



SHOULDER

# A blinded, randomized, controlled trial assessing conservative management strategies for frozen shoulder

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**Background:** There is little evidence for the optimal form of nonoperative treatment in the management of frozen shoulder. This study assesses the efficacy of current physiotherapy strategies.

**Methods:** All primary care referrals of frozen shoulder to our physiotherapy department were included during a 12-month period. Of these referrals, 17% met the inclusion criteria for primary idiopathic frozen shoulder. The 75 patients were randomly assigned to 1 of 3 groups: group exercise class, individual physiotherapy, and home exercises alone. A single independent physiotherapist, who was blinded to the treatment groups, made all assessments. Range of motion, Constant score, Oxford Shoulder Score, Short Form 36, and Hospital Anxiety and Disability Scale (HADS) outcome measures were performed at baseline, 6 weeks, 6 months, and 1 year.

**Results:** The exercise class group improved from a mean Constant score of 39.8 at baseline to 71.4 at 6 weeks and 88.1 at 1 year. There was a significant improvement in shoulder symptoms on Oxford and Constant scores ( $P < .001$ ). This improvement was greater than with individual physiotherapy or home exercises alone ( $P < .001$ ). The improvement in range of motion was significantly greater in both physiotherapy groups over home exercises ( $P < .001$ ). HADS scores significantly improved during the course of treatment ( $P < .001$ ). The improvement in HADS anxiety score was significantly greater in both physiotherapy intervention groups than in home exercises alone.

**Conclusions:** A hospital-based exercise class can produce a rapid recovery from a frozen shoulder with a minimum number of visits to the hospital and is more effective than individual physiotherapy or a home exercise program.

**Level of evidence:** Level I, Randomized Controlled Trial, Treatment Study.

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**Keywords:** Shoulder; adhesive capsulitis; frozen shoulder; physiotherapy; SF-36; HADS; anxiety

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Frozen shoulder, or adhesive capsulitis, is a condition of uncertain etiology characterized by the spontaneous onset of pain with significant restriction of both active and passive range of movement of the shoulder.<sup>33</sup> It has been classically divided into phases of freezing (insidious onset

**Table I** Inclusion and exclusion criteria

## Inclusion criteria

Age 40 to 70 years

Patients reported local shoulder pain, frequently present either over the anteromedial aspect of the shoulder extending distally into the biceps region or over the lateral aspect of the shoulder extending into the lateral deltoid region. Symptoms were present for at least 3 months.

Spontaneous onset of a painful stiff shoulder

Marked loss of active and passive global shoulder motion, with at least 50% loss of external rotation

Normal findings on anteroposterior and axillary radiographs of the glenohumeral joint

## Exclusion criteria

Pathologic findings or glenohumeral osteoarthritis on radiographic evaluation

Clinical evidence of significant cervical spine disease

History of significant trauma to the shoulder

Local corticosteroid injection or any physiotherapy intervention to the affected shoulder within the last 3 months

Cerebrovascular accident affecting the shoulder

Inflammatory joint disease affecting the shoulder

Bilateral frozen shoulder due to possible underlying systemic cause

Thyroid disease

Any coronary event, post-coronary artery bypass, or catheterization before the clinical appearance of frozen shoulder

Prior surgery, dislocation, or fractures on the affected shoulder

Active medicolegal involvement

of diffuse shoulder pain with progressive loss of movement), frozen (gradual subsidence of pain, plateauing of stiffness with equal active and passive range of motion), and thawing (gradual improvement of movement and resolution of symptoms).<sup>33</sup> Differing classifications have also been described; Neviaser described the process in 4 stages based on arthroscopic findings,<sup>31</sup> and a recent review by Hanchard<sup>20</sup> has suggested that two groups, “pain predominant” and “stiffness predominant,” may be simpler and more appropriate. All of the classifications, however, stress the importance of recognizing that the disease process is a continuum rather than having well-defined stages.

A primary or “true” frozen shoulder occurs when there is no exogenous cause or preexisting condition. It is manifested as an idiopathic painful shoulder with a decreased range of movement in which no systemic diagnosis, precipitating shoulder condition, or radiographic explanation can be found.<sup>25,29,36</sup> Arthroscopic and histologic studies have shown that the condition is one of glenohumeral capsular contraction, particularly of the coracohumeral ligament within the rotator interval.<sup>8</sup> The condition is usually thought to be self-limited, although Hand et al<sup>22</sup> demonstrated that 41% of patients have mild to moderate symptoms at 7 years and 6% have severe ongoing symptoms with pain and functional loss.

Despite considerable scientific research, the etiology and pathology of frozen shoulder remain unknown.<sup>23</sup> The prevalence has been estimated at approximately 2% to 3% of adults in the general population.<sup>29</sup> However, Bunker<sup>8</sup> calculated a much smaller prevalence of 0.75% of the population on the basis of clinic attendance in secondary care. It usually develops between the ages of 40 and 70 years<sup>5,33,36</sup> and rarely recurs in the same shoulder unless an injury or disease process predisposes the joint to repeated episodes of stiffness.<sup>13,21</sup>

Many studies have attempted to establish the most effective treatment of frozen shoulder, but there still remains much debate in the literature. Currently, there is no agreement on the standard management of this condition.<sup>14</sup> The controversy is due in part to a failure of many authors to precisely define and accurately identify frozen shoulder among other causes of shoulder pain and stiffness.<sup>17,36</sup>

The Chartered Society of Physiotherapy has completed a project on the management of frozen shoulder.<sup>20</sup> Conclusions drawn from these evidence-based clinical guidelines suggest that future researchers should report their physiotherapy interventions in sufficient detail to remove ambiguity, consider multicenter trials, and focus on specific stages of frozen shoulder. In line with these recommendations, the aim of this study was to investigate the clinical effectiveness of common physiotherapy interventions in the treatment of frozen shoulder using validated outcome measures to determine effectiveness.

## Methods

The study used a randomized controlled trial of 3 common physiotherapy interventions. Patients were randomly allocated to treatment groups, and the study conformed to the CONSORT statement.<sup>1</sup> All patients gave written informed consent before participating in the study.

Eligible patients were all new referrals to the physiotherapy department with a diagnosis of frozen shoulder. Patients were assessed and inclusion and exclusion criteria verified (Table I). Inclusion criteria were representative of the typical features of frozen shoulder: an insidious onset of pain and stiffness with a clinical reduction in range of motion, principally a >50% reduction in external rotation, without an underlying radiologic abnormality.<sup>30</sup> All patients were required to have had symptoms for a

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