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LETTER TO THE EDITOR

Challenges of telemedical exercise management for cancer survivors during the COVID-19 pandemic

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In these last two years, the COVID-19 pandemic has not only affected individuals with cancer, but also the working conditions of their attending medical staff. As cancer survivors are considered at high risk for severe infection, many measures have been undertaken to prevent these patients from contracting SARS-CoV-2. Being of central importance for survival, primary cancer treatment remained largely unaffected within established safety precautions. However, supportive cancer care and particularly concomitant exercise therapy have been substantially compromised. Benefits of supportive exercise therapy for individuals suffering from cancer have been well-established over the last two decades [1]. However, this supportive modality has been either drastically limited or even fully cancelled during the current pandemic, as it requires intensive personal contact between patients and medical staff for medical clearance, performance diagnostics, exercise instructions, and supervision.

Telemedicine may provide excellent opportunities to continue supportive exercise therapy in people with cancer. A large extent of the required exercise supervision and even medical assistance could be performed via telecommunication, reducing the necessary personal contact between patients and medical staff.

Currently, it seems largely impossible to digitalize the entire exercise support process. Particularly medical clearance and performance diagnostics will still require direct interaction between patient and medical staff. The cardiovascular risk assessment entails, e.g., blood sampling, echocardiography, and cardiopulmonary exercise testing (CPET), whereas the assessment of musculoskeletal risk involves medical imaging and fall risk assessment. Nevertheless, a "digitization" of the movement instructions and supervision process, which will span several months, holds a great potential to reduce personal contact, while maintaining the necessary quality of supportive care.

In clinical practice, telecommunication can be both advantageous and challenging. In aerobic exercise interventions, telemedical support allows training process supervision and direct feedback on exercise timing and progression. Based on their CPET results, the patients can be educated on their individual target heart rate zones, allowing them to exercise on their own. The arising difficulties are that the patient requires a reliable ambulatory heart rate monitoring and that "live" supervision is impracticable, as long as the patient does not exercise on a stationary training machine. In the management of resistance exercise, however, "live" supervision is in comparison far more practicable because of the mostly stationary exercise character. Therefore, telemedical supervision is more feasible and supportive communication can be provided immediately. On the other hand, classic resistance exercise equipment (e.g., strength machines, barbells plus weight plates) is unavailable to most patients at home. Furthermore, the use of alternatives like bodyweight, resistance bands, or dumbbell exercises makes it difficult to judge exercise intensities.

The topic of ideal training equipment for telemedical exercising was approached by Dr. Mavropalias in his commentary, "Elastic tubes: The ideal equipment for telehealth exercise medicine in the management of prostate cancer?." Firstly, we want to express our gratitude to Dr. Mavropalias for bringing attention to this important topic. We fully agree about the importance of resistance exercising for cancer survivors as clearly reflected in our own research [2, 3]. Moreover, we agree that telehealth medicine exercise is an important and challenging field and potentially the most promising future for exercise support in cancer survivors. However, we are skeptical about the use of elastic tubes as the ideal equipment for telemedical exercise support. Resistance bands — not just elastic tubes — for instance are well-established in (cancer) rehabilitation and have proved to be

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effective [4, 5]. As have dumbbells [6], bodyweight exercises [7] respectively weighted wests [8, 9], and stability balls [7, 10]. From the perspective of practicability, we understand that elastic tubes may be considered as optimal in telehealth exercising. However, in our opinion and in line with general exercise recommendations, the key factor of a successful exercise intervention would not be the applied tool itself, but the ability to put either sufficient mechanical or metabolic stress on the exercised muscle in order to provoke adaptive processes, which can be achieved by various resistance exercise methods, respectively tools.

The key questions remaining in this context are how to quantify the resistance exercise stimulus and how to ensure that it is sufficient to provoke adaptation. In our own clinical experience, we found it rather difficult to implement the concept of repetition maxima in home-based resistance exercising with small equipment. In our experience, using a timed repetition maximum method for resistance exercise interventions is feasible. Therefore, in contrast to the widely known and used repetition maxima, where the patients exercise within a repetition range until muscular fatigue, a similar stimulus could be achieved by prescribing a time-under-tension window in which the muscle needs to be exhausted. For instance, 30 to 40 s (30–40secRM) until volitional fatigue for a high intensity/low repetition stimulus or 50 to 60 s (50–60secRM) for a high repetition/low intensity resistance exercise stimulus. Regardless of the tool used, e.g., resistance bands, elastic tubes, bodyweight, dumbbells, mineral water crates, or any imaginable weight, this method ensures a sufficient resistance exercise stimulus. Moreover, progression models can be easily applied, for instance, by increasing the time-under-tension and therefore the exercise volume.

In summary, the COVID-19 pandemic has thrown the door wide open for the expanded use of telemedical exercise supervision for the fight against cancer. In clinical practice, this means not only utilizing the potential of this tool but also facing its challenges. One of the remaining key challenges is that gym equipment is not available for most individuals with cancer at home. This is particularly challenging in regard to ensuring an adequate resistance exercise stimulus. A feasible solution would be using a time-under-tension window where muscle fatigue is achieved regardless of the resistance training device.

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Declarations

Ethics approval This is a Letter to the Editor. No ethical approval is required.

Consent to participate This is a Letter to the Editor. There were no participants; therefore, there was no informed consent process.

Consent to publish This is a Letter to the Editor. There were no participants; therefore, there was no informed consent process.

Conflict of interests The authors declare no competing interests.

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