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KE ARAH KECEMERLANGAN SUKAN

Towards Excellence in Sports

NATIONAL COACHING ACADEMY 2014 SPORTS SCIENCE COURSES CALENDAR

Organised by

NATIONAL SPORTS COUNCIL OF MALAYSIA

KE ARAH KECEMERLANGAN SUKAN
Towards Excellence in Sports

NOTES:

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  ---> Search: **Coaching Academy**
  * For participants who wish to pursue a course please refer to procedure and complete the application form and submit it to the organizer of your choices listed below.

MONTH	LEVEL	NO.	CODE	DATE	ORGANISER (State Sports Council)	VENUE
Feb	III	1	3(01)2014	12-18 Feb	Sabah	Kota Kinabalu
	I	2	1(01)2014	24-28 Feb	National Coaching Academy, NSC	Auditorium 1, NSC
		3	1(02)2014	24-28 Feb	Selangor	KBK, Section 7, Shah Alam
Mar	I	5	1(03)2014	3-7 Mar	Seremban	Seremban Sports Complex 2
		6	1(04)2014	3-7 Mar	Pahang	IKIP Utama, Kubang Buaya, Kuantan Pahang
		7	1(05)2014	3-7 Mar	Sarawak	Miri
		8	1(06)2014	10-14 Mar	Kelantan	Kota Bharu
		9	1(07)2014	10-14 Mar	Pulau Pinang	Cemerlang Room, P.Pinang Sports Council
		10	1(08)2014	17-21 Mar	Perak	Ipoh
		11	1(09)2014	17-21 Mar	Federal Territories	Federal Territories Sports Council, Presint 2
		12	1(10)2014	24-28 Mar	Sabah	Kudat
		13	1(11)2014	24-28 Mar	Kedah	Alor Setar
	II	14	2(02)2014	24-29 Mar	Selangor	KBK, Section 7, Shah Alam
Apr	I	15	1(12)2014	7-11 April	Terengganu	Terengganu Sports Council
		16	1(13)2014	7-11 April	Sarawak	Sibu
	III	17	3(02)2014	14-19 April	Selangor	KBK, Section 7, Shah Alam
Jun	II	18	2(01)2014	16-20 Jun	Pahang	IKIP Utama, Kubang Buaya, Kuantan Pahang
		19	2(03)2014	16-20 Jun	Seremban	Seremban Sports Complex 2
		20	2(04)2014	16-20 Jun	Sarawak	Samarahan
	Viva	21	3(V01)2014	21-Jun	Sabah	Kota Kinabalu
	II	22	2(05)2014	23-27 Jun	Pulau Pinang	Cemerlang Room, P.Pinang Sports Council
	Viva	23	3(V02)2014	21-Jun	Selangor	KBK, Section 7, Shah Alam
	II	24	2(06)2014	23-27 Jun	Perak	Ipoh
Jul	III	25	3(03)2014	30 Jun-5Jul	National Coaching Academy, NSC	Lavender Room, MSN
	II	26	2(07)2014	7-12 Jul	National Coaching Academy, NSC	Auditorium 1, NSC
	I	27	1(14)2014	14-18 Jul	National Coaching Academy, NSC	Auditorium 1, NSC
Aug	I	28	1(15)2014	11-15 Aug	Seremban	Seremban Sports Complex 2
	III	29	3(04)2014	11-16 Aug	Sarawak	Kuching
	II	30	2(08)2014	18-23 Aug	Federal Territories	Federal Territories Sports Council, Presint 2
Sept	II	31	2(09)2014	18-23 Sep	Terengganu	Terengganu Sports Council
	II	32	2(10)2014	18-23 Sep	Kedah	Alor Setar
	III	33	3(V03)2014	27-Sep	National Coaching Academy, NSC	Meeting Room 1 (AKK)
Oct	I	34	1(16)2014	2-6 Oct	Sabah	Beaufort
	II	35	2(11)2014	1-6 Oct	Sabah	Beaufort
		36	2(12)2014	13-18 Oct	Sarawak	Miri
Nov	Viva	37	3(V04)2014	1-Nov	Sarawak	Kuching

