Author’s response to reviews

Title: Gastric emptying and small intestinal transit time and motility assessed by a magnet tracking system

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Author’s response to reviews: see over
Dear

Tim Shipley, PhD
Executive Editor of BMC-series journals

On behalf of the co-writers I wish to thank the reviewers for taking the time to reassess our manuscript and suggest further improvements. We have done our best to address all issues raised. The manuscript has been subject to professional revision of the language by American Journal Experts (certificate attached). We hereby re-submit a revised version of the manuscript:

“Gastric transit and small intestinal transit time and motility assessed by a magnet tracking system.”

Please find below a systematic list addressing all questions raised by the reviewers.

Yours Sincerely,

Jonas Worsøe, MD
Response to reviewers

Changes in content and new sentences for the second revision are highlighted in yellow.

Referee 1:

Regarding the use of MTS-1 for investigations in children:

*Investigations in children are already undertaken at our department. In cooperation with pediatric gastroenterologists, 20 healthy children aged 6-12 have been examined to establish a control group (unpublished). Only few have had problems taking the magnetic pill and when allowed to move for 10 minutes per hour and entertained with TV etc. all could cooperate.*

Referee 2:

1

The "small" magnet was by no means small (6x15 mm, 1.6 g!). Such a large magnet will not pass the small intestine with the meal (as the authors agree in their revision). Accordingly, it is impossible to draw conclusion on postprandial small contraction frequencies or transit velocities. In the current version, this is still a major aspect of the manuscript.

*We agree with the reviewer that the magnet will not behave like the meal. However, the same holds true for several other methods for investigation of gastrointestinal transit including the much used wireless motility capsule (SmartPill) and attempts to evaluate motility with the Pillcam. The SmartPill has recently been recommended for clinical use by the American and European Neurogastroenterology societies in spite of this limitation.*

*Small contractions with frequencies specific for each segment of the bowel were very clearly visible and their identification represents a major difference between the present and other methods. As the postprandial response affects the whole gastrointestinal tract changes in movement of the pill do reflect postprandial motility even though the magnet may not follow the meal.*

*These considerations have now been included in the discussion.*

2
The authors state in their revision that it is impossible to differentiate movements of the intestine from movements of the magnet inside the intestine by using MTS-1 data as performed by the authors. The reviewer agrees. But why do the authors only comment on this without drawing the necessary consequences with respect to their data calculation and presentation? To the understanding of the reviewer one might argue that the observed short bursts of transport are very likely to reflect intraluminal transport. However, calculations of mean transport velocities are impossible as long as a correct measure of the length of the small intestine is missing.

We agree with the reviewer that movement of the pill is movement in any direction including antegrade and retrograde movement within the lumen, movement of the bowel itself and movement of the person. Movement of the person was noted and infrequent. We assume that movement of the bowel was much less that intraluminal movement. The reviewers point is accepted and it is now clear in the discussion that movement of the pill is not only in the antegrade direction. Therefore, the velocity reflects the sum of antegrade and retrograde movement and not necessarily directly correlated to passage time. It is more appropriately considered a motility index.

This is further underlined in the discussion.

Referee 3

1

The introduction is still difficult to read and follow. It appears to the reviewer that the wording has not much improved. The reviewer recommends putting some effort in rephrasing the important parts of the Introduction. Simply listing facts in simple paragraphs may not be considered appropriate.

The introduction has been re-written to improve readability Two references have been added (1 and 2).

2

The wording in the revised parts should be improved. Watch out for typos.

The manuscript has also undergone professional language revision (certificate attached).

3

Please provide correct units to all numbers listed. Also slope and time have units.
Units have been added on figure 1A/B. The unit of the slope of the frequency vs. progression graph (figure 4) is added: \( \text{min}^{-1} \text{cm}^{-1} \).

Figures all still of poor design

We have tried to improve the quality of the figures.

Corrections and adaptations are required for the figure legends

A

Figure 1 and Figure 2 have the same title, but have different information content.

Figure 1 and figure 2 are now put together as figure 1A/B. This should demonstrate the information available during the recording. The numbers of the remaining figures have been changed accordingly.

B

Figure 3 is still unclear to the reviewer. The title appears not appropriate. No data comparison is provided. Why arbitrary unit on y-axis? Should be position or angle?! The reviewer doesn't recognize anything on the provide images.

The purpose of the figure is to correlate images documenting anatomical location with motility data. Even so, we are well aware that it is difficult to recognize any specific bowel segment from a single image. The title is changed to:"Correlation of anatomical location and motility data using the PillCam and the Magnet Tracking System". The unit of the y-axis is specified \([\text{orientation } \theta \text{ and } \phi \text{ on the y-axis}]\) and the phrase arbitrary unit is discarded.

C

Figure 4, please provide a unit for time, i.e. 9:45 h.

Figure 4 is now figure 3.

The title of the x-axis in both fig. 3 and fig. 4 is changed to: Time (hours: minutes).

D
Figure 5, the title should be somewhat like progression over time in the fasting state.

*Figure 5 is now figure 4.*

*The title is changed accordingly: “Progression of the magnetic pill over time during fast”*