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Title: A newly developed sling incorporating a shock absorber to minimize the motion effect on SpO_2 during the 6-minutes-walk test

Dr. Kenji 10565 Miyamoto miyakenreiko@yahoo.co.jp MD [1], Dr. Yuya 10566 Tanaka get-goal.win.win.win@ezweb.ne.jp MD [1] and Dr. Toshiaki 10567 Kurimoto malon8821hiro@docomo.ne.jp MD [1]. [1] Department of Rehabilitation, Faculty of Health Sciences, Hokkaido University, Sapporo, Japan, 060-0812 .

Body: Recently, the degree of desaturation during 6-minute-walk test (6MWT) is considered to have prognostic value in patients with idiopathic pulmonary fibrosis. In this study, we demonstrate a negative effect of motion on SpO_2 during the walking, and present a newly developed device that minimizes the negative effect during the test. Subjects and Methods: Ten healthy volunteers (26±11yrs) performed 6MWT in 4 different manners: 1) usual walking, 2) usual walking while trying to minimize the effect of motion on the finger on which the oximeter-probe was placed, 3) usual walking using a newly developed sling with a shock absorber (75g) wrapped around the finger and the probe, and 4) walking on a treadmill at the same speed as the usual 6MWT while the finger and the probe were in a resting position without movement. SpO_2 was measured continuously using a Pulsox 300i (Konica-Minolta). Results: During the usual walking with/without the finger moving, there was severe desaturation of more than 4% from the baseline. However, when walking with the new device or on the treadmill there was only a small change in the SpO_2, which was within the accuracy of the oximeter.

Motion effects on SpO2

Degree of desaturation	Usual walking	Walking while trying not to move the finger and the probe	Walking using the new device	Walking on the treadmill
2%>dSpO2>4%	32.9±51.3	67.2±78.9	39.6±73.2	16.5±33.2
4%>dSpO2>6%	13.2±39.6	14.5±38.0	0	0
6%>dSpO2	3.5±10.5	9.0±27.0	0	0

dSpO2= BaselineSpO2-desaturated SpO2, seconds.

Conclusions: SpO_2 monitoring during 6MWT does not provide reliable data on desaturation. However, using the new device, more reliable data on desaturation are available.