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Response to the Letter to the Editor on 'The effectiveness of technology-supported exercise therapy for low back pain: A systematic review.'

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To the Editor:

We would like to thank dr. Kawada for his interest in our research and his comments on our paper entitled 'The effectiveness of technology-supported exercise therapy for low back pain: a systematic review.'[1]

In his letter, dr. Kawada suggested to perform a meta-analysis. The main reason for not performing a meta-analysis was the heterogeneity of the included studies, as mentioned in the paper and recommended by the guidelines for Systematic Reviews in the Cochrane Back and Neck Group. [2] The included studies used different forms of exercise therapy and different types of technological support. Therefore, we provided effect sizes of individual studies instead of pooled results.

The author highlighted the importance of pain neurophysiology education and cognitive behavioral therapy (CBT) in the treatment of patients with chronic low back pain. Accordingly, he stated that the effectiveness of technology-supported exercise therapy (TSET) should be assessed simultaneously with pain education and CBT. We agree that it is essential to include a cognitive component, such as pain neuroscience education (PNE), in the rehabilitation of patients with chronic low back pain. The rehabilitation programs of some of the studies that were included in the review did contain an educational component. However, the education focused on a more traditional back school approach, i.e. information on posture, advice to staying active and anatomy. No studies were found that used TSET in combination with a modern PNE

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approach (e.g. as described by Nijs et al.[3]). This should not come as a surprise since most of the studies investigating the effectiveness of PNE have only been published more recently.[4]

The author indicated that it is important to assess the influence of content and dose on the effectiveness of the TSET-programs. As mentioned before, the content of the TSET-programs and their comparisons varied greatly. In the discussion section of our paper, we clearly described that the lack of additional benefit from technological support may be explained by the content of the TSET-programs. For example, most of the papers that compared TSET to a placebo treatment used a very narrow approach to exercise therapy, that is, only the function of one particular muscle (group) was trained (e.g. transversus abdominis muscle). It is unlikely that such a minimal intervention will improve a multifactorial problem such as chronic low back pain. Moreover, there is growing consensus that exercise therapy should be tailored to the patient's individual needs and incorporated in functional activities.[5, 6]

To investigate the effect of the dose, a separate analysis was performed regarding the effects of a standard treatment and TSET to a standard treatment alone. This separate analysis proved valuable, because adding a TSET-program to a standard treatment was superior to a standard treatment alone, whereas a TSET-program alone was not better than another intervention.

Looking at the studies that compared TSET to another intervention or a placebo, 14 out of 16 studies (88%) used the same number and duration of treatment sessions in the TSET and control group. One paper (6%) did not clearly describe the number of treatments in the control group. When considering dose, home exercises should also be taken into account. Four out of sixteen (25%) papers provided a home exercise program. Two of these studies reported results on

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adherence, and did not find a significant difference between TSET and conventional exercise therapy. Therefore, the number and duration of supervised treatment sessions, as well as the adherence to home exercises are highly unlikely to have influenced the results of the comparison between TSET and other interventions.

In conclusion, there are many aspects that still need to be clarified when it comes to TSET for low back pain. Although it may be useful to evaluate the effects of a PNE and TSET simultaneously, we believe that various elements pertaining to TSET itself should be investigated first. For example, our systematic review shows that the integration of technological systems in an individual approach and home exercises is currently lacking, which may explain why TSET was not found to be more effective than conventional exercise therapy. In addition, some types of technological support (e.g. postural feedback) might be more effective than others (e.g. EMG-feedback). Future research should evaluate the feasibility of introducing technology in an evidence-based approach to exercise therapy and focus on the underlying principles of technological support. Gaining more insight into the optimal way of providing technological support (e.g. type of feedback, methods to increase adherence and motivation) may provide valuable information to enhance the effectiveness of technology-supported exercise therapy for low back pain.

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