Adhesive capsulitis – A review of the 'Joint Active Systems (JAS) Shoulder' and its impact on treatment

By

WorkSafeBC Evidence-Based Practice Group

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About this report

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About the Evidence-Based Practice Group

The Evidence-Based Practice Group was established to address the many medical and policy issues that WorkSafeBC officers deal with on a regular basis. Members apply established techniques of critical appraisal and evidence-based review of topics solicited from both WorkSafeBC staff and other interested parties such as surgeons, medical specialists, and rehabilitation providers.

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Background

Recently, the Evidence-Based Practice Group (EBPG) was asked to investigate the efficacy/effectiveness of the Joint Active Systems – Shoulder (JAS Shoulder) device in treating post-operative adhesive capsulitis.

According to the manufacturer's website (http://www.jointactivesystems.com/Default.aspx), Joint Active Systems (JAS) devices are designed to restore range of motion based on stress relaxation and low-load stretch therapy. The company (JAS) states that stress relaxation and low-load stretch is an established stretching technique that can safely and efficiently restore normal length to shortened tissues surrounding a joint, allowing for motion and use when stiffness develops after injury. It is further claimed that during a stress relaxation and low-load stretch therapy session employing JAS devices, the joint is brought to a pain-free stretched position and held there for several minutes allowing for the surrounding tissues to relax and lengthen. Further review of the JAS website revealed information on two studies[1-2] that are listed under JAS shoulder (http://www.jointactivesystems.com/For-Professionals/Research-and-Resources.aspx). The summary of one of the studies (by Donatelli et al.) posted on this website states that static progressive stretch, which is provided by the JAS Shoulder device, had been proven effecfive in permanently elongating shortened tissues.

Methods

- Systematic literature searching was conducted on November 18, 2010.

- Searching was conducted on commercial medical databases, including Cochrane Database of Systematic Reviews, ACP Journal Club, Database of Abstracts of Reviews of Effects, Cochrane Central Register of Controlled Trials, Health Technology Assessment, NHS Economic Evaluation Database, BIOSIS Previews, EMBASE, MEDLINE, MEDLINE In-Process & Other Non-Indexed Citations, MEDLINE Daily Update, and OLDMEDLINE, that are available through the OvidSP interface.

- Searching was done in several stages due to the fact that no studies were identified in the earlier searches. These searches were conducted by employing different keywords, including:

    1. (JAS shoulder device) OR (joint active systems shoulder device). *No published studies were identified.*
    2. (JAS shoulder) OR (joint active systems shoulder). *No published studies were identified.*
    3. (joint active systems). *Three[3-5] published studies were identified.*
    4. (static progressive stretch) AND (adhesive capsulitis). *No published studies were identified.*
    5. (static progressive splinting) AND (adhesive capsulitis). *No published studies were identified.*

- Upon examination on the titles and abstracts of the three[3-5] published studies identified during the literature search, all articles were thought to be irrelevant in answering the question on the efficacy/effectiveness of JAS-shoulder in treating post-operative adhesive capsulitis.

- Two articles listed on the JAS company website[1-2] were not identified through our literature searches. One article[1],which was deemed to be not relevant to the question of this systematic review, was published in a journal that is not indexed in Cumulative Index Medicus. The other article[2] was not identified – most likely due to the different keywords employed in this article and our search strategy. Upon examination of the summary of this study, this article was then retrieved in full, appraised, and presented below.

- Level of evidence (Appendix 1) was assigned to each primary study according to the EBPG - WorkSafeBC level of evidence.

