 5 extremely

23. Were you limited in your work or other regular daily activities as a result of your arm, shoulder or hand problem? (Circle number)

1 Not limited at all 2 slightly limited 3 moderately limited 4 very limited 5 unable

► Severity of symptoms

Please rate the severity of the following symptoms **in the last week**.
(circle number)

		None	mild	moderate	severe	extreme
24.	Arm, shoulder or hand pain	1	2	3	4	5
25.	Arm, shoulder or hand pain when you performed any specific activity	1	2	3	4	5
26.	Tingling (pins and needles) in your arm, shoulder or hand	1	2	3	4	5
27.	Weakness in your arm, shoulder or hand	1	2	3	4	5
28.	Stiffness in your arm, shoulder or hand	1	2	3	4	5

29. During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder or hand? (circle number)

1 Not at all 2 a little 3 moderately 4 Badly disturbed 5 unable to sleep at all

30. I feel less capable, less confident or less useful because of my arm, shoulder or hand problem

1 Strongly disagree 2 Disagree 3 Neither agree nor disagree 4 Agree 5 Strongly agree

► Calculation method

The overall score is given as a percentage score, calculated as follows:

$$\frac{[(\text{sum of the n answers})-1] \times 25}{n}$$

The score is only valid when 90% of the questions have been answered by the patient (i.e. 3 missing values at most).

Further details on the calculation method may be found at this link:
http://www.dash.iwh.on.ca/assets/images/pdfs/score.pdf

► Sports/performing arts module (optional)

The following questions relate to the impact of your arm, shoulder or hand on playing your musical instrument or sport or both If you play more than one sport or instrument (or both), please answer with respect to that activity which is most important to you.
Please indicate the sport or instrument which is most important to you: ……
o I do not play a sport or an instrument. (You may skip this section.)

Please circle the number that best describes your physical ability in the past week. Did you have any difficulty:

	No difficulty	Mild difficulty	Moderate difficulty	Severe difficulty	Unable
using **your usual technique** for playing your instrument or sport?	1	2	3	4	5
playing your musical instrument or sport because of arm, shoulder or hand pain?	1	2	3	4	5
playing your musical instrument or sport as well as you would like?	1	2	3	4	5
spending your usual amount of time practising or playing your instrument or sport?	1	2	3	4	5

► Work module (optional)

The following questions ask about the impact of your arm, shoulder or hand problem on your ability to work (including homemaking if that is your main work role). Pl ease indi cate what your job/work is:
_____
_____ _____
p I do not work. (You may skip this section.)
Please circle the number that best describes your physical ability in the past week. Did you have any difficulty:

	No difficulty	Mild difficulty	Moderate difficulty	Severe difficulty	Unable
using your usual technique for your work?	1	2	3	4	5
doing your usual work because of arm, shoulder or hand pain?	1	2	3	4	5
doing your work as well as you would like?	1	2	3	4	5
spending your usual amount of time doing your work?	1	2	3	4	5

SCORING THE OPTIONAL MODULES: Add up assigned values for each response; divide by 4 (number of items); subtract 1; multiply by 25.
An optional module score may not be calculated if there are any missing items.

Appendix 3. Constant score

After Constant CR, Murley AHG. A clinical method of functional assessment of the shoulder. Clin Orthop Relat Res 1987;(214):160-4. French translation by M. Dougados, with his kind permission.

► Score sheet

Surname: First name Date of birth:	Date: Primary care doctor: Prescribing doctor:

	Date		Start	Middle	End
Pain (total out of 15)	A. Verbal scale 0 = unbearable 5 = moderate 10 = mild 15 = none				
	B. Linear pain scale Subtract the number obtained from 15 0_____15 No pain Severe pain				
	Total	A + B / 2 (/15)			
Level of daily activities (total out of 10)	Work/occupation activities	work impossible or not resumed (= 0); severe difficulty (= 1); moderate difficulty (= 2); mild difficulty (= 3); no difficulty (= 4).			
	Recreational activities	impossible (= 0); severe difficulty (= 1); moderate difficulty (= 2); mild difficulty (= 3); no difficulty (= 4).			
	Sleep disturbance	pain prevents sleep (= 0); moderate difficulty (= 1); no difficulty (= 2). e.g. on changing position			
Level of working with hand (total out of 10)	To what level can the patient use his or her hand without pain and with sufficient strength? waist (= 2); xiphoid (sternum) (= 4); neck (= 6); head (= 8); above head (= 10).				
Mobility (total out of 40)	Forward flexion (total/10)	0°-30° (= 0); 31°-60° (= 2); 61°-90° (= 4); 91°-120° (= 6); 121°-150°(= 8); >150°(= 10).			
	Abduction (total /10)	0°-30° (= 0); 31°-60° (= 2); 61°-90° (= 4); 91°-120°(= 6); 121°-150°(= 8); < 150°(= 10).			

