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LETTER TO THE EDITOR

Validity and reliability of the one-minute sit-to-stand test for the measurement of cardio-respiratory responses in children with cystic fibrosis. Authors' reply

We would like to thank Dr. Urquhart and colleagues for their correspondence on our work reporting the cardio-respiratory responses observed during the 6 min walking test (6MWT) and the one-minute sit-to-stand test (STST1') in children with cystic fibrosis (CF).[1,2] Their comment opens up a discussion that is critical for the CF community, and that goes beyond the objectives of this work. The rationale for choosing the 6MWT as a reference test was simplified in our research letter, but this commentary will allow us to elaborate on this choice.

It is undeniable that the 6MWT cannot be considered as the *'gold standard'* for all the children with CF. Dr. Urquhart and colleagues underscored its limits: the 6MWT is self-paced, non-incremental, and submaximal for the majority of CF children. However, we chose the 6MWT as the reference test in this work because it is the most widely used field test for these people, even in pediatric centres. Calling the 6MWT a *'gold standard'* might be imprecise, but recent surveys witness that it is still widely regarded as the reference field test in the CF clinical practice landscape.[3,4] We have therefore chosen to use the 6MWT to enhance the applicability of our results. Furthermore, we reported the association between the cardio-respiratory response during both tests, and discussed the possibility of using the STST1' as a surrogate to the 6MWT. It was not our aim to establish that either of these tests was a reference.

Peak heart rate (HR) reached during both tests in our cohort was very low. Reaching a high level of motivation to perform the STST1' and the 6MWT for young people with CF (pwCF) is challenging. The unpleasantness of both tests can lead to demotivation, especially as our protocol required two rounds of each test to evaluate reliability. The time perception was also probably different in our cohort of young pwCF, compared to other cohorts of adults.[5] Finally, our study was descriptive meaning that the investigations took place during a standard medical consultation, or at the time of the annual review. Contrarily, other studies showing a higher level of exertion with the STST1' included adult pwCF undergoing a pulmonary rehabilitation program, and who, in turn, were probably highly motivated to achieve the best possible performance.[6,7]

To conclude, we acknowledge the core message of this comment. Exercise testing for young pwCF should present sufficient cardio-respiratory challenge. Simple submaximal field tests (e.g., the 6MWT or the STST1') may not be difficult enough to expose exercise-related symptoms, and a ceiling effect would be observed in children with near-normal lung function. However, there are still important discrepancies between the procedures described by the European Cystic Fibrosis Society Exercise Working Group, and the current practices in the CF centers. It is an important challenge for the future that these approaches become commonplace within clinical practice worldwide, especially since the physical fitness of young pwCF is expected to improve in the CF transmembrane conductance regulator (CFTR) modulators era, which will further reduce the usefulness of submaximal exercise tests.

Declaration of Competing Interest

Dr. Combret, Dr. Prieur and Dr. Medrinal report performing expertise activities for Air Liquide Medical Systems, outside of the submitted work.

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