MAJLIS SUKAN NEGARA MALAYSIA

COACHING JOURNAL

AKADEMI KEJURULATIHAN KEBANGSAAN

Contents

Message from Editorial Advisor

Welcome to the first edition for 2014 of our journal. Last year seems to have sped past at faster rate knots than I can remember in previous years. Work seems to be getting busier as the rate of change that we are dealing with educators and coaches seems to increase exponentially each year.

The production of the two issues of Journal annually has been changed from December to January and June by the Akademi Kejurulatihan Kebangsaan, clearly defines well the willingness to progress even further. As they say , time will determine the yet to come achievements, the Coaching Journal will make more interesting added with knowledge and based information on Coaching.

The journal provides insights into professional practice issues, highlights sports techniques, shares experienced knowledge, and provides practical application of current research. Each issue includes regular columns that features thought-provoking accounts of the coaches, programs, practices and concerns in Coaching. The editorial staff encourages submission of articles of professional to those working in the athletic training arena. The efforts transcended in addition to maintaining the Academy as being the best and to look after every needs of the coaching placed here is a clear indication on the commitment of this Academy. This exemplary gesture, in my opinion and also my hope that the progress could be seen.

Once again I would like to take this opportunity to thanks each and every individual who had worked hand in hand with me to produce this Volume 1 Issue 3 Coaching Journal. I believe with more help and cooperation we can make this Journal more interesting added with knowledge based information in the coming issues.

I am deeply indebted to all those who had been helping me since day one of establishing the Academy. I wish to take this opportunity to convey my deepest thanks and gratitude to Dato'Seri Zolkples Embong our Director General National Sports Council of Malaysia for allotting me this space to deliver my message.

EN. AHMAD ZAWAWI ZAKARIA
Editorial Advisor
COACHING JOURNAL
AKADEMI KEJURULATIHAN KEBANGSAAN

COACHING JOURNAL
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COACHING JOURNAL is published twice a year by the NATIONAL SPORTS COUNCIL OF MALAYSIA. Contributors are welcome to submit related articles at any time throughout the year. Article should be submitted via email to **lboonhooi62@gmail.com** | **hockey-vive@yahoo.com** and be submitted in English. Each article will be reviewed and edited if necessary and authors will be notified of acceptance within 6 to 8 weeks from the date of submission.

Article CONTRIBUTION FOR COACHING JOURNAL AKADEMI KEJURULATIHAN KEBANGSAAN

We have endeavoured to make the Coaching Journal a much better read. To a certain extent we have succeded in streamlining the content, but overall are still far from satisfied. As part of our efforts to further improve the Journal, we are continuously accepting article contributions from interested parties.We invite submissions from sports associations, academicians, sports adminitrators as well as coaches on topics ranging from academic to on field applied areas of interest. It can be an original research, technical commentary, knowledge base update or even association report; as long as it is related to coaching matters – it will be considered. Below are some guidelines to submitting an article:

OBJECTIVE OF THE JOURNAL

To keep the coaches abreast of the latest developments in coaching related areas of interests.

TARGET AUDIENCE

Coaches - the Journal will be distributed to coaches (grassroots right up to elite level). The other possible readers would be the athletes.

CONTENT

All articles submitted must be in English. It should be straight forward and easy to understand. The methods and statistic section need not be too detailed. It is alright to use previous published work with the relevant permissions acquired. More importantly, instead of a general conclusion please add a section "Practical Application for Coaches". In this section, explain how coaches can utilize the content of your article in their everyday work. We also recommend that you highlight important lines/paragraphs in your article. As with any printed work, please cite the relevant sources should the article include any external content/picture/table/figures.