	External rotation (total /10)	hand behind head, elbow forward (= 2);
		hand behind head, elbow back (= 4);
		hand on head, elbow forward (= 6); hand on head, elbow back (=8); full elevation above top of head (= 10).			

	Internal rotation (total /10)	back of hand at buttock level (= 2); back of hand at sacrum level (= 4); back of hand at L3 level (= 6); back of hand at T12 level (=8); back of hand at T7-T8 level (= 10).			
Muscular strength (total out of 25)	Isometric abduction (90° antero-external elevation in plane of scapula)	hold 5 s, 500 g = 1 point (= 0 if 90°not reached)			
Total (total out of 100)	Absolute score				
	Normalised score				

Table 3-1: Normal shoulder function score on the Constant scale according to age and sex.

Age	Men			Women		
	Right	Left	Average	Right	Left	Average
21/30	97	99	98	98	96	97
31/40	97	90	93	90	91	90
41/50	86	96	92	85	78	80
51/60	94	87	90	75	71	73
61/70	83	83	83	70	61	70
71/80	76	73	75	71	64	69
81/90	70	61	66	65	64	64
91/100	60	54	56	58	50	52

► Calculation method and presentation of results

• Pain

A double assessment is required in the pain area. The patient is asked to indicate the intensity of his or her pain on a verbal scale. If there is no pain, a score of 15 is given. Otherwise the score will be 10, 5 or 0 depending on whether the pain is mild, moderate or unbearable. Then a 15-cm visual analogue scale is used. This will be scored by the patient after the examiner has explained how to put a mark on the line at the point corresponding to the intensity of the pain. Note that the figures 0 and 15 are printed at either end of the scale, where 0 means no pain and 15 extreme pain. The final pain score is obtained by subtracting the number obtained from 15 on the VAS in order to get back to the same assessment scale as the verbal scale. Then the two numbers are added together and divided by 2. This gives the average of the two assessments, corresponding to the final pain score.

In the original reference, the pain is scored on 'the greatest level of pain occurring during activities of daily living, such as work, relaxation, rest, or pain occurring at night.'

• Activities

In the activity area, the doctor notes down the information gathered by questioning the patient.

• Mobility

For the mobility area, the ranges of motion to be scored are those that the patient can perform actively and without pain while sitting on a chair without armrests. If the shoulder is not frozen, abduction may exceed 90°.

For assessment in the muscular strength area, access is needed to a dynamometer with a sensitivity of at least 500 g attached to the handle by a band. The patient should sit with the arm outstretched in the plane of the scapula, i.e. with 30° of forward flexion. The patient must resist the downward pull exerted by the examiner for 5 seconds. The test is repeated 5 times.

• Other areas:

