Annals of Physical and Rehabilitation Medicine xxx (2016) xxx–xxx

Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com

Original article

# High-intensity stretch treatment for severe postoperative adhesive capsulitis of the shoulder

Preston M. Wolin [b], Amy Ingraffia-Welp [b], Carlos E. Moreyra [c], William C. Hutton [a,*]

[a] Emory University, Atlanta, GA, USA
[b] Center for Athletic Medicine, Atlanta, GA, USA
[c] Tenet Florida Physician Services, Atlanta, GA, USA

ARTICLE INFO

*Article history:*
Received 13 November 2015
Accepted 27 April 2016

*Keywords:*
Adhesive capsulitis
Shoulder
Stretching
High intensity stretching
Physical therapy

ABSTRACT

*Background:* Some patients with postoperative adhesive capsulitis reach a plateau in their recovery with a standard protocol of physical therapy (PT), which puts them at risk for further surgical intervention.
*Objectives:* We aimed to evaluate therapy for postoperative adhesive capsulitis of the shoulder in 2 groups of patients: (1) those who used a high-intensity stretch (HIS) device after reaching a plateau in their recovery with a standard protocol of traditional PT (PT + HIS) and (2) those who showed no plateau in their recovery with a standard protocol of traditional PT alone (PT only).
*Methods:* We retrospectively reviewed the records for 60 patients (51 males; mean age 46.7 ± 12.6 years) with postoperative adhesive capsulitis who received treatment between March 2007 and May 2010. Forward elevation and combined internal/external rotation at the initial postoperative visit and final visit were measured. The measurements from group 2 patients were used as an observational benchmark.
*Results:* The PT + HIS ($n = 42$) and PT-only ($n = 18$) patients did not differ in total follow-up time. Initial elevation was worse for PT + HIS than PT-only patients (22.1° lower, $P = 0.02$), but the final elevation was equivalent. Initial rotation was worse for PT + HIS than PT-only patients (16.6° lower, $P = 0.04$), but the final rotation was higher for PT + HIS patients (10.6° higher, $P = 0.04$). Gains in elevation and rotation were greater for the PT + HIS than PT-only patients ($P = 0.04$ and $P = 0.01$).
*Conclusions:* Patients with postoperative adhesive capsulitis of the shoulder who are unable to reach their PT treatment goals with a standard protocol of PT may benefit from the addition of HIS to their treatment regimen. HIS could be a valuable adjunct to PT for treating postoperative adhesive capsulitis in appropriate patients.

© 2016 Elsevier Masson SAS. All rights reserved.

## 1. Introduction

Adhesive capsulitis of the shoulder occurs in up to 5% of the population [1,2]. It can limit a patient's ability to perform activities of daily living due to pain and to loss of both active and passive range of motion (ROM). Two general categories of adhesive capsulitis have been described:

- primary, or idiopathic;
- and secondary [3–5].

Primary adhesive capsulitis develops gradually over time without a specific known cause. Secondary adhesive capsulitis generally results from trauma or immobilization and can be separated into 3 types:

- endocrine disorder-related;
- post-traumatic;
- and postoperative [6].

Up to 40% of patients with adhesive capsulitis experience symptoms for longer than 3 years and up to 15% have a persistent disability [7,8]. Recovery from primary adhesive capsulitis generally includes a return of motion and resolution of symptoms; however, secondary adhesive capsulitis can be more difficult to treat [9]. Postoperative adhesive capsulitis can follow a more protracted course, often requiring a surgical release procedure [5,9–15]. Postoperative adhesive capsulitis can occur in up to 13% of patients after rotator cuff repair [11]. Other aetiologies of postoperative adhesive capsulitis include labral repair, capsulorrhaphy, shoulder arthroplasty and humerus fracture fixation [15]. Adhesive capsulitis incurs significant costs: direct costs were reported to be $7 billion in the United States in 2000 (equivalent to more than $9 billion in 2016) [16].

* Corresponding author.
*E-mail address:* whutton@emory.edu (W.C. Hutton).

http://dx.doi.org/10.1016/j.rehab.2016.04.010
1877-0657/© 2016 Elsevier Masson SAS. All rights reserved.

Please cite this article in press as: Wolin PM, et al. High-intensity stretch treatment for severe postoperative adhesive capsulitis of the shoulder. Ann Phys Rehabil Med (2016), http://dx.doi.org/10.1016/j.rehab.2016.04.010

The standard of care for postoperative adhesive capsulitis has included treatment with continuous passive motion (CPM) devices in the early postoperative period, followed by traditional physical therapy (PT). CPM devices are intended to prevent the formation of scar tissue and move the joint back and forth throughout the entire ROM of the joint. The use of CPM devices for treating frozen shoulder has had mixed results [17–19]. Other non-surgical interventions used as adjunct therapy to PT include glucocorticoid injections and arthrographic joint distension [1,20–23]. If motion loss persists after prolonged conservative treatment, surgical intervention including manipulation under anesthesia or lysis of adhesions is often the only recourse. An effective non-operative solution after surgery could provide significant savings in downstream healthcare costs by preventing a second surgical procedure along with the subsequent additional PT and doctor visits.

