

**REPETITIVE JUMPING SPEED AT SUB-MAXIMAL HEIGHT
IN ADOLESCENT BASKETBALL PLAYER:
A DEVELOPMENTAL STUDY**

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ABSTRACT

REPETITIVE JUMPING SPEED AT SUB-MAXIMAL HEIGHT IN ADOLESCENT BASKETBALL PLAYER: A DEVELOPMENTAL STUDY

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The purpose of this study was to develop a test to measure repetitive jumping speed ability, examine the reliability and validity of this test as a measure of leg speed, leg power and reactive strength and to study this type of stretch-shortening cycle activity where the ability to jump repetitively as fast as possible is of major concern. Twenty-one adolescent basketball players were selected to participate in this study and they performed (a) 40-meter dash test, (b) maximal counter-movement vertical jump test, (c) speed jump test, (d) counter-movement drop jump test and (e) bounce drop jump test. The 3-repetition speed jump test had the most significant relationship with both leg speed and leg power and has thus been identified as the most valid protocol. It had also been proven to be reliable with the Cronbach's alpha coefficient at 0.918 and the Pearson Product Moment correlation coefficient of 0.89 ($p < 0.01$). The mean of the speed jump test index between the two testing sessions were also not significantly different. Discriminant analysis showed that the speed jump test was also able to differentiate between different levels of performance. The correlation coefficients between the 3-repetition speed jump test index and last 30-meter time in 40-meter dash, vertical jump height and 40-meter dash time were 0.520, 0.446 and 0.445 respectively. Data

indicated that stretch-shortening cycle (SSC) in reactive jump for (i) height, (ii) height and speed and (iii) speed are different performance components and that mechanisms of force enhancement in SSC activity could be task specific.

ABSTRAK

KELAJUAN LOMPATAN ULANGAN PADA KETINGGIAN SUB-MAXIMA DI KALANGAN PEMAIN BOLA KERANJANG REMAJA: SATU KAJIAN PERKEMBANGAN

Oleh

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Ogos, 2002

Tujuan utama kajian ini adalah untuk merangka satu ujian prestasi fizikal yang dapat menguji keupayaan seseorang untuk melompat berulang kali dalam masa yang paling singkat dan seterusnya membuktikan kebolehpercayaan dan kesahan ujian 'Speed Jump' ini sebagai pengukuran kepantasan kaki, kuasa kaki dan kekuatan reaktif. Kajian ini juga bertujuan untuk mengkaji aktiviti *stretch-shortening cycle* ini dimana kepantasan adalah faktor terpenting dalam melakukan lompatan reaktif. Dua puluh satu pemain bola keranjang remaja telah dipilih untuk menyertai kajian ini. Mereka telah menjalani 5 ujian iaitu, (a) ujian lari pecut 10-meter dan 40-meter, (b) ujian lompatan vertikal maksima *counter-movement*, (c) ujian *Speed Jump*, (d) ujian lompatan reaktif *counter-movement* dan (e) ujian lompatan reaktif lantunan. Ujian *speed jump* 3 ulangan mempunyai perhubungan yang paling signifikan dengan kedua-dua pembolehubah kelajuan kaki dan kuasa kaki dan sejurusnya dikenal pasti sebagai protokol ujian yang paling sesuai. Kebolehpercayaannya juga dibuktikan dengan koefisien alfa *Cronbach* pada 0.918 dan korelasi koefisien *Pearson* pada 0.89 ($p < 0.01$). Perbezaan min indeks *speed jump* antara sesi pertama dan kedua juga dibuktikan tidak signifikan. Analisis

diskriminan menunjukkan ujian *speed jump* ini berupaya untuk membeza tahap prestasi yang berlainan. Korrelasi antara indeks *speed jump* 3 ulangan dengan catatan masa bagi 30 meter terakhir dalam lari pecut 40 meter, ketinggian lompatan vertikal dan lari pecut 40 meter masing-masing adalah 0.520, 0.446 dan 0.445 (kesemuanya $p < 0.05$). Data menunjukkan *stretch-shortening cycle* dalam lompatan reaktif dengan tujuan (i) ketinggian, (ii) ketinggian dan kelajuan dan kelajuan merupakan komponen persembahan yang berlainan dan mekanisme untuk peningkatan daya dalam aktiviti-aktiviti SSC ini berkemungkinan adalah spesifik kepada tugas.

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LIST OF ABBREVIATIONS

| | |
|------------|---|
| SSC | Stretch-shortening cycle |
| SJ | Squat jump |
| CMJ | Counter-movement jump |
| DJ | Drop jump |
| IEMG | Integrated electromyography |
| ATP | Adenosine triphosphate |
| P_p | Peak power |
| P_{avg} | Average power |
| > 2 tr yrs | Group of subjects that have been training for more than 2 years |
| < 2 tr yrs | Group of subjects that have been training for less than 2 years |
| SJ_{in} | Speed jump index |
| Ct | Contact time |
| g | Acceleration of gravity |
| VJH | Vertical jump height |
| 40m | 40-meter dash time |
| F10m | First 10-meter time in 40-meter dash |
| L30m | Last 30-meter time in 40-meter dash |
| CDJH | Counter-movement drop jump height |
| BDJ_{in} | Bounce drop jump index |