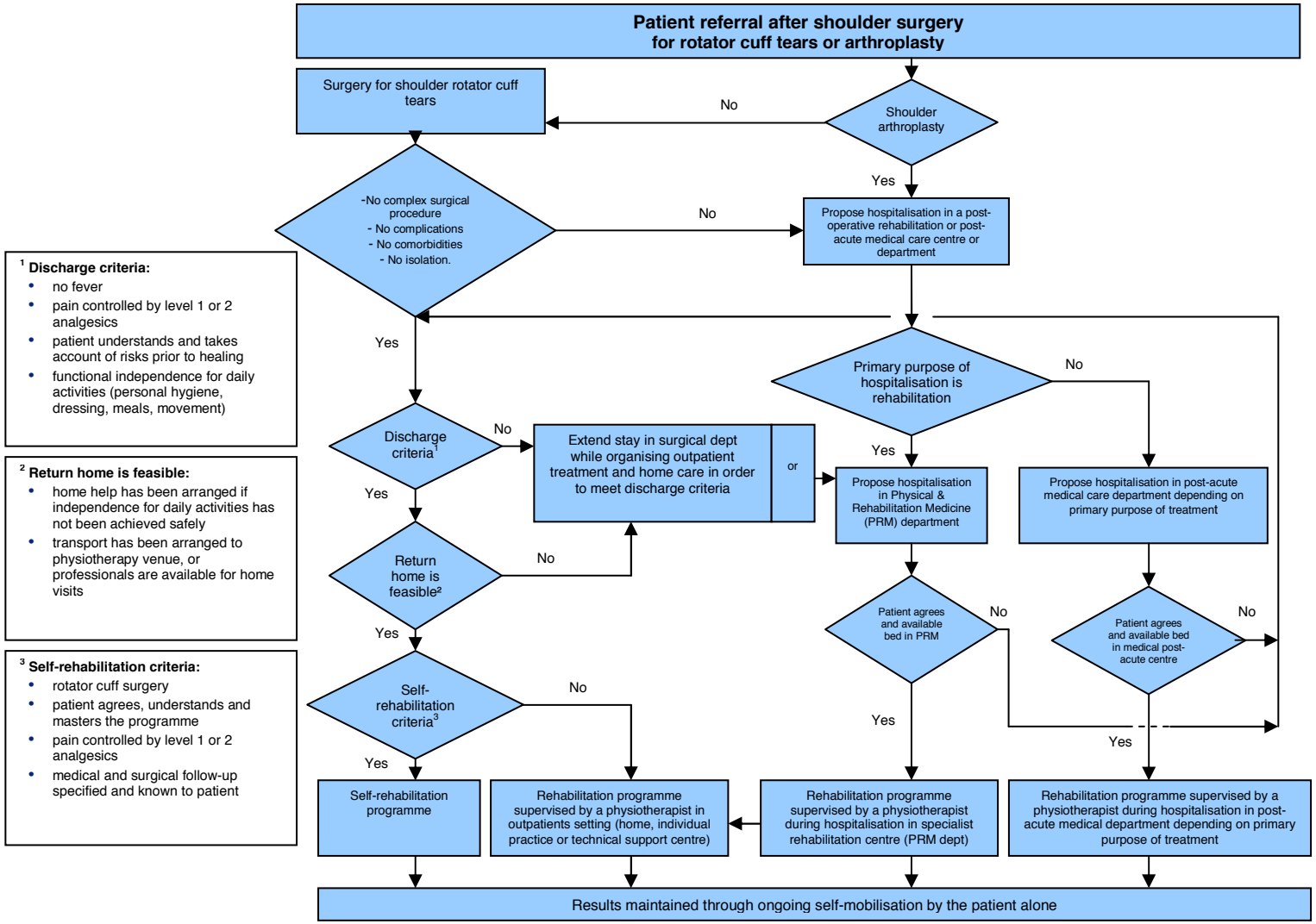
For each of the other areas, the scores given for each of the items are allocated. The total score is out of 100.

• The results may be presented in 3 ways:
  - each of the 5 areas is presented separately
  - the total is presented as an absolute score
  - the total is presented as a relative score normalised by age and sex.

This last technique has the advantage of being the most effective for quantifying anomalies (the difference of an individual from the normal score of a group of the same age and sex), and then providing an average of these scores in a study of a mixed group of patients (men and women, young and old). For example, if the absolute score obtained for a 35-year-old man is 40 when the average for men in this age group is 97, then the 'normalised' score will be –57 (table 3-1). In 2008, the authors are putting forward the 'weighted' score, which is the ratio of the measured score to the normal score, which gives a weighted score of 41% (40/97 = 0.41) in the example above.

With regard to age- and sex-dependent physiological ability, some standards have been proposed based on the scores obtained from hundreds of volunteers of both sexes and all ages (study on ranges of active joint motion and of muscular strength in abduction in the plane of the scapula) (table 3-1).