Results

- Donatelli et al.[2] conducted a small (n=30), two groups parallel randomized controlled trial (Level of evidence 1. Appendix 1), investigating the efficacy of a physical therapy program (PT) alone (control group) vs. PT and the use of a static progressive orthosis (c.q. JAS Shoulder) (experimental group) among patients diagnosed with primary – second or third stage – adhesive capsulitis. *Even though this study was listed as a randomized controlled trial, it should be noted that there was no hypothesis nor was a sample size calculated in order to answer the research question. The authors reported that a random number list was employed in group assignment; however, it is not clear how this random number list was generated as well as whether any allocation concealment was contemplated or done given the fact that this study was not blinded at all. It should also be noted that even though this study was a randomized study, there was an imbalance in the distribution of potential prognostic factors, such as sex, between experiments and controls.* Patients were assessed for active abduction in the plane of scapula (POS) and passive external rotation in an adducted position (ER/ADD) prior to intervention, after the 6th session (end of treatment), and during the follow-up session. *It should be noted that, in relation to the timing of outcome assessment, multiple statistical analyses (including multiple outcomes) were conducted without any adjustment to the significance level of the test employed.* The authors concluded that the mean increase of ER/ADD was higher in the experimental group (mean 19°) compared to controls (mean 12°) even though the difference was not statistically significant. The other outcome measurement presented was on active elevation. In this measurement, the experimental group demonstrated a higher mean of increase on active elevation at the plane of scapula (mean 22°) compared to the controls (mean 10°). This difference was statistically significant. *These were only some of the outcome measurements and statistical tests reported by the authors. It should be strongly noted that no adjustment was made to the level of significance of the statistical tests used. It should also be noted that controls also reported improvement in the outcome measurements.* The authors also reported that patients in the experimental group indicated a reduction in shoulder pain, especially at night, allowing them to sleep better. *The authors did not report on how any reported pain was quantified or measured, nor did they describe how this may have had an impact on the patient. As such it is not clear how these measurements could be appraised.*

Summary

- At present, there is anecdotal evidence on the efficacy of JAS Shoulder in improving ROM among patients diagnosed with stage 2 or 3 adhesive capsulitis. *However, it should be noted that this evidence came from a low quality, level 1 evidence study that needs to be duplicated by other researchers. This study also provided evidence that standard physiotherapy may be beneficial in improving ROM among these patients. Perhaps, more importantly, it needs to be proven that the JAS Shoulder device is more efficacious than "older", presently used rehabilitation devices in furthering the treatment of patients with adhesive capsulitis.*

- Information from the Ontario distributor of this product suggests that the cost of the JAS Shoulder system is approximately $1700 to purchase and that it rents for almost $800 per month.

References

1. LaStayo P and Jaffe R. Assessment and management of shoulder stiffness: a biomechanical approach. Journal of Hand Therapy. Apr-Jun 1994;7(2):122-130.

2. Donatelli R, Wilkes JS, Hall W and Cole S. Frozen shoulder encapsulates therapy challenges. Biomechanics. Feb 1, 2006:31-6.

3. Bonutti PM, McGrath MS, Ulrich SD, McKenzie SA, Seyler TM and Mont MA. Static progressive stretch for the treatment of knee stiffness. Knee. 2008;15(4): 272-276.

4. McGrath MS, Ulrich SD, Bonutti PM, Marker DR, Johanssen HR and Mont MA. Static Progressive Splinting for Restoration of Rotational Motion of the Forearm. Journal of Hand Therapy. 2009;22(1):3-9.

5. Seyler TM, Marker DR, Bhave A, Plate JF, Marulanda GA, Bonutti PM, Delanois RE and Mont MA. Functional problems and arthrofibrosis following total knee arthroplasty. Journal of Bone and Joint Surgery - Series A. 2007;89(SUPPL. 3):59-69.

Appendix 1

WorkSafeBC - Evidence-Based Practice Group Levels of Evidence [adapted from 1,2,3,4]

1	Evidence from at least 1 properly randomized controlled trial (RCT) or systematic review of RCTs.
2	Evidence from well-designed controlled trials without randomization or systematic reviews of observational studies.
3	Evidence from well-designed cohort or case-control analytic studies, preferably from more than 1 centre or research group.
4	Evidence from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments could also be included
5	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.

References

1. Canadian Task Force on the Periodic Health Examination: The periodic health examination. CMAJ. 1979;121:1193-1254.

2. Houston TP, Elster AB, Davis RM et al. The US Preventive Services Task Force Guide to Clinical Preventive Services, Second Edition. AMA Council on Scientific Affairs. American Journal of Preventive Medicine. May 1998;14(4):374-376.

3. Scottish Intercollegiate Guidelines Network (2001). SIGN 50: a guideline developers' handbook. SIGN. Edinburgh.

4. Canadian Task Force on Preventive Health Care. New grades for recommendations from the Canadian Task Force on Preventive Health Care. CMAJ. Aug 5, 2003;169(3):207-208.