FORMAT

- Arial, 11 pts, single spacing
- Justified alignment, margins 2.54cm all around (letter)
- Title is Bold, include the affiliations under it.
- Reference Citation in text is (numbered) - Notes style, Vancouver
- Include a picture of the first author and his profile (Academic Qualification and present Occupation)

The Journal is a registered periodical with a designated ISSN number. This makes it easier to catalogue and cite. Consequently, we also send copies of the Journal to all the relevant libraries.

For further information and article submission, please email to lboonhooi62@gmail.com and hockey_vive@yahoo.com

DR. LIM BOON HOOI
Editor in Chief
The Official Journal of the Akademi Kejurulatihan Kebangsaan Majlis Sukan Negara Malaysia

THE ELEMENTS OF SPEED DEVELOPMENT IN SPRINTING ABILITIES:
Some Important Factors that Contribute to Improve Sprinting Ability

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INTRODUCTION

The single most important factor in all track and field events is speed. Usually in sprints the fastest athlete will cross the finish line first. The same thing happens in the hurdles. In jumps, an athlete with a faster maximal speed will have a faster controllable speed in the runaway and would be to transfer the horizontal speed into a better jump. Traditional thinking dictates that sprinters are born not made while this is true to the extent, that is not possible to be a world-class sprinter or at least would be able to perform a record breaking performance, back without genetic endowment, sports science, and coaching practice have done much to refute this limiting statement. Speed is both a biomotor quality and a motor skill sport specific. Speed encompasses the ability to start quickly from different position, accelerate to top speed in the minimal time possible. Below are some of the important factors that could be an essential to develop sprinting ability among the athletes.

ANTHROPOMETRIC CHARACTERISTIC

Anthropometric characteristic such as height, weight and leg length are not significant factors in speed development. Research indicates that, but body composition does play an important role in developing speed; the leaner the athlete, the more efficient the performance. Excess body weight carried as fat is detrimental to performance. Nowadays, the ideal sprinters body type are leaner than Ben Johnson, a former world record holder and Canadian sprinter where a muscular type (however to generate force, you need a heavier sprinter, heavier in sense of muscle, not fat) (figure 1).

Figure 1:
Comparison body composition between Ben johnson (left) and Usain Bolt (right)

FLEXIBILITY AND THE RANGE OF MOTION (ROM)

The ability to move the appropriate joints through a large ROM at high speed is also essential. This is often confused with static flexibility, a factor that has a little relationship to performance. Speed works demands large large amplitude of movement at the shoulders, hip and knees and that requires dynamic flexibility. In sprinting, the ROM between the arms and the legs are very vital to increase/ decrease speed. When teaching rotary running, the ROM of the hip is vital to proper execution of the rotary action and the extension of the hip. If we applied the full ROM for the arms also effects stride length and stride frequency. As frequence is trained, the Rom tends to reduce and inhibit stride length.

GROUND REACTION FORCE (GRF)

Speed improvement is definitely linked to improvement in power, which is the capacity to produce the greatest amount of force in the shortest time possible. The training approach today focuses on reducing the time it takes to get necessary force into the ground. The fastest athlete would spend less time on the ground and have longer strides which is repeated with a greater frequency of all which are directly related to stride and power [1].

PLYOMETRICS TRAINING

Most of us belive that an athlete's faster mucle fiber can improve stride frequency by reducing time spent on the ground and in the air 9flight phase). In fact, this reducing ground contact time and airtime has been the basic approach to speed training. On improving the faster muscle fiber strength, there are various kinds of training applied to this force. One of them is plyometrics training that focuses on the myostatic reflex of the sprinting neuromuscular/ shortening (concentric in a fast movement) reflex of human muscle. When muscle goes through this reflex, they can produce more power through simple concentric muscle contraction [2]. Some of the examples are single-leg-hops will train the explosiveness of the legs and the joints. This improvement gained in explosiveness will enable the athlete to get a great push on the backside of the running cycle and a quicker and more powerful knee drive in the swinging phase on the front side of the running cycle.

