

Table 2: Descriptive measures during fatigue development for evoked twitches and the ability to maintain the required force level during the contractions (SLP). Values are mean(standard deviation) for both genders and muscle groups.

Variable	Contraction	Elbow Flexors		Knee Extensors	
		Female	Male	Female	Male
Twitch (N)	Pre*	25.3(9.8)	70.4(22.0)	207.3(32.9)	310.0(73.4)
	1*	22.9(10.7)	59.2(17.2)	180.0(29.9)	252.5(31.5)
	2*	21.9(11.0)	50.3(15.7)	172.2(28.2)	223.5(35.7)
	3*	23.4(8.5)	48.1(16.7)	150.6(50.8)	207.6(43.7)
	4	22.5(10.9)	41.2(11.3)	166.0(25.6)	185.7(39.9)
	5	21.8(7.7)	40.7(12.3)	157.7(32.4)	170.1(42.2)
	6	23.0(9.4)	35.7(14.1)	148.8(24.3)	150.5(39.9)
	7	20.6(12.0)	31.3(13.0)	146.0(28.0)	143.2(41.1)
	8	18.3(6.0)	31.2(13.1)	122.2(49.9)	130.2(44.8)
	9	18.2(10.2)	28.5(14.2)	128.8(29.7)	118.9(32.2)
	10	17.5(9.8)	25.4(14.8)	121.8(30.6)	112.0(35.9)
SLP (N·sec ⁻¹)	1	0.78(4.5)†	-0.04(0.9)	0.11(0.6)	0.36(1.0)
	2	-0.15(0.5)	-0.06(0.5)	-0.66(0.5)	0.39(2.4)
	3	-0.22(0.3)	0.01(0.6)	-0.35(0.8)	0.02(1.1)
	4	-0.44(0.5)	-0.27(0.7)	-0.21(0.8)	-0.70(0.9)
	5	-0.40(0.5)	-0.26(0.9)	0.001(1.0)	-0.45(2.2)
	6*	-0.53(0.6)	-0.77(1.6)	-0.17(0.4)	-1.68(1.67)
	7*	-0.25(0.4)	-1.08(1.9)	-0.29(0.6)	-2.16(2.22)
	8*	-0.42(0.6)	-0.15(2.8)	-0.43(0.6)	-3.30(2.18)
	9*	-0.45(0.5)	-1.05(1.6)	-0.39(0.6)	-3.32(2.9)
	10*	-0.52(0.4)	-0.89(1.5)	-0.15(0.8)	-5.12(3.3)

* Indicates significant difference ($P < 0.05$) between genders when muscles are grouped.

† A single participant initially demonstrated difficulty with the coordination of the task resulting in her SLP value for the first contraction being highly positive. Removal of this participant's data point did not influence the statistical outcome and has therefore remained in the analysis.

main effect for MUA. The gender main effects for MVC ($F = 80.696$, $P = 0.001$, $\eta_p^2 = 0.590$) and evoked twitches ($F = 26.886$, $P = 0.001$, $\eta_p^2 = 0.374$) from pre- to post-fatigue revealed that males achieved higher force levels (both voluntary and electrically evoked) during both fatigue protocols.

The significant time \times gender interaction for MVC ($F = 21.144$, $P = 0.001$, $\eta_p^2 = 0.274$) indicated that males achieved higher force levels at all time intervals from pre- to post-fatigue (Figure 3), yet the same interaction for evoked twitches ($F = 19.213$, $P = 0.001$, $\eta_p^2 = 0.299$) revealed that the peak twitch amplitude was only greater for males at the pre-fatigue, and both the 30- and 45-minute post-fatigue intervals. The significant time \times gender interaction for percent MVC ($F = 5.228$, $P = 0.001$, $\eta_p^2 = 0.086$) revealed that females had a relative fatigue advantage (Figure 4) throughout all points of recovery except for the 30 minute interval. The gender \times muscle interaction for the same variable ($F = 5.928$, $P = 0.018$, $\eta_p^2 = 0.099$) highlighted that this difference was largely attributed to difference in percent MVC for the knee extensions.

Fatigue development

The significant gender main effects during the fatiguing contractions for evoked twitches ($F = 8.424$, $P = 0.006$, $\eta_p^2 = 0.170$) and SLP ($F = 11.547$, $P = 0.001$, $\eta_p^2 = 0.204$) indicated that males achieved greater levels of electrically evoked force, but were less capable of maintaining the required force levels. Interestingly, the time \times gender interaction for the evoked twitches ($F = 19.516$, $P = 0.001$, $\eta_p^2 = 0.322$) illustrated that when compared to their male counterparts, the females had statistically equivalent peak twitch amplitudes after the third sustained contraction (Figure 5).

As for the ability to maintain the target force level during the fatiguing contractions, the significant time \times gender interaction for SLP ($F = 6.964$, $P = 0.001$, $\eta_p^2 = 0.134$) showed that the females had a significantly greater ability to maintain the required force from the sixth to tenth contractions (Figure 6). When the significant gender \times muscle interaction for SLP was assessed ($F = 5.611$, $P = 0.022$, $\eta_p^2 = 0.111$), it became apparent that the males had a more difficult time maintaining the target force during the isometric knee extensions as compared to the isometric elbow flexions, whereas there was no such significant difference for the females. Time \times gender \times muscle analysis