Appendix 4. Patient referral



Appendix 5. Model prescription

Prescription

Title, surname and first name of prescriber
Contact details of prescriber

Place, date

Surname and first name of patient
Date of birth

☐ Rehabilitation of right or left upper limb and its root for (surgical indication)
or
☐ Rehabilitation of right or left upper limb and massage of cervico-dorsal region for (surgical indication)

Urgent
Specific type of care: ☐ ALD ☐ AW ☐ OD ☐ Home

Additional information[24]

Intervention date: ……	**Shoulder:** ☐ right; ☐ left; ☐ dominant side
Type of intervention: ☐ acromioplasty ☐ resection of coracoacromial ligament ☐ tendon reinsertion ☐ tendon suture ☐ muscle flap ☐ prosthesis: ☐ total ☐ humeral ☐ inverted ☐ arthroscopy ☐ open surgery	**Structures repaired:** (tears or surgical approach) ☐ supraspinatus ☐ biceps long head ☐ infraspinatus ☐ deltoid ☐ subscapularis ☐ other…….. **Arm support device:** …… To be worn until Day… ☐ sling ☐ thoracobrachial orthosis set at …°abduction ☐ anti-rotation cushion
Movements allowed:	
Passive mobilisation until Day… Range of joint motion allowed: ……	Active mobilisation from Day… Range of joint motion allowed: ……
Other useful information: • aetiology …… • comorbidities: ……..	• preoperative active ranges of motion: elevation …°; lateral rotation …° • Preoperative scores: Constant: …. ; Dash: …

[24] This additional information may be provided in various forms, depending on what is easiest for the hospital when the patient is discharged, provided it complies with current regulations.

Appendix 6. PT diagnostic assessment summary sheet

Physiotherapist Address: Phone: e-mail:	**Patient** Surname: First name: Date of birth:	□ right-handed □ left-handed Occupation: Leisure activities:		
Medical prescription date…/…/… Description:		prescribing doctor:		
Treatment already given Number of sessions held as of … / … / … : …… Techniques used □ individual; □ group; □ balneotherapy; □ other ……	**Signs suggesting unexpected development** □ fever; □ reappearance or increase in pain; □ inflammatory reaction □ ranges of joint motion levelled off or regressing □ sideration or paralysis of … □ sensory disorder of … □ instability of joint or prosthesis			
Evaluation	**Assessment 1** **date**	**Assessment 2** **date**	**Assessment 3** **date**	**Assessment 4** **date**
Pain Intensity validated scale: VAS or …… Controlled by treatment Other data: (topography, times, triggering factors)	□ yes; □ no	□ yes; □ no	□ yes; □ no	□ yes; □ no
Functions of the skin Skin and scar condition				
Mobility if allowed passive: P active against gravity: A elevation external rotation (ER1*) internal rotation other	P: □ NE* A: □ NE* P: ……° A: ……° P: ……° A: ……° P: ……° A: ……°	P: □ NE* A: □ NE* P: ……° A: ……° P: ……° A: ……° P: ……° A: ……°	P: □ NE* A: □ NE* P: ……° A: ……° P: ……° A: ……° P: ……° A: ……°	P: □ NE* A: □ NE* P: ……° A: ……° P: ……° A: ……° P: ……° A: ……°
Muscle functions Contractility of all muscles Tonicity (specify location) hypotonia: H, contractures: C Endurance				
Cardiorespiratory function: (if expecting to return to sport or work)				
Activities DASH outcome measure Independent for ADL* Balance or moving difficulties, risk of falls (Tinetti or Timed Up and Go) Important activities for the patient	□ yes; □ no □ yes; □ no	□ yes; □ no □ yes; □ no	□ yes; □ no □ yes; □ no	□ yes; □ no □ yes; □ no
Patient's agenda (expectations, goals):	**PT diagnosis including therapeutic targets**			
Future therapeutic plans □ End treatment: reason … □ Propose to continue treatment				
Conclusion				

* NE: not examined; ER1: external rotation, elbow to body; ADL: activities of daily living.

The Clinical Practice Guidelines Method

Clinical guidelines have been defined as proposals established using an explicit method to help healthcare professionals and patients find the most appropriate care in a given clinical situation.
The *clinical practice guidelines (CPG)* method is one of the methods used by HAS to produce clinical guidelines. It is based on critical analysis and review of the available medical literature as well as on the opinion of a multidisciplinary group of professionals involved with the subject of the guidelines.