RUNNING POSTURE

Posture is very important in sprinting mechanics. In acceleration phase, there is more of pronounced lean to overcome inertia. In top speed, there is a more erect posture. So we design drills to train the athletes, to place their limbs in more appropriate positions to improve the rate of force development with chest placed high, abdominal tuck in and bottoms high, this will help the lower limbs to prople more efficiently to generate forces from the ground. The key was to generate high speed backwards to minimize breaking forces and maximize propulsive force. The secret seemed to be the ability to generate high negative thigh speed [3].

ARM ACTION

In lever system, we know that short lever produce fast movement and long lever produce more power. In sprinting, the short lever motion can be identified through bending both arms that is essential to acceleration and control the stride length and stride frequency. The swinging should start at the shoulder joints and not at your elbow joints.

LEG ACTION

Leg action is the action of the hips and legs relative to the troso and the ground. For a quick starts, it involves lift the thigh and quickly put on the ground to start generate ground reaction force. It involves extending the ankle, knee and the hip to produce the greatest force. We remember that for fast movement, foot must be very close to the athlete's botoms during sprinting (apply short lever system). During flight phase,often we hear some of the coaches emphasize on lifting the thigh,but how many coaches emphasize on put the thigh down quickly? It is very important to cut down the shortest time possible during the flight phase [2].

FOOT PLACEMENT

For the ground reaction force, the foot placement on the ground should be from the ball of the foot to the toe of the foot. We realize that foot divide into 3 parts: hell, ball and toe. To generate more force, it is a must to use both ball and toe and not only toe of the foot during sprinting. During maximum speed, if we lie down near the track surface to see an athlete coming towards finishing line form 50 meter distance, we can really see his/her toes part less contact /no contact with the ground!

CORE MUSCLE DEVELOPMENT

Another component for increasing maximum velocity is core development. it has been said that sprinting is 30% abdominal (external, internal oblique,rectus abdominis etc.) without the strong core abdominal muscles, the sprinters ability to maintain an optimum sprint position is inhibited. The high thigh lift position essential to maximum stride length maintenance depends on it. In order to achieve ithis, athlete must add abdominal exercises into many of his/her workouts. Between sprints and interval repitition s, athlete can perform abdominal workouts. A part of that, some core muscles have to be strengthen in order to gain maximum speed such as pectoralis muscles, quadriceps, hamstrings, gluteus muscles, erector spinae, and trapezius. Some of the sprinting power might come from the hip especially gluetus muscles. That's why we realize that some top class sprinters have a good tone gluteus muscles.

EXERCISES FOR DEVELOPING LEG STRENGTH: TRAINING THE MOVEMENTS NOT THE MUSCLES

The legs are the rpimary source of power in many sports. The leg muscles work together to reduce and produce force in the most effective manner for the required activity. The exercise should incorporates all three planes of motion 9saggital, frontal and horizontal) because movement occurs that ways. Exercise should be over the greatest range of motion possible. Limiting the range of motion only serves to narrow the athlete's performance motion. Traditional training prgram that use exercises such as leg extension and leg curl fail to take into account these fucntional exercises. This program uses exercises to train the muscles not the movements. To be functional, you must train movements not muscles. The functional goal is to prepare the leg to use ground reaction force in an effective manner [1]. Movement seldom occurs with both legs applying force together at the same time. Forces as high as 3-5 times body weight on one leg are not uncommon. Therefore it is important to train the legs one at a time where possible. Most of us may have good right/left leg but the opposite leg couldn't take the strength of the other one. To generate ground reaction forc, the athlete should have both equal strength to be able to produce the greatest force [1].

