Self & Manual Mobilization in Men With Ankylosing Spondylitis

Research Review By Dr. Robert Rodine

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Study Title    Self- and manual mobilization improves spine mobility in men with ankylosing spondylitis – a randomized study
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Background

Ankylosing spondylitis (AS) is a chronic inflammatory disorder that primarily affects the spine and pelvis. Following initial diagnosis, treatment is aimed at controlling pain during inflammatory periods while employing exercise and mobilization/manual therapy that aims to maintain mobility and prevent deformity (1).

For reference, the traditionally taught New York Diagnostic Criteria for AS are:

- Chest expansion less than 2.5 cm
- LBP for longer than 3 months that is not relieved by rest
- Restricted lumbar spine range of motion (particularly in flexion and rotation)
- Radiographic changes in SI joints rated as: grade 2 bilaterally or grade 3 unilaterally

Editor’s Note:

Recently, due to the delay in radiographic changes that occur with AS, a newer set of criteria has been proposed in adults < 50 yoa (2):

- Morning stiffness ≥ 30 minutes
- Pain relieved with exercise but not with rest
- Awakening with back pain but only in second half of the night
- Alternating buttock pain

If 2/4 criteria are present, the sensitivity is ~70% and specificity ~80% for accurately diagnosing AS.

The purpose of this RCT was to determine the effects of mobilization on chest-expansion. As reduced
chest expansion results in restricted respiratory potential via rigidity of the costotransverse and costovertebral joints, AS patients are subject to reduced aerobic capacity. As a result this is a highly valuable outcome measure in AS patients. Vital capacity, posture and general spinal mobility were also assessed.

**Pertinent Results**

- Subsequent to eight weeks of care, improvements were noted within the treatment group compared to the control group.
- Chest expansion was significantly improved at the level of the xyphoid (P < 0.01), however not when measured at the level of the 4th intercostal space.
- Cervical posture was improved in the sagittal plane in the treatment group, with the measurable wall-C7 distance decreasing from 5.2 cm to 3.9 cm (P < 0.001). Thoracic posture also improved, though no difference was noted between groups in terms of lumbar posture.
- Spinal mobility demonstrated improvement for the treatment group in thoracic spine flexion and for thoracic flexion/extension range of motion. The same improvement was noted in the lumbar spine. Overall, significant differences were not noted between groups in BAS scales, with exception for the BAS Metrology Index, which showed improvement favoring the treatment group. The BASMI score range is 0-10. Pre-treatment scores measured a mean of 1.3/10 (SD 0.9) and were lowered to a mean of 0.3/10 (SD 0.6) post-treatment for those that received self- and manual mobilization.
- Vital capacity was not improved in either group.
- Six month follow-up was available on 15/16 subjects from the treatment group. Significant improvement remained for cervical spine posture, lumbar flexion, lumbar flexion/extension range of motion and for the BASMI. Improvements in chest expansion were lost, as were improvements to thoracic spine mobility.
- Information on home exercise compliance in the treatment group was not provided by the authors, nor was data on continued compliance with home exercise subsequent to the eight week treatment plan.

**Clinical Application & Conclusions**

While long-term improvements were not as drastic subsequent to eight weeks of self- and manual mobilization, short-term improvements in mobility, range of motion and chest expansion were significant. This is consistent with anecdotal knowledge of exercise compliance in AS patients. As this patient group adheres to exercise and mobility routines, symptoms of pain and stiffness tend to subside. However, when exercise strategies are absent, symptoms tend to increase. Further, exercise performance may decline significantly during acute flare-ups.

Within the current study, an eight week treatment plan of manual mobilization followed by home exercise improved function and motion when compared to a control group. It should be noted however, that significant between-group differences were not noted via the use of the BAS self-administered questionnaires.
This information is helpful to the field practitioner in two ways. First, this study promotes understanding a time-frame in which noticeable differences can be achieved in AS patients via a mobilization and movement-focused program applied twice per week, for 8 weeks. Secondly, this study helps us to understand that these improvements are not all maintained over time. This last point can be viewed in several ways.