► Choosing subjects for guidelines

The HAS Board chooses the subjects for clinical guidelines. In selecting subjects the Board takes into account public health priorities and any requests from ministers responsible for health and social security. The HAS Board can also accept subjects proposed by learned societies, the French national cancer institute, the French Association of National Health insurance funds, the French National Association of Healthcare Professions, organisations representing health care professionals or establishments or registered user groups.

► Steps of the working method

Steering committee

HAS sets up a steering committee made up of representatives of the learned societies, professional or user organisations and, if need be, of the relevant health agencies and institutions. The committee defines exactly the subject of the guidelines, the questions to be discussed, the patient populations and the professionals for whom the guidelines are intended. It draws attention to relevant publications, particularly existing guidelines. It proposes suitable professionals to take part in working groups and act as peer reviewers. Finally it takes part in the peer review.

Working group

HAS sets up a multidisciplinary and multiprofessional working group made up of healthcare professionals who practice within the French national health service or privately and who come from different geographical backgrounds or represent different schools of thought and, if appropriate, of other concerned professionals and representatives of patient and user organisations. HAS appoints a working group chair to coordinate the group's work in collaboration with the HAS project manager. A report author is also designated by HAS to select, analyse and review the relevant medical and scientific literature (see box). The report author drafts the scientific report and assigns the chosen studies levels of evidence, under the supervision of the HAS project manager and the working group chair.

Sources for drafting the scientific report

- Medical and scientific databases searched systematically over an appropriate time period for the subject (languages: French, English). In particular, search for clinical practice guidelines, consensus conferences, medical decision-aid articles, systematic reviews, meta-analyses and other assessments.
- If appropriate, more specific databases (e.g. health economics)
- All useful internet sites (government agencies, learned societies, etc.)
- Grey literature (documents which cannot be accessed through conventional channels)
- Legislative and regulatory texts which could be related to the subject
- Cited references in the articles retrieved (manual search)
- Articles provided by the members of the working group and by peer reviewers.

Searches are updated regularly until the project is complete.

Producing the draft guidelines

The working group produces draft guidelines based on the report and the opinions expressed during the meetings of the working group (usually two meetings). Guidelines are graded A, B or C on a scale proposed by HAS according to the level of evidence on which they are based.[25] The grading used for the guidelines is given in the box below. The draft guidelines are then submitted to the peer reviewers.

Peer reviewers

HAS appoints the peer reviewers using the same criteria as for working group members. The peer reviewers are consulted by post and give an opinion on the content and structure of the report and guidelines, in particular on whether the guidelines are easy to read, to understand and to apply. Members of the HAS specialist committee responsible for professional guidelines (Committee for the Assessment of Healthcare Strategies*)* also peer review the guidelines.

1.1 Grading of guidelines

Grade	Scientific evidence level
A	trials of a high level of evidence (level of evidence 1), e.g. high-power randomised controlled trials (RCTs) free of major bias and/or meta-analyses of RCTs or decision analyses based on level 1 trials.
B	studies of an intermediate level of evidence (level of evidence 2), e.g. RCTs with some bias, meta-analyses based on questionable methodology, well-conducted non-randomised controlled trials or cohort studies;
C	studies of a lower level of evidence, e.g. case control studies (level of evidence 3) or case series (level of evidence 4).

In the absence of reliable publications, the guidelines are based on professional agreement among members of the working group and peer reviewers.

Final version of the guideline

The working group analyses the peer reviewers' comments, amends the report if necessary, and produces the final version of the guidelines and a quick reference guide (QRG), during a working session.
The final version of the report and guidelines and the procedure used to produce them are discussed by the Committee for the Assessment of Healthcare Strategies which may ask the working group to make amendments before submitting its opinion to the HAS Board.

Validation by the HAS Board

On the proposal of the Committee for Healthcare Strategy Assessment, the HAS Board validates the final report and authorises its distribution.

Distribution

HAS makes available on its website (www.has-sante.fr), free of charge, the evidence report, the guidelines and the Quick Reference Guide (QRG). HAS may decide to print both the QRG and the guidelines.www.has-sante.fr

[25] For more information on the method of producing clinical practice guidelines, see ANAES 1999 guide (in French): "*Recommendations pour la pratique clinique - Base méthodologique pour leur réalisation en France*". www.has-sante.fr.