USAIN BOLT: THE COMBINATION OF ABILITY AND SCIENCE OF SPRINTING

Belive it or not, speed is something that we can predict and understandable. In this case, Usain Bolt did the world record timing 9.58 during the World Championship 2009, while driving his both legs in an optimal speed same like his opponents. Everyone knows whoever compete aginst him will do the same action (as fast as possible). Most academician and coaches will agree that running in a fast rate sometimes related to the ground reaction force that been produced. This is what Peter Weyand from University of Southern Methodist is analyzing. He studied 2 groups, athlete and non-athlete. He surprised that the time taken to lift the leg and placed on the ground is about the same bettwen the 2 groups. So, he is wondering if both perform the similar movement, why is some of them running faster than the other? Weyand releaved that speed depends upon 2 factors; the force that been applied while the leg is lifted from the ground, and how long an athlete could use the force. Imagine a spring, the more force been used to push the leg to the ground, the far the force push the body moving forward, and maximize athlete's every single stride. In sprinting, normal people generate between 500 to 600 pounds of force, but a sprinter uses more than 1000 pounds . for your information, the force is not the only factor , but the rate of the force also contibutes. The average time the athletes' foot contact to the ground is about 0.12 seconds while the average an olympic sprinter's foot contact to the ground is about 0.08 seconds (0.08 seconds about 60% difference). The total time an individual's leg on the air is 0.12 secodns and this is no difference whether you run at your fastest or else. An elite sprinter had more time during the flight phase and less time during contact on the ground do perform a movement and back to flight phase because they can push with maximum effort. So, again what makes Usain Bolt faster than the rest and can perform in 9.58 seconds? An excellent unique combination of height, strength and his speed ability. At 1.87m, he is 0.05m taller than his rivals Asafa Powell and 0.15m than Tyson Gay. While most of the sprinters execute 44 stride frequency in 100m, Bolt only need 41 stride frequency to be faster than the rest.

CONCLUSION

This article is no way of explaining or detailing a complete training program. There also many elements involved in this training such as rest and recovery periods, aerobic capacity and the psychological state of the athlete.

PRACTICAL APPLICATION FOR COACHES

Coaches need to emphasize to the important point to build up speed following the ideal sprinting technique and mauling a sprinters body structure, leg length and good arm drive. A solid technique foundation in training is a must.

APPLIKASI PRAKTIKAL UNTUK JURULATIH

Seorang jurulatih perlu menekankan kepada perkara-perkara terpenting dalam membina pecutan maksimum mengikut teknik pecutan yang terbaik dan sesuai mengikut bentuk tubuh, kepanjangan kaki serta pacuan kedua tangan yang baik. Dalam hal ini, penekanan harus diberikan kepada penguasaan teknik yang cemerlang di dalam latihan.

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ANTHROPOMETRICAL PROFILE OF MALAYSIAN TOP UNIVERSITY SWIMMERS: Where Do We Stand?

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INTRODUCTION

Becoming a successful swimmer takes time, skills, hard training and motivation. Different techniques are used - freestyle, butterfly, backstroke and breaststroke; and preferable distance vary. Swimming events range from 50m to 1500m. Open-water or long-distance may range between 1 km to 25 km. Swimming performance limiting factors include endurance and power abilities, functional and somatic precondition, factor of technique and personal preconditions [1, 2, 3].
Close relationship between performance and the body's anthropometric characteristics has been known for quite a while, but it was not until the fifties that research in the area intensified. Since then, many anthropometric and physiological characteristics of the human body have been investigated and related to swimming performance.
In this study, we concentrated on anthropometrical profile of Malaysia top University swimmers inclusive of the height of the swimmers, weight, arm span, sitting height, foot length, pelvic width, shoulder width and also body composition of swimmers using the measures of BMI and body fat percentage.

Objectives of the Study were as follows:

1. To compare anthropometrical profiles of male and female Malaysian elite university swimmers.
2. To analyse the differences between sprinters and middle and long distance swimmers within the genders.