As the authors did not comment on exercise compliance during the six months post-treatment, it is unknown to what extent the subjects continued to participate in their mobility program. Therefore, it is difficult to interpret the follow-up results. Given that AS is a progressive disease, it is possible that subjects mobility was further impaired during the six month time frame, decreasing gains achieved from treatment. While this possibility should be considered, it is unlikely given the small time frame. Another explanation is that the subjects did not continue with their mobility programs and gains achieved decreased over the follow-up time frame. Or, subjects did participate and gains were lost as a) self-mobilization alone is insufficient to maintain gains or b) given the progressive nature of AS only some of the gains achieved are maintainable over time.

Regardless of the explanation however, caution must be exercised in follow-up interpretation as the study design does not directly address this issue. This being said, it would be reasonable to for AS patients to continue with mobility directed programs, striving to maintain mobility gains subsequent to eight weeks of care. Readers should remember that in this patient group, even small amounts of temporary relief are welcomed, and clinically significant.

Future research in the area would be helpful if directed towards dose-response relationships to manual care and mobility improvements in AS patients or the determination of supportive care strategies and frequencies in this patient population.

**Study Methods**

Thirty-four male patients with AS from a hospital outpatient clinic were entered into the study. Subjects were included if they met the NY criteria for AS (see above), were 20-60 years of age and had stable pharmacological treatment. Subjects were excluded if they presented with high inflammatory activity, were subject to pharmacological changes, demonstrated radiographic ossification in the thoracic spine or suffered other severe illnesses.

Two subjects withdrew, leaving 32 included subjects. Sixteen subjects were randomized to the treatment group and 16 to the control group. No differences were observed between groups.

Within the treatment group the average age was 36.5 yrs (29-60) and the disease duration was 2.5 years (0-20). Within the control group the average age was 35 years (23-53) and the disease duration
was 3.5 yrs (0-20).

Interventions:

The treatment group was provided with manual mobilization for one hour, twice weekly for a period of eight weeks, provided by a physiotherapist. Subjects began each session with a warm-up session that consisted of vibratory massage to the soft-tissues of the back and gentle mobility exercises. Active and passive mobility exercises in the ranges of flexion/extension, rotation and lateral flexion were performed, all in varying starting positions, to the spinal column/thoracic cage. Passive mobilization was performed with general movement, angular, specific and translatory movements. Contract-relax stretching techniques were utilized as was soft-tissue therapy to the neck.

Self–mobilization was performed at home, three times daily. This consisted of three exercises, adjusted for each patient’s physical characteristics and capacities. Compliance was monitored during regular physiotherapy visits. Unfortunately no specific details about these exercises were provided.

The control group performed their usual physical exercise routine for an eight week monitored period. They were then offered treatment similar to the other group.

Outcome Measures:

Outcome measures were assessed by two blinded assessors at baseline and at eight weeks. Measures consisted of the Bath Ankylosing Spondylitis (BAS) scales, chest expansion measured at the level to the 4th intercostals space and at the xyphoid process, vital capacity measured via spirometry and spinal mobility. A six month follow-up was also conducted.

Posture was determined by placing the subject with their back, heels and buttock against the wall while measuring the distance between the wall and the C7 spinous process. A kyphometer was also used to measure posture between T2-3 and T11-12 as well as between T11-12 and S1-2.

Spinal mobility was determined through maximal thoracic spinal flexion and extension in a standing position with a kyphometer. The same was performed in the lumbar spine.

The BAS Disease Activity Index investigates impairment. The BAS Functional S index measures disability. The BAS Global score measures participation, demonstrating the impact of AS on overall well-being. The BAS Metrology Index was also used which measures impairment as a functional test, which describes measurements of cervical rotation, wall-to-tragus distance, lumbar lateral flexion and a modified Schober’s test.
Study

Several limitations are apparent within this study. Firstly, it consists of a small sample size (although for a condition like AS, the sample size was respectable). Secondly, information on home-exercise compliance was not provided for either the eight-week treatment period nor for the six month follow-up period. Additionally, no description was provided on the ‘usual’ exercise regimes of the control group. This information would be helpful for more appropriate comparisons.

Strengths of this study consisted of using two independent and blinded assessors and a randomized allocation method. Additionally, patients were excluded if subject to pharmacological changes or suffering from other severe illnesses, both of which could have impact upon study results.

Additional References