Participants

Learned societies and professional associations

The following learned societies and professional associations were asked to participate in compiling these guidelines:

- French Association for Physiotherapy Research and Assessment (AFREK)
- National Association of Staff Physiotherapists (ANKS)
- French Federation of Physiotherapists and Rehabilitation Specialists (FFMKR)
- French Shoulder Rheumatology Group (GREP)
- Objectif kiné (OK)
- French Society of Arthroscopy (SFA)
- French Society of Orthopaedic and Traumatological Surgery (SOFCOT)
- French Physiotherapy Society (SFK)
- French Society of Physical Medicine and Rehabilitation (SOFMER)
- French Society of Medicine in the Workplace (SFMT)
- National Union of Physiotherapists and Rehabilitation Specialists (SNMKR).

Steering committee

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Working group

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Mr Frédéric Srour, physiotherapist, Paris
Dr Bruno Toussaint, orthopaedic surgeon, Annecy.

Peer reviewers

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Ms Sandra Marcadé, ATIH, Lyon
Dr Pierre Métral, ATIH, Lyon
Dr Olivier Scemama, project manager, HAS, Saint-Denis La Plaine

Summary data sheet

TITLE	**Post-operative rehabilitation and referral to outpatient or inpatient rehabilitation centre care after rotator cuff tear surgery or shoulder arthroplasty** **After rotator cuff tear surgery and shoulder arthroplasty**
Working method	Clinical practice guidelines (CPG)
Posting date	January 2008
Publishing date	Available in electronic format only
Objective(s)	• To help doctors make the right decision when prescribing physiotherapy after rotator cuff surgery or shoulder arthroplasty by enabling them to assess whether the patient should be hospitalised in order to receive postoperative rehabilitation. The aim of this is to avoid inappropriate hospitalisation in rehabilitation centres, in accordance with the Social Security Funding Act No 2005-1579 of 19 December 2005 amending Article L. 162-2-2 of the Social Security Code. • To specify the information that needs to be exchanged between the surgeon and the physiotherapist in order to implement the patient's postoperative rehabilitation.
Professional(s) concerned	• Orthopaedic surgeons • Physiotherapists • Physical medicine and rehabilitation specialists • Other healthcare professionals: occupational therapists, general practitioners, specialists in sports medicine, specialists in medicine and health in the workplace
Requestor	HAS' own initiative
Sponsor	HAS, Guidelines Department and Department of Health Economics and Public Health Assessment
Funding	Public funds
Project management	Coordination: Ms Joëlle André-Vert, project manager, Guidelines Department (assistant to the head of department: Dr Najoua Mlika-Cabanne) and Ms Célia Primus, project manager, Department of Health Economics and Public Health Assessment (head of department: Ms Catherine Rumeau-Pichon) Secretarial services: Ms Laetitia Cavalière Literature search: Ms Emmanuelle Blondet, with the help of Ms Sylvie Lascols (head of the Documentation Department: Ms Frédérique Pagès)
Participants	Learned societies, organising committee, working group (chair: Prof. Henry Coudane, orthopaedic surgeon, Nancy) review group: see list of participants. HAS received declarations of interests from the members of the organising committee and working group.
Literature searches	Covering the period from January 1990 to September 2007 1 506 articles were identified and 579 articles were analysed, 331 of which were cited
Authors of the evidence review	Mr Guy Cordesse, physiotherapist, La Ferté sur Jouarre Ms Joëlle André-Vert, project manager, Saint-Denis La Plaine Ms Célia Primus, project manager, Saint-Denis-La Plaine
Validation	Opinion of the Committee for Healthcare Strategy Assessment Validated by the HAS Board on 16 January 2008.
Other formats	The summary of the guideline (in English) and the evidence review (in French) may be downloaded from www.has-sante.fr
Supporting documents	Formal consensus: 'HAS guidelines established by formal consensus on surgical and orthopaedic procedures not generally requiring hospitalisation for follow-up care and rehabilitation in patients for whom physiotherapy is indicated' (HAS, 2006)

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