Reviewer's report

Title: Central motor control failure in fibromyalgia: a surface electromyography study

Version: 1 Date: 13 November 2008

Reviewer: Bjorn Gerdle

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Major Compulsory Revisions

The aim of the study was to assess whether myoelectrical manifestations of fatigue in patients affected by fibromyalgia (FM) are central or peripheral in origin. The authors report a lesser development of myoelectrical manifestations of fatigue in FM. They suggest that this is the electrophysiological expression of a remodeling of the FM muscle in term of prevalence of slow conducting fatigue resistant type I fibers. They also suggest that since differences between-group were found only in voluntary contractions they should be related to a central motor control failure rather than to a muscle membrane alteration suggesting a pathological remodeling of the muscle fibers related to an altered suprasegmental control.

Abstract:
1) Revise with respect to the changes suggested below!

Introduction:
2) “In 1965 C.K. Meador provocatively proposed the concept of “nondisease” [1] and fibromyalgia (FM) has enjoyed the reputation of being a non-disease for many years since the diagnostic criteria proposed by the American College of Rheumatology (ACR) in 1990 [2].”

Comment: I suggest that this sentence is excluded. Disease is a heterogenous concept and it is beyond the aim of this manuscript to discuss disease and nondisease. FM is a clinically accepted diagnosis.

3) “…also bioptic results have not…”

Comment : Do you mean results from biopsy studies ?

4) “Some studies [10,11], have failed to find any definitive evidence of muscle disease, and others have only found non-specific myopathological patterns [12].”

Comment: It is necessary to tell the readers which muscles these references concern. I also suggest that you refer to the brief review of Bengtsson 2002 in Rheumatology. She for instance concluded that biopsy studies of the trapezius muscle have shown mitochondrial disturbances (i.e., ragged-red fibres,
moth-eaten fibres) in type-I muscle fibres, hypothrophy of type-II fibres, reduced capillarisation, and greater thickness of the endothelium of the capillaries. Lowered tissue oxygenation and altered microcirculation have also been described (Bengtsson 2002; Sandberg et al. 2005; Elvin et al. 2006; McIver et al. 2006).

5) “….and a matched control group (HLT)…”
Comment. The abbreviation is not logic for me – why not MCG?

Materials and Methods:

6)”….and subcutaneous tissue thickness”
Comment: Describe details about this. Method and where?

7) “For these reasons the sample was considered clinically omogeneous…”
Comment: correct spelling!

8) “All the enrolled subjects underwent a 48 hours washout.”
Comment: With respect to what substances?

9)“The study was approved by our Ethics Committee…”
Comment: where? Which city and country?

10) “Myoelectric signals were detected from the biceps brachii muscle of the dominant side, which was selected because: 1) it is not one of the 18 myalgic points used to classify FM or a site of spontaneous pain in our patients, and…”
Comment: correct language! None of the points are muscles! There are tender points in certain muscles.

11) “After the MVC assessment, the motor points in the biceps brachii were identified and marked on the skin,…”
Comment: describe how it was done! But is it really a point? Do you mean the innervation zone?

12) “The 25 Hz stimulation was not judged unbearable or uncomfortable, since the tetanus occurs in all the subjects of both groups.”
Comment: The sentence is difficult to understand. Do you mean: The 25 Hz stimulation was not judged unbearable or uncomfortable, even though tetanus occurred in all subjects of both groups.

Data analysis

13) Comment: Report the statistical package used for the statistical analyses! The number of subjects is low. Power analysis?

Results

14) “….as described in the methodological session.”
Comment: Change from session to section
“CV distributions were statistically greater in the FM group…”

15) Comment: is greater the correct word? Wider?

Discussion

16) “However, neither technique has detected any alterations in the muscle contractions of FM patients.”

Comment: This might be correct for the relation between muscle pain and fatigue (do you mean general fatigue in FM patients or EMG fatigue?) but it is not correct on a more general level. See for instance studies from our group (for instance number 18 in the reference list and other studies).

17) “Indeed it is true and well documented that FM patients complain about fatigue and misjudge their physical activity.”

Comment: Supply with references!

18) “The former usually have larger fibres and higher CV values than the latter [13].”

Comment: As far as I remember reference 13 do not report original data in this respect; use other references to support your statement. Moreover, in several studies of different muscles have been reported that women (subjects in this study) have larger type I fibers than type II fibers or no difference between the two fiber types in this respect. How is the situation in biceps brachii? This must be reported and used when interpreting your results!

19) “In practical term, a 30% MVC do not activate the whole MU pool (mainly Type I fibres), whereas an MVC of 60%, or more does (both Type I and Type II fibres).”

Comment: This might be true on a general level but are there studies in the literature about this muscle (biceps brachii)? As far as I remember the group of DeLuca investigated this.

20) “For example, a physiological reduction in the number and size of type II fibers in elderly subjects leads to paradoxically fewer myoelectrical manifestations of fatigue than in young subjects [36].”

Comment: See above – Bengtsson reported smaller type II fibres in FM!

21) “In agreement with other studies [19, 36-39], but adopting a different approach, we can conclude that the lack of myoelectric fatigue and the associated muscle symptoms in fibromyalgia syndrome are generated by an alteration of in central nervous system motor recruitment strategies rather than by peripheral mechanisms [40,41] within the muscle itself.”

Comment: I my opinion this conclusion is too strong/definite. In fact you have not investigated the muscle fibres using biopsies! You also have to take in consideration factors such as hypotrophy, moth-eaten fibres and ragged red fibres. If type I fibres are larger than type II fibres will your conclusion be the same?
22) “Reduced EMG manifestation of fatigue and a hypotrophy of fiber type II as those shown histologically in FM [11, 42-46] are characteristic findings in elderly people [3,36]. The same state of de-conditioning is found in chronic fatigue syndrome [47]. “

Comment: I do not think it is appropriate to discuss ageing – the two groups had the same age. De-conditioning is not found with respect to MVC in this study. Or do you mean that de-conditioning could exist with respect to fatigue but not with respect to strength (MVC)?

23) “..on the basis of an anomalous sensory-motor system pattern and the use of non-physiological strategies in managing functional motor tasks [50].”

Comment: Reference 50 concerns chronic fatigue patients. Give adequate references!

24) “and the presence of a central sensitization has also been proposed by other authors speculating about neurophysiological mechanisms of muscle pain in FM [48,6,37,53]…”

Comment: Central sensitization can only be observed in animals. Central hyper excitability might be a more adequate word here. In fact several authors have reported central hyper excitability – just not speculated or suggested!

Conclusions

25) This section is too long! Revise it based on the above comments.

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**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