

# Self-Management of Idiopathic Adhesive Capsulitis: A Case Report

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**I**DIOPATHIC adhesive capsulitis (IAC; commonly referred to as “frozen shoulder”) usually affects patients 40–70 years old. The prevalence of IAC is not precisely known, but it is estimated that 3% of people develop the disease over their lifetimes. Men tend to be affected less frequently than women, and there is no predilection for race. IAC has been associated with several conditions.

## KEY POINTS

▶ Idiopathic adhesive capsulitis is associated with a long recovery process and prolonged limitations in work and sport activities.

▶ Most patients are encouraged to perform exercises at home, which are both time-consuming and uncomfortable.

▶ The use of a vibration platform and specific shoulder positioning may accelerate recovery from idiopathic adhesive capsulitis in an efficient and more tolerable self-managed program.

A higher prevalence exists among patients with diabetes, compared with the general population. The prevalence among patients with insulin-dependent diabetes is even higher (up to 36%), with increased frequency of bilateral shoulder involvement.<sup>1</sup> Although the prognosis for full recovery of shoulder function is generally good among patients

without comorbidity, the course of treatment can be lengthy and therapeutic interventions can be painful. The protracted recovery often involves a self-directed home program, even when patients receive physical therapy. The subject whose case is reviewed in this report was familiar with the condition and elected

to self-manage it without medical consultation. His description of the intervention that provided relief is unique and may warrant attention as a potentially useful alternative to the painful active-assisted home exercises that are typically utilized for management of adhesive capsulitis.

## Chief Complaint

A healthy 54-year-old right-hand dominant male complained of idiopathic pain and limited range of motion in his left shoulder. He was familiar with the symptoms of IAC, since he had experienced its symptoms in his right shoulder after a skiing accident 10 years earlier.

## Medical History and Quality of Life

The subject was a 186-cm-tall (6'1”), 83 kg (183 lb), BMI 24.8, and Caucasian of Mediterranean ancestry. He assessed his general health as excellent. He denied smoking and reported alcohol consumption as being limited to one glass of wine daily at dinner. He reported no use of medications and had no medical concerns, except his shoulder symptoms. He described his work was sedentary, and reported minimal daily physical activity. He reported 9 minutes of daily use of a vibrating platform for fitness training (Globus Physioplate, Codogne, IT).

The subject's shoulder discomfort manifested gradually over a period of 3 months. Initially, pain and loss of motion were minimal, hindering only extreme movements of the shoulder. Eventually, pain and loss of motion significantly affected his activities of daily living. He particularly noted difficulty in putting on pull-over shirts and sweaters, due to the inability to raise his left arm. Pain and loss of motion significantly affected the quality of his sleep, since resting on either side caused pain. Pain, reported on a scale of 0 to 10 (0 = no pain, 10 = disabling pain) was 1 at rest, 2 with minimal movements, 4 if resting on either his involved left or uninvolved right side, and 7 when trying to reach positions with the affected arm elevated above 80 degrees. Pain was described as deep aching in the axilla and over the head of the humerus. There was no pain radiating to the arm or symptoms of more serious pathology.

### Prior History

The subject had experienced a previous episode of IAC in his right shoulder 10 years earlier. His right shoulder had been immobilized for 15 days following a fracture of the greater tuberosity of the humerus. After nine weeks of physical therapy failed to improve the mobility of the shoulder, he was diagnosed with AC and underwent arthroscopic arthrolysis of the shoulder capsule. Physical therapy was initiated immediately after surgery and continued for two months. The subject reported having realized 95% recovery in ROM and complete pain relief.

### Diagnosis

The subject recognized the symptoms of IAC as they occurred at the beginning of March 2009. At first, ROM was minimally limited, and he hoped that active movement of his shoulder within his pain threshold would prevent progressive worsening of the condition; however, he reported that the restriction in motion increased from 5% to 50% of normal ROM. Along with the loss of ROM, his pain started to affect his sleep quality.

### Self-Management

Approximately four months after the condition developed, the subject resumed a regimen of whole-body vibration exercise (WBV), hoping that increased physi-

cal activity would be beneficial. This exercise routine had not been performed for approximately 10 months but had been completed on an almost daily basis in the past. The exercise regimen consisted of WBV that was performed 6 days per week. The exercise sessions consisted of two 30-second periods in a "push-up" position, two 30-second periods in a "triceps dip" position twice, and two 30-second periods in a "side-plank" position on both sides (arm straight, shoulder abducted approximately 90°). These upper body exercises were alternated with lower extremity exercises that were performed in standing positions on the WBV platform. The complete routine consisted of eight minutes of activity on the WBV platform, with approximately one-minute intervals between exercise periods. The exercise regimen did not elicit any shoulder pain and did not worsen IAC symptoms. Although ROM and quality of life did not immediately improve, his condition had been progressively worsening before initiation of the WBV program.

### Improvement

Approximately three months after initiation of the WBV exercise regimen, the subject consulted a massage therapist for ideas to increase shoulder ROM. One of the lower extremity WBV exercises was discontinued and replaced with a position that pushed the shoulder into the gleno-humeral abduction barrier (Figure 1). The position was maintained with the left shoulder at a tolerable pain threshold (5/10) for 30 seconds, which was done once each day and 6 times per week.



**Figure 1** Position that pushes the shoulder into the gleno-humeral abduction barrier to increase shoulder ROM.

Improvement in ROM and pain was realized within two weeks, and the subject estimated that it had been restored to 90% of normal after two months. The subject experienced an “enormous” improvement in quality of life, which included normal movement when dressing and on the ability to sleep on both sides. In the month prior to development of this case report, the subject reported that ROM had improved to 95% of normal. At the initial meeting with one of the authors of this report (CRD), small limitations in scaption and external rotation were noted (5-10°). Reach behind the back was restricted by approximately three spinal segments in comparison to the unaffected extremity. Subsequently, shoulder position was altered to induce rotation of the arm around its longitudinal axis (Figure 2). Within a couple of exercise sessions, further improvement in ROM was evident when reaching with the left arm behind his back, and full scaption had been achieved.



**Figure 2** Shoulder position altered to induce rotation of the arm around its longitudinal axis.

## Discussion

Patients suffering from IAC experience a period of “freezing” that is associated with gradual loss of shoulder ROM and an increase in pain, which is followed by “thawing” that leads to gradual improvement. End-range joint mobilization has been reported to facilitate restoration of motion and reduction of pain and disability.<sup>2,3</sup> The positioning of the shoulder during exposure to vibration used for this subject was similar to the positioning recommended for end-range joint mobilization.<sup>2,3</sup>

The mechanism by which WBV may facilitate recovery from IAC is not clear, but its apparent beneficial effect is worthy of investigation. The vibration platform induced a high number of micro-movements within the gleno-humeral joint. At a vibration frequency of 30 Hz, a 30-second exercise duration creates 900 repetitions of the same micro-movement. Although the 1.6 mm movement of the vibration platform is exceedingly small, the frequency at which tissue is stretched far exceeds that which could be derived from a manual therapy session.

Neuromuscular response to a vibration stimulus has been reported, which may explain the beneficial response observed for this case. Vibration exercise has been shown to decrease the spontaneous firing rate of a large portion of muscle spindles.<sup>4</sup> This effect was associated with diminished static stretch sensitivity of the muscle for a few seconds after the discontinuation of a vibration stimulus. Thus, the tone in muscles surrounding the shoulder may have been reduced during the 30 seconds of vibration exposure, thereby permitting more force to be applied to the joint capsule. Further investigation is warranted to assess the effect of vibration on muscle tension in the presence of pain.

The natural history of IAC has been described as occurring in phases: the initial painful phase typically persists for 2-9 months, a stiff phase lasts for 3-12 months, and a recovery phase has a duration of 5-26 months.<sup>5</sup> Reeves suggested that the duration of disability may last from 12 to 42 months, with a mean of 30 months.<sup>6</sup> Earlier recovery may be facilitated by corticosteroid injection,<sup>7-9</sup> and manual therapy directed at restoring glenohumeral ROM and scapular rhythm.<sup>2,5,10</sup>

The subject did not receive a corticosteroid injection, nor was there physical therapy intervention. He initiated the vibration regimen during the stiff phase of IAC. It is certainly possible that the outcome of his self-directed intervention came at a time when natural recovery would have occurred, but the rapid improvement suggests that there was a beneficial therapeutic response to the vibration exercise intervention.

Because a case study cannot establish a cause-effect relationship, the potential advantages of initiating the intervention for management of IAC is speculative. Although discomfort was experienced during the intervention, its level was under the control of the subject and its duration was brief. Moreover, the intervention required very little time.

Clearly, the results from a single case cannot confirm the benefits of a new therapeutic intervention, and we do not advocate self-management of IAC without the guidance of a health care professional. Shoulder pain and a loss of ROM may be the result of other some other condition that requires medical management.

We offer this case report for consideration of a novel approach to the treatment of IAC. The results we report suggest that the use of a vibration platform, with the specific shoulder positioning that was utilized, may markedly facilitate the resolution of adhesive capsulitis. Further investigation is needed to identify the optimal timing of its administration and other treatment parameters. The regimen that was utilized is less time-consuming and less painful than home exercises that are commonly recommended for management of adhesive capsulitis. These factors may contribute to greater patient compliance and more rapid resolution of this difficult-to-treat condition. With proper instruction, patients with IAC could benefit from self-administered WBV treatments to supplement therapeutic procedures that are administered in a clinical setting. Systematic evaluation of this potentially beneficial therapy is needed.

## Financial Interest Disclosure

The subject whose case has been reviewed is the second author of this report (GMC). As managing partner of Globus Sport & Health Technologies LLC, which is the importer of the vibrating platform that was used, he has a financial interest in the device that is manufactured by Globus Italia, Codogno, Italy. ■

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