Limitations of The Study

Number of swimmers participated in the present study depended on actual participation of swimmers in Karnival Sukan Majlis Sukan Universiti Malaysia (MASUM) which was limited in numbers and was also limited to three top finishers in each final. Participation of swimmers in this research also depended on the approval from the organizing committee, coaches and swimmers own will to participate in the research.

University swimmers who have qualified for the National Team were exempted from tests and measurements since their anthropometric and physiological assessments were taken care of by the Institute Sukan Negara scientists.

MATERIALS AND METHODS

Subjects

The research measurements took place at Pusat Akuatik Bukit Jalil. The data were collected from 11 males and 14 females from among th swimmers of Majlis Sukan Universiti Malaysia (MASUM).

Variables and Measurements

The anthropometric characteristics of swimmers collected included: height and weight, arms spam, sitting height, foot length, shoulders and pelvic width and also body fat percentage. All height (cm) and weight (kg) measurements were recorded by using ruler scale (SECA 206). Arms spam, sitting height and foot length (cm) were measured by Anthropometry tape (Rosscraft). Shoulders' width and pelvic measurements were done by using breadth calipers.

All anthropometric measurement variables were measured according to the recommendations of The American College of Sport Medicine and International Standard for Advancements in Kinanthropometry (ISAK, 2001) and done by well-trained technicians to avoid the inter-observer coefficient of variation.

Statistical Analysis

Data analysis was performed using Statistical Package for Social Science (SPSS) Version 20. For the descriptive statistics, the data was displayed in means ± standard deviation (SD).

Independent-Samples T test was used to investigate of any significant differences between genders through the variables. The same applied for the differences between the swimming styles within each gender. The level of significance for evaluating the statistical analysis was set at $p < 0.05$.

RESULTS

Swimmers participated in 4 categories of events : freestyle, backstroke, butterfly, and breaststroke. For all categories of events, they were further sub-divided into 2 groups swimming distance wise: sprint (50m, 100m) and middle & long distance (200m, 400m, 800 and 1500m).

Gender wise, irrespective of the event or distance swam, the data obtained in the study were as follows (Table 1)

Table 1:
Descriptive statistics for both genders for MASUM swimmers

VARIABLES	MALES (N=11) MEAN	(SD)	FEMALES (N=14) MEAN	(SD)
Age	21.0	±1.26	22.5	± 1.65
Height (cm)	171.15	± 4.58	161.61	± 6.19*
Weight (kg)	65.13	± 7.95	54.94	± 7.05*
BMI (kg/m2)	22.21	± 2.35	20.96	± 1.54
Arm Span (cm)	177.10	± 8.42	162.80	± 7.62*
Sitting Height (cm)	88.74	± 1.83	84.88	± 4.26*
Foot Length (cm)	25.03	± 1.26	23.46	± 1.18*
Fat Percent (%)	16.46	± 5.16	24.04	± 2.77*
Pelvic Width (cm)	27.47	± 1.75	27.25	± 1.56
Shoulder Width (cm)	41.15	± 1.78	36.84	± 1.66*

* Significantly different (p<0.05) between genders

With obviously expected significant gender differences in height, weight, arms span, sitting height, foot length, fat percentage and shoulder width, it was surprising not to have it in the BMI and especially in teh pelvic width.

Further segregation of male swimmers into two categories, namely sprinters and middle and lomg distance swimmers revealed the following results as shown in Tab. 2.

Table 2:
Descriptive statistics according to the type of event for males

VARIABLES	SPRINT (N=5) MEAN (SD)		MIDDLE & LONG (N=6) MEAN (SD)	
Height (cm)	169.90	± 3.76	172.20	± 5.27
Weight (kg)	66.86	± 8.20	63.68	± 8.19
BMI (kg/m2)	23.15	± 2.72	21.42	± 1.86
Arm Span (cm)	177.10	± 7.17	177.10	± 10.03
Sitting Height (cm)	88.48	± 2.12	88.95	± 1.74
Foot Length (cm)	25.62	± 1.27	24.53	± 1.12
Fat Percent (%)	16.78	± 3.69	16.25	± 6.03
Pelvic Width (cm)	27.80	± 2.17	27.20	± 1.45
Shoulder Width (cm)	41.86	± 0.47	40.55	± 2.28

Table 2 illustrates that distance swimmers happened to be slightly taller but also slightly lighter than sprinters. Being shorter, though heavier, resulted in sprinters having a higher BMI. Neither difference though happened to be significant.

