



UNIVERSITI PUTRA MALAYSIA

**COMPARISON OF MUSCULAR ENDURANCE TRAINING PERIODISATION
MODELS WITH EQUATED VOLUME AND INTENSITY IN ADOLESCENT
HOCKEY PLAYERS AT BUKIT JALIL SPORTS SCHOOL**

SHANKARALINGAM A/L RAMALINGAM

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MODELS WITH EQUATED VOLUME AND INTENSITY IN ADOLESCENT
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By

SHANKARALINGAM A/L RAMALINGAM

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

August 2011

Dedications

To my mother and father, S.Kulendyammal and P.Ramalingam;

To my Guruji;

To my sisters, brother and niece, Visnukala, Usha, Sundralingam and Harshini

And

To the rest of my friends and family who have encouraged me along the way.



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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Chairman : Kok Lian Yee, PhD

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The purpose of the present study was to determine if significant differences exist between two different models; linear periodisation (LP) and daily undulating periodisation (DUP), in eliciting superior gains in muscular endurance for the back squat and bench press. Twenty (n=20) adolescent athletes between 16 to 17 years old underwent a 12-wk strength training programme. They were tested for the lower-body muscular endurance (70% of estimated 1RM back squat) and upper-body muscular endurance (70% of estimated 1RM bench press). Following initial testing, participants were randomly assigned to one of the two training groups with ten participants in each group. Participants

performed the programmed exercises twice a week throughout the training period with volume and intensity equated for both groups at the end of the experimental period. The LP group linearly changed intensity and volume over each 4-wk training phase while the DUP group changed intensity and volume daily. Muscular endurance for back squat (LP=51.11%, DUP=61.60%) and bench press (LP=55.83%, DUP=48.48%) increased significantly from pre- to post-test. However, there were no significant differences measured between groups. Therefore each of the two models proved effective in increasing back squat and bench press muscular endurance over the course of 12 weeks.

Abstrak tesis yang dikemukakan kepada senat Universiti Putra Malaysia
sebagai memenuhi keperluan ijazah Master Sains

**PERBANDINGAN LATIHAN DAYA TAHAN OTOT DENGAN MODEL
PERIODISASI YANG DISAMAKAN ISIPADU DAN INTENSITI DI
KALANGAN PEMAIN HOKI REMAJA DI SEKOLAH SUKAN BUKIT
JALIL**

Oleh

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Ogos 2011

Pengerusi : Kok Lian Yee, PhD

Fakulti : Fakulti Pengajian Pendidikan

Tujuan kajian ini adalah untuk menentukan jika ada wujud perbezaan yang signifikan diantara dua model periodisasi; *linear periodization* (LP) dan *undulating periodization* (UP) dalam meningkatkan daya tahan otot bagi senaman *back squat* dan *bench press*. Dua puluh (n=20) atlet remaja diantara umur 16 ke 17 tahun telah menjalani latihan bebanan selama 12 minggu. Peserta kajian diuji untuk daya tahan otot bahagian bawah badan (70% daripada anggaran satu ulangan maksimum (1RM) bagi *back squat* dan daya tahan otot bahagian atas badan (70% daripada anggaran satu ulangan maksimum (1RM) bagi *bench press*). Selepas pra ujian, peserta kajian dibahagikan secara rawak kepada

salah satu kumpulan latihan dengan sepuluh peserta bagi setiap kumpulan. Peserta kajian menjalankan latihan yang telah dirancang dua kali seminggu dengan isipadu dan intensiti disamakan untuk kedua-dua kumpulan sepanjang tempoh eksperimen. Kumpulan LP menukar intensiti dan isipadu bagi setiap empat minggu fasa latihan manakala kumpulan UP menukar intensiti dan isipadu untuk setiap latihan. Daya tahan otot untuk *back squat* (LP=51.11%, UP=61.60%) dan *bench press* (LP=55.83%, UP=48.48%) meningkat secara signifikan dari pra ke pasca ujian. Namun, tidak ada perbezaan yang signifikan di antara kedua-dua kumpulan eksperimen yang terlibat. Dengan itu, kedua-dua model periodisasi terbukti efektif di dalam meningkatkan daya tahan otot bagi *back squat* dan *bench press* selama 12 minggu tempoh eksperimen.

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I certify that a Thesis Examination Committee has met on 22 August 2011 to conduct the final examination of Shankaralingam A/L Ramalingam on his thesis entitled "Comparison of Muscular Endurance Training Periodisation Models with Equated Volume and Intensity in Adolescent Hockey Players at Bukit Jalil Sports School" in accordance with the Universities and University College Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The committee recommends that the student be awarded the Master of Science.

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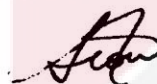
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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not currently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

R.SHANKARALINGAM

Date: 22 August 2011

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