Indirect Predictive One Repetition Maximum (1-RM) of Quadriceps Muscles for Spinal Cord Injury (SCI) Individuals.

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Background
Quadriceps muscles is the major contributor of Sit-to-Stand (STS) activity for spinal cord injury (SCI) individuals. It is the primary muscle for knee extension during the STS movement. Predictive 1 repetition maximum (1RM) is a way to assess maximal dynamic muscular strength in individuals with SCI. For predictive 1RM of the quadriceps muscle, bench press is a common test to calculate the predictive 1RM. However, for people with SCI, some of them are not be able to do a proper bench press due to the muscle weakness and insufficient power control on the lower limb. Thus, an indirect predictive 1RM was set for them to overcome with this problem. The objective of this study is to measure the quadriceps muscle strength during knee extension activity for SCI patients using indirect predictive 1RM test.

Methods
Two SCI subjects that were both novice lifters was recruited for indirect predictive 1RM test. The adjustable loads were attached around the ankle of subjects. The test was completed on both sides of the ankle individually with and without the presence of functional electrical stimulation (FES) to artificially stimulate the muscle contractions.

Results
The indirect predictive 1RM test was successfully performed by both SCI subjects with the average loads of 3.95kg ± 2.87. Subject 1 was unable to lift the loads during right leg knee extension both with and without the FES thus resulting in high value of standard deviation of the loads.

Conclusions
The indirect predictive 1RM is an alternative way that can be applied to SCI subjects who had muscle weakness and joints contracture to measure their muscle strength after the injury.