Results for the female population of University swimmers segregated into sprinters and middle & lomg distance swimmers revealed the following results as shown in Table 3.

Table 3:
Descriptive statistics according to the swimming distance in females

VARIABLES	SPRINT (N=9) MEAN (SD)		MIDDLE & LONG (N=5) MEAN (SD)	
Height (cm)	162.07	± 5.92	160.78	± 7.27
Weight (kg)	54.97	± 5.91	54.90	± 9.58
BMI (kg/m2)	20.89	± 1.32	21.10	± 2.05
Arm Span (cm)	162.59	± 6.20	163.18	± 10.57
Sitting Height (cm)	84.36	± 4.85	85.70	± 3.45
Foot Length (cm)	23.50	± 1.32	23.38	± 1.00
Fat Percent (%)	24.38	± 2.15	23.42	± 3.87
Pelvic Width (cm)	26.94	± 1.05	27.80	± 2.25
Shoulder Width (cm)	36.67	± 1.21	37.16	± 2.40

Analysis on the female swimmers has not revealed any differences between sprinters and middle & long distance swimmers.

DISCUSSION

Studies on younger swimmers revealed that sprint swimmers of 12-13 years of age were taller and heavier than long-distance swimmers of the same age [4]. Young swimmers (10-15 years of age) exhibited greater muscularity and aerobic capacity than non-swimmers. Swimmers of 12 to 18 years of age also had less body weight (BW) and fat free mass (FFM) and greater percent body fat (% fat) than older swimmers (19 to 21 year of age) [5].

Female swimmers (mean age=13 years) had greater percent body fat (%fat) and endomorphic ratings than male swimmers (mean age=15.7 years) and potentially explain gender differences in performance [6]. Performance timings were significantly and negatively correlated with height. Longer body segments would appear to influence the development of propulsive to a greater extent than that of resistance forces [7].

Relationship between performance and mass, height, length of arms and leg, has shown negative correlation between swimming time and weight and also between swimming time and leg and arm length [8]. Height, arms span, mass, total height and body density influence the performance in short swimming events [9].

To answer the question of 'Where do we stand?' some comparisons need to be done. Canadian scientists [10] reported basic anthropometric variables for Canadian adolescent elite swimmers as shown in Table 4.

Table 4:
The results for Canadian adolescent elite swimmers

AGE	GENDER	HEIGHT	WEIGHT
17	M	180.6 ± 7.3	75.6 ± 7.4
17	F	166.4 ± 5.0	61.2 ± 4.9
18	M	184.0 ± 7.9	77.6 ± 7.5
18	F	169.0 ± 4.8	64.1 ± 5.9

It is obvious that Malaysia University swimmers are notably shorter and lighter in both male and female section as compared to the Canadian swimmers. The study comparing young Chinese and Estonian swimmers aged about 13 years showed females at 163,62 and 162,60 cm body height; 50,31 and 48,14 kg body weight respectively and males at 163,62 and 162,60 cm body height; 51,59 and 50,67 body weight [11].

The results showed that significant differences existed in anthropometry between North-European and Asian young swimmers. These differences were more pronounced in female, with higher fat tissue in Nordic girls. Leg lengths were different between Chinese and Estonian girls having the Estonian longer legs. Hands lengths were different both in male and in female subjects. In some variables there were no differences.

Particularly, no significant differences in BMI were found between Estonian and Chinese swimmers, both in male and in female. Estonian male young swimmers showed a BMI of 18,86 and female - 19,55 while the Chinese male had BMI of 18,83 and female of 18,91 [11].

