

## 研究業績 英文表記

和文	
表題	スタティックストレッチング後の膝関節屈曲可動域, 筋力, 爆発的筋発揮能力, 筋発揮コントロール能力の経時的変化
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英文	
Title	The Time-Course Changes in Knee Flexion Range of Motion, Muscle Strength, and Rate of Force Development After Static Stretching
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Abstract	<p>Previous studies have shown that longer-duration static stretching (SS) interventions can cause a decrease in muscle strength, especially explosive muscle strength. Furthermore, force steadiness is an important aspect of muscle force control, which should also be considered. However, the time course of the changes in these variables after an SS intervention remains unclear. Nevertheless, this information is essential for athletes and coaches to establish optimal warm-up routines. The aim of this study was to investigate the time course of changes in knee flexion range of motion (ROM), maximal voluntary isometric contraction (MVIC), rate of force development (RFD), and force steadiness (at 5 and 20% of MVIC) after three 60-s SS interventions. Study participants were sedentary healthy adult volunteers (n = 20) who performed three 60-s SS interventions of the knee extensors, where these variables were measured before and after SS intervention at three different periods, i.e., immediately after, 10 min, and 20 min the SS intervention (crossover design). The results showed an increase in ROM at all time points (d = 0.86–1.01). MVIC was decreased immediately after the SS intervention (d = -0.30), but MVIC showed a recovery trend for both 10 min (d = -0.17) and 20 min (d = -0.20) after the SS intervention. However, there were significant impairments in RFD at 100 m (p = 0.014, F = 6.37, η<sup>2</sup> = 0.101) and 200 m (p &lt; 0.01, F = 28.0, η<sup>2</sup> = 0.33) up to 20 min after the SS intervention. Similarly, there were significant impairments in force steadiness of 5% (p &lt; 0.01, F = 16.2, η<sup>2</sup> = 0.221) and 20% MVIC (p &lt; 0.01, F = 16.0, η<sup>2</sup> = 0.219) at 20 min after the SS intervention. Therefore, it is concluded that three 60-s SS interventions could increase knee flexion ROM but impair explosive muscle strength and muscle control function until 20 min after the SS intervention.</p>
keyword	flexibility, knee extensor, maximal voluntary isometric contraction, explosive muscle strength, prolonged effect

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