

## Reviewer's report

**Title:** Cooling via one hand improves physical performance in heat-sensitive individuals with Multiple Sclerosis: a preliminary study.

**Version:** 1 **Date:** 4 February 2008

**Reviewer:** Thorsten Ingemann-Hansen

### Reviewer's report:

Multiple Sclerosis (MS) is the most common cause of non-traumatic disability affecting young adults in the northern hemisphere. MS is an inflammatory demyelinating disorder of the central nervous system, with symptoms resulting from impaired conduction through demyelinated and transected axons. How the disease presents itself depends on the location of lesions and on the impact of demyelination on the nerve conduction. - The ability of elevated body temperature to increase MS symptom and signs has long been realized, and cooling therapy has been associated with measurable but modest improvements in motor and visual function as well as subjective benefits. However the aetiology of the heating reaction in MS seem on the whole unknown, and new approaches investigating heat-sensitive patients with MS is required. Maybe new hypotheses to aetiology of this phenomenon could thereby be formulated.

The present study is straightforward and investigates 10 MS patients, who all reported heat-related MS-symptom. They were tested on a treadmill in a standardized way, and stop criteria were exacerbation and subjective fatigue. The work load was determined in a baseline trial performed in a standardized way. The work load under the subsequent experimental trials was adjusted to be approx. 65 percent of the max work load achieved under the baseline trial. The work load for each patient was kept constant for the pair of experimental trials. The intervention consisted of a heat extraction device applied to the palm of one hand. This device has been developed by the authors and has previously been tested in normal subjects, where it was demonstrated, that heat efficiently can be removed from the body. Such treatment could provide a substantial performance benefit in thermally stressful conditions.

The results of the present study demonstrated that cooling intervention significantly increased treadmill exercise durations by about 33%. Thus utilization of heat transfer capacity could be favourable to heat-sensitive individual with MS.

### Minor Essential Revisions

- Could it be specified what "heat-related MS symptom exacerbations" contain?
- "regular exercise programs"? Could training-intensity and training-volume be specified as well as the duration of the program?
- Legend to figure 2 states that 5 subjects is presented? The figure contains

subject 1, 7, 3 and 2.

- About reference no 4: The second author is missing (JM, name?)

**What next?:** Accept after minor essential revisions

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests'