



UNIVERSITI PUTRA MALAYSIA

**INFLUENCE OF STATIC, DYNAMIC, AND COMBINED STATIC-DYNAMIC
STRETCHING ON SPRINT TIME, REACTION TIME, PEAK FORCE AND PEAK
POWER PRODUCTION IN YOUNG MALE SPRINTERS**

JAD ADRIAN WASHIF

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By

JAD ADRIAN WASHIF

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
Malaysia, in Fulfilment of the Requirements for the Degree of
Master of Science**

February 2014

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia
in fulfilment of the requirement for the degree of Master of Science

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Chair: Kok Lian Yee, PhD

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The purpose of this study was to examine the influence of static, dynamic, and combined static-dynamic stretching on sprint time, reaction time, peak force and peak power production in sprinters. Thirteen ($n = 13$) young male sprinters performed three different stretching methods including static stretching (SS), dynamic stretching (DS) and combined static-dynamic stretching (CSDS). Electronic timing-gates with reaction measurement pads were used to measure sprint time (50 m) and reaction time, and a force-plate was utilised to assess peak force (PF) and peak power (PP) production. The results indicated statistically significant differences among the three stretching methods for sprint time ($p = .001$) and reaction time ($p = .015$) but not for peak force ($p = .483$) and peak power ($p = .458$) even though DS elicited better performance. DS evoked the best sprint time ($6.18 \text{ s} \pm .11$), followed by CSDS ($6.33 \text{ s} \pm .10$) and then SS ($6.37 \text{ s} \pm .11$). These results were similar for reaction time with the best results coming after performing DS ($0.221 \text{ s} \pm .039$), but followed by SS ($0.257 \text{ s} \pm .047$), and then CSDS ($0.293 \text{ s} \pm .075$). These results suggested that DS induced better sprint time and reaction time, SS resulted in the slowest sprint, and the lowest PF and PP production, while CSDS resulted in the slowest reaction time. The reasons for better performance following DS may be associated with greater neuromuscular activation compared with other methods. However, the benefit from DS may have been diluted when combined with SS. SS and CSDS prior to high-speed, high-power and short-term activities are not recommended as they seem to have a deleterious influence on performance. Therefore, the application of DS for sprint time and reaction time seem to be able to increase the ability of muscle to perform maximally.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan ijazah Sarjana Sains

**PENGARUH REGANGAN STATIK, DINAMIK, DAN GABUNGAN
REGANGAN STATIK-DINAMIK TERHADAP MASA PECUTAN, MASA
REAKSI, DAN HASILAN DAYA DAN KUASA PUNCAK DALAM
KALANGAN PELARI PECUT MUDA LELAKI**

Oleh

JAD ADRIAN WASHIF

Febuari 2014

Pengerusi: Kok Lian Yee, PhD
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Tujuan kajian ini adalah untuk menilai pengaruh regangan statik, dinamik, dan gabungan regangan statik-dinamik keatas prestasi pecutan, masa reaksi, hasilan daya dan kuasa puncak dalam kalangan pelari pecut. Tiga belas ($n = 13$) pelari pecut muda telah melakukan tiga kaedah regangan yang berbeza iaitu regangan statik (SS), regangan dinamik (DS), dan gabungan regangan statik-dinamik (CSDS). Pencatat masa elektronik yang dilengkapi dengan pad pengukur masa reaksi telah digunakan untuk mencatat masa pecutan (50 m) dan masa reaksi, dan 'force plate' telah digunakan untuk menaksir daya puncak (PF) dan kuasa puncak (PP). Keputusan menunjukkan bahawa terdapat perbezaan yang signifikan antara tiga kaedah regangan bagi masa pecutan ($p = .001$) dan masa reaksi ($p = .015$), tetapi tidak bagi daya puncak ($p = .483$), dan kuasa puncak ($p = .458$) meskipun DS menunjukkan prestasi lebih baik. DS menghasilkan prestasi pecutan yang terbaik ($6.18 \text{ s} \pm .11$), diikuti CSDS ($6.33 \text{ s} \pm .10$), dan kemudian SS ($6.37 \text{ s} \pm .11$). Hasil yang serupa diperolehi untuk masa reaksi dengan keputusan terbaik diperolehi selepas melaksanakan DS ($0.221 \text{ s} \pm .039$), tetapi diikuti oleh SS ($0.257 \text{ s} \pm .047$), dan kemudian CSDS ($0.293 \text{ s} \pm .075$). Dapatan ini mencadangkan bahawa DS menghasilkan masa pecutan dan masa reaksi yang lebih baik, SS menghasilkan masa pecutan yang paling perlahan, dan hasilan daya dan kuasa puncak yang paling rendah, manakala CSDS pula menghasilkan masa reaksi yang paling perlahan. Punca prestasi lebih baik selepas melaksanakan DS boleh dikaitkan dengan pengaktifan otot saraf yang lebih tinggi berbanding dengan kaedah lain. Bagaimanapun, faedah daripada DS mungkin berkurangan apabila ia digabungkan dengan SS. SS dan CSDS sebelum aktiviti-aktiviti berkelajuan tinggi, berkuasa tinggi, dan jangka pendek adalah tidak digalakkan kerana regangan tersebut mempunyai pengaruh yang merosakkan prestasi. Oleh itu, aplikasi DS untuk masa pecutan dan masa reaksi seolah-olah dapat meningkatkan kemampuan otot untuk beraksi secara maksimum.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2013 (Revision 2012-2013) are adhered to.

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