Supplementary Digital Content 3. A complementary experiment comparing the force produced on the cycling ergometer from immobilized versus free ankles.

An important difference between the isometric chair and the new cycling ergometer is the added degree of freedom at the ankle (i.e. there is the possibility of movement about the ankle joint). To demonstrate that with proper subject familiarization the added degree of freedom at the ankle does not alter the force produced, we performed a complementary experiment.

We acquired two different types of braces, a lower leg cast (Figure 1) made of hard plastic and an ankle-foot orthosis (Figure 2) made of sturdy fabric that can be tightened and secured with Velcro. The leg cast completely immobilized the ankle, while the orthosis did so to a lesser degree, while still providing more support than no brace. We recruited six subjects to come to the laboratory and perform 3 sets of MVCs followed by high-frequency doublets and single-pulse nerve stimulation (i.e. Db100, Tw) on the resting knee extensor muscles while they were seated on the cycling ergometer. Each subject was tested in the following three different conditions: cast, orthosis and no brace (control) in a random order, performing three MVCs for each condition.

The means and standard deviations of the force produced are presented in the table 3 below. A one-way ANOVA was conducted to determine if the force parameters were different while wearing the different braces (cast and orthosis) versus simply locking the ankle (control). No significant differences were found among conditions for any parameter (MVC $F(2, 15) = 0.080$, $p = 0.923$; Db100 $F(2, 15) = 0.091$, $p = 0.913$; Tw $F(2, 15) = 0.015$, $p = 0.985$).

Based on these results, we believe that with sufficient familiarization to the technique of locking the ankle during voluntary and involuntary contractions the added degree of freedom at the ankle does not compromise the validity of the cycling ergometer.

Table 3. Mean force produced in each condition

Condition	MVC (N)	Db100 (N)	Tw (N)
Cast	351 ± 75	149 ± 45	121 ± 35
Orthosis	368 ± 76	159 ± 43	125 ± 31
Control	361 ± 74	159 ± 51	123 ± 35

Figure1. Leg cast

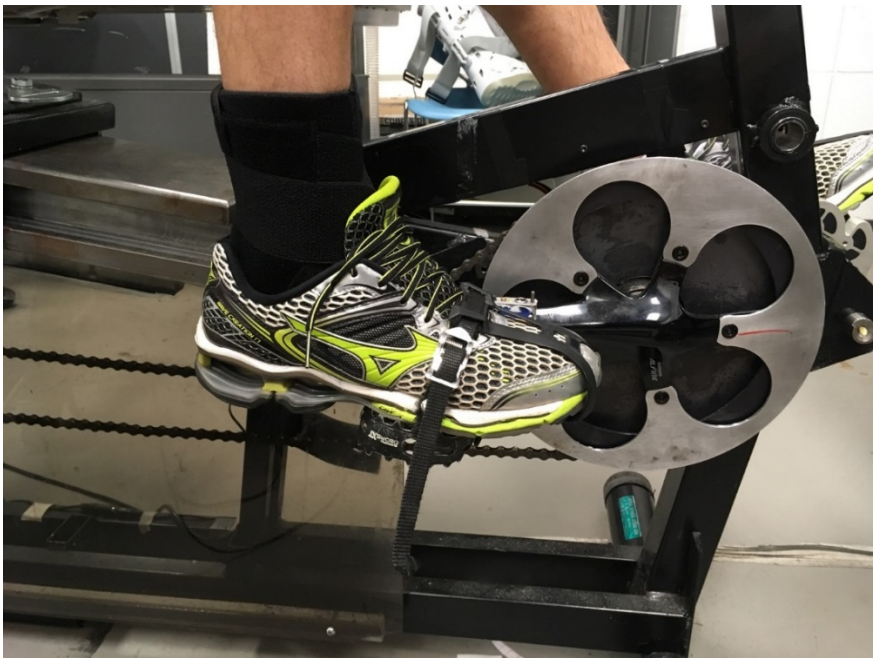

Figure 1. Ankle-foot orthosis