Russian (Soviet) norms for anthropometric variables for swimmers [12], highly recommended to follow while talent identifying swimmers of various ages, suggest the following values (Table 5).

Table 5:
Norms for anthropometric variables in USSR (2002)

AGE	MALES		FEMALES	
	HEIGHT(cm)	WEIGHT(kg)	HEIGHT(cm)	WEIGHT(kg)
12	155-159	42-47	146-152	40-44
13	159-163	47-52	152-156	44-48
14	163-168	52-57	156-160	47-52
15	168-173	57-62	160-164	49-55
16	173-176	62-57	164-168	54-55
17-18	176-180	67-72	168-172	57-62
19-20	178-186	72-77	170-174	60-66

Russian norms are quite comparable with Canada obtained figures at the ages of 17 and 18 years. Similarly both Chinese and Estonian adolescent swimmers fit neetly into the Russia generated norms, with girls of both countries being slightly laller and heavier than their Russian counterparts. As of Malaysian University swimmers, both male and female lag a lot in height and actually fitting by both height and weight into a 15-16 years of age category by Russian swimming anthropometry standards.

CONCLUSIONS AND PRACTICAL APPLICATION FOR COACHES

With performance relations to anthropomentry of the swimmers being a proven fact [13], at least two messages to be taken home here are:

1. Talent identification schemes in the country should pay more attention to the 'anthropometrically potential' swimmers at the early stages of their career, rather than picking the ones who swim faster;
2. Perhaps it's time to revert the philosophy of the University Sports (swimming in our case) from the 'Students who Swim' into the 'Swimmers who Study'.

Such approach will definitely help improving the standards of the University Sports and will surely help elite athletes in pursuing their higher education endevours.

APLIKASI PRAKTIKAL UNTUK JURULATIH

Skim mencari bakat di negara kita harus diberi penekanan dan perhatian dalam potensi antropemetrik perenang semasa usia muda supaya tidak mencari perenang melalui kalangan yang dapat berenang dengan laju sahaja.

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WHAT MUSIC SHOULD ATHLETES PLAY WHEN THEY PERFORM IMAGERY TRAINING?

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INTRODUCTION

Imagery is a psychological skill that has been consistently reported by numerous Olympians and elite athletes to enhance their sporting performance [26]. Imagery training is systematical use of mental practice to rehearse an action in the mind without engaging in the actual physical movements involved [29]. Morris [31] wrote "Imagination is terrifically powerful – by mentally rehearsing a routine before a major competition, athletes can prepare themselves to achieve their optimal performance when it counts most" (p. 5).

Imagery has been acclaimed as a "central pillar of applied sport psychology" [37]. It has been considered an integral part of athletic success in sports [9]. Most sport coaches who are looking back on their career, agreed that they used imagery training more than any other mental training technique in sport psychology, and felt that it was the most useful technique that they used with their athletes [3, 17]. In addition, successful, professional, high performance athletes who used imagery rigorously and systematically, achieved superior outcomes compared to less successful athletes, who did not use imagery systematically [5, 8]. Olson [34] confirmed that coaches acknowledge the potential of the performance-enhancing benefits of imagery used by their athletes. Athletes can employ imagery techniques for many purposes including: learning and practice of skills; pre-performance routines and game planning strategies; previews and reviews; mental warm-ups and development of psychological skills; problem solving and stress management; increasing concentration and confidence levels; and recovering from injury and rehabilitation [14, 31, 45, 50].

In the applied sport psychology literature, there is a great deal of evidence that has demonstrated that imagery training improves sporting performance (e.g., [2, 31, 48]. In a review of over 200 scientific studies on imagery, the majority of investigations indicated that imagery interventions improved sporting performance [46]. Although imagery alone is not as beneficial as physical practice, most researchers have reported that imagery improves learning and performance to a greater