Reviewer's report

**Title:** Influence of temporomandibular disorder on temporal and masseter muscles and association with occlusal contacts in adolescents: electromyographic study

**Version:** 1 **Date:** 4 April 2013

**Reviewer:** Samuel W Cadden

**Reviewer's report:**

1. The question being asked is well-defined (page 4, paragraph 4).

2. The methods are adequate although in some respects, they could be described better (see below).

3. There are some potential problems in respect of the data (see below).

4. Not all the results are reported (see below).

5. The Introduction and Discussion need to be revised in a fairly major fashion (see below).

6. The authors hint at limitations of the work although they do not specify these in detail (see page 12, 2nd paragraph).

7. The authors cite a substantial amount of previous work – although they do not always consider controversies (see below).

8. Given the results of the study (that there was no association with the number of occlusal contacts), one could argue that the words "and association with occlusal contacts" in the Title are rather misleading.

9. General: The English usage is good but not perfect and the manuscript will require some adjustments in that respect.

**Major issues (compulsory revision).**

In the Introduction and the Discussion, there is a major weakness, namely that the authors make a number of definitive statements about controversial topics without acknowledging the controversies. The following are major examples of this:

- In the second paragraph of the Introduction, the authors refer to a "consensus" about the aetiologies of TMD. Consensus is not a word one would often use in this context.

- In the third paragraph of the Introduction, the authors state that "TMD . . . is related to high degrees of stress" when the phrase should probably be "TMD . . .
may be related to high degrees of stress”.

• In the third paragraph on page 4, it is stated that "electromyography is an important tool . . . in the differential diagnosis and monitoring of TMD”. Again this is far from being universally-accepted as witnessed by the literature on the topic. [Similar point in the Discussion – sentence overlapping pages 12 and 13.]

• Page 12, first 3 lines: The physiological basis of the mandibular rest position may indeed involve reflexes in anti-gravity muscles – but that is far from being a universally-accepted explanation – in fact there are few more controversial areas in oral physiology than this topic!

Methods, Page 8, first paragraph (also Table 3 and Fig. 1): I have great difficulty following exactly how the normalisations were performed. It seems from this paragraph that the data during chewing were normalised to their own mean value while those during rest and maximal intercuspation were normalised with respect to the MVC. However that is not obvious in the Results/Tables/Figures. The fact that the EMG data were normalised is absolutely fundamental to the interpretation of the results – so greater clarity is needed here.

The Results section contains a great deal concerning the results of statistical tests, but rather less in respect of actual results. No examples of individual electromyograms or occlusograms are given and, as far as I can see, no data at all are presented in respect of the occlusal contact data.

Discussion: As mentioned above, the interpretation of the EMG data is totally dependent on the fact that these data are normalised (to MVC or whatever – see above). If the MVC was different in the different categories of subjects, then it follows that the other (normalised) levels of activity would be different too. Of course there is no satisfactory way of using surface EMGs to compare MVCs as so many other factors influence the absolute voltage on an EMG. However this vital consideration – which some might argue is an (unavoidable) weakness in such studies - is hardly discussed (except by implication on page 13, paragraph 2).

Discussion: Much of the Discussion consists of weakly-linked, or unlinked, citations from the literature. It would read much better if the authors were to try to develop a line of argument from their results in combination with previous ones.

Minor issues (compulsory revision).

Abstract:

Even in the Abstract, it is important to state that the "standardized electromyographic activity" is normalised to MVC as this fact is fundamental to interpretation of the results as a whole (see also below).

The first sentence of the Conclusion section of the abstract belongs in the Results section.
Introduction:

In the final line of page 3, the authors cite 2 papers in respect of studies on "the pediatric population". However it seems that one of these papers refers to patients between 19 and 30 years of age while the other is for 15-35 years old subjects. Neither group fall easily within the usual sense of the word "pediatric".

Materials and Methods:

Page 6, lines 14-15: It is far from clear what point the authors are trying to make with the comment about the alcohol cleaning not modifying the electrodes or their position. Presumably the cleaning was done before the electrodes were attached?

Page 6, line 17: "impede interference from external noise" is not quite correct (although I think we all know what the authors mean). It is probably sufficient to say that the reference electrode was applied to permit good differential signals to be recorded (or perhaps there is no need to say anything in this context?).

Page 7, line 3: Need a new sentence starting at "no visual . . ".

Page 8, lines 5-6: It is illogical to use an average value when calculating an MVC – logic demands that the MVC is the Maximum level in any of the relevant recordings.

Page 8, lines 15-17: Were both non-parametric and parametric tests performed on the same data – and if so, why?

Results:

Page 10, line 2: There was no Fig. 2 in the manuscript which I received.

Discussion:

1st paragraph, last 4 lines: The ages in the cited study and the present study were very different but there is no comment on that (potentially important?) fact.

Page 10 last 3 lines – Page 11 first two lines: Need a reference here.

Page 11, paragraph 4: Are the authors referring here to events during the experiments or preceding the experiments (or both)?

Page 14, lines 5-6: "Electrical activity is directly related to muscle strength" What is meant by this – to what sort of electrical activity are the authors referring?

Discretionary issues/revisions.

Materials and Methods:

Page 5, line 9: Surely the Index is "calculated" not "administered"?

Page 6, line 1: Similarly I suggest that occlusal contacts are "assessed" not
"tested".

Page 6, line 7: Similarly it is better to state that EMG signals are "recorded" rather than "detected" in the context of a quantitative study.

Page 6, line 9: "over" rather than "to" the belly of the muscle when referring to skin surface electrodes.

Page 7, line 2 "on the Frankfurt plane" might be better as "such that the Frankfurt plane was".

Page 7, lines 12-15: It is arguably inappropriate to use the term "maximal intercuspation" when the teeth are not permitted to come into contact.

Page 8, line 13: Probably should define ICC on first usage here.

Results:

Page 9, paragraphs 3 and 4 (also Table 3 and Fig. 1): Rather unusual to present the ANOVA findings completely separately from the post-hoc findings as is done here. Although the ANOVAs were a necessary preliminary, the results of the post-hoc tests are (arguably) what are really interesting.

Fig. 1: Surely could give more meaningful (accurate) P values than just stating that all were < 0.05.

Discussion:

Page 12, 2nd paragraph: Does the reference in the 8th line of this paragraph refer to everything in the preceding 7 lines? In any case, there is a need for a reference earlier in this paragraph.

**Level of interest:** An article of limited interest

**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.