Mechanical therapy (performed at home) used as an adjunct to outpatient PT has been successful in treating adhesive capsulitis in the knee [24–26]. Mechanical therapy devices can be classified as low- or high-intensity stretch (HIS) devices [27]. HIS devices can apply torque to the joint similar to that applied by a physical therapist, whereas low-intensity devices apply lower torque to the joint and are usually used for longer treatment periods. Unlike CPM devices that are designed to prevent scar tissue formation, HIS devices are designed to stretch a joint at its end ROM to permanently elongate scar tissue that has already formed in the joint. In general, patients are given HIS devices when they are not meeting treatment milestones and have reached a plateau in their recovery with a standard protocol of PT. This plateau puts them at risk for further surgical intervention including manipulation under anesthesia or lysis of adhesions. A study of more than 60,000 patients with secondary adhesive capsulitis in the knee due to injury or surgery reported that patients receiving an HIS device were at significantly less risk of re-hospitalization or re-operation than those receiving a low-intensity device or PT alone [28]. To our knowledge, only one study has evaluated the use of an HIS device for treating shoulder stiffness [29]. That study dealt with frozen shoulder and is addressed in the discussion.

The purpose of this retrospective study of patients with postoperative adhesive capsulitis was to evaluate the efficacy of treatment for 2 groups of patients:

- patients who had reached a plateau in their recovery and failed to meet treatment goals with a standard protocol of traditional PT alone who were given an HIS device in addition to PT (PT + HIS);
- and patients with no evidence of reaching a plateau in their recovery and who met their treatment goals with PT alone (PT only).

We aimed to examine whether patients who had reached a plateau in their recovery with PT alone would benefit from the addition of HIS to their treatment protocol, so that they would recover to an equivalent level as compared to patients who reached all treatment goals with PT alone. The retrospective nature of this study and atypical study design precluded a direct comparison between group 1 and 2 patients. Results from group 2 patients were used as a benchmark to observe group 1 patients, for an observational study.

## 2. Materials and methods

### 2.1. Participants

This retrospective institutional research board-approved study was granted a waiver of informed consent. Clinical notes were examined for patients seen postoperatively between March 2007 and May 2010 after undergoing an arthroscopic shoulder procedure performed by one of the authors (PW). Within this time, 60 patients (51 males, mean age $46.7 \pm 12.6$ years, height $1.8 \pm 0.1$ m, weight $93.9 \pm 18.1$ kg) received treatment for postoperative adhesive capsulitis. Surgical procedures included rotator cuff repair, subacromial and nerve decompression, paracapsular release, biceps tenodesis, labral repair, repair of a superior labral tear from anterior to posterior, distal clavicle excision, capsulorrhaphy, and microfracture surgery (see Supplementary Table). Overall, 42/60 patients reached a plateau in their recovery after failing to achieve target treatment goals with a standard protocol of traditional PT. For these 42 patients, the addition of HIS mechanical therapy (High-Intensity Stretch Device, ERMI Shoulder Flexionater®) was considered the best treatment to avoid further surgical intervention (PT + HIS group). The other 18 patients showed no evidence of a plateau in their recovery and reached their treatment goals with a standard protocol of PT (PT-only group). For the 42 PT + HIS patients, the HIS device was introduced after a mean of $10.4 \pm 4.0$ weeks of treatment with a standard protocol of traditional PT. The 42 patients received the HIS device while continuing with PT for a mean of $15.8 \pm 7.0$ weeks, for a total mean of $26.2 \pm 10.1$ weeks treatment time (10.4 weeks of PT alone + 15.8 weeks of PT + HIS). The PT-only patients did not reach a plateau in their recovery and met all treatment goals with the standard protocol of traditional PT for a statistically equivalent duration ($26.8 \pm 10.3$ weeks). Therefore, PT + HIS patients did not require more treatment time than PT-only patients. The groups did not differ in mean age (46.6 vs. 44.3; $P = 0.41$), height (1.8 m vs. 1.7 m; $P = 0.14$) or weight (96.2 kg vs. 78.0 kg; $P = 0.16$).

### 2.2. Intervention

The postoperative PT protocol for each patient was customized to the patient's pathology and the surgical procedure performed. All patients started with formal PT within 3 days after surgery. All patients except those who underwent a subscapularis tendon repair began with passive flexion, elevation and internal and external rotation on the scapular plane, in addition to selected active-assisted ROM exercises.

Interval target goals for ROM progress during PT were specified for each patient and were based on the contralateral shoulder ROM. ROM goals varied among patients and depended on the age and sex of the patient, preoperative ROM in the injured shoulder, injury and surgery type, and ROM in the contralateral arm. The 42 patients in the PT + HIS group were consistently unable to reach their ROM goals and were prescribed an HIS device; they also continued PT. All of these patients showed failure after at least 5 weeks of PT (mean $10.4 \pm 4.0$ weeks) before the introduction of the HIS device, with the exception of one patient who had limited pre-surgery ROM, reached a plateau early in treatment and received the device after 2.6 weeks (18 days) of PT. Because this project is retrospective, we are not able, at this stage, to give specific numbers that define a plateau in recovery. However, patients with $< 45^\circ$ in external rotation and $120^\circ$ in forward elevation after 5 or more weeks of PT are generally considered at risk of a poor outcome without additional intervention.

The PT + HIS patients were given an HIS device to be used at home (Fig. 1). After the device was set up in the patient's home, the patient received clear demonstrations on how to use it. Patients were asked to perform six 10-min sessions of end-range stretching per day with the device.

The HIS device could be set to stretch in external rotation, abduction or a combination of the 2 movements (Fig. 1). The patient could increase the torque being applied to the shoulder by pumping the hydraulic actuator lever arm, which was controlled by the patient's unaffected arm. By pumping the lever arm, the patient moved the affected shoulder to its end ROM, and that static

Please cite this article in press as: Wolin PM, et al. High-intensity stretch treatment for severe postoperative adhesive capsulitis of the shoulder. Ann Phys Rehabil Med (2016), http://dx.doi.org/10.1016/j.rehab.2016.04.010

Download English Version:

https://daneshyari.com/en/article/5706039

Download Persian Version:

https://daneshyari.com/article/5706039

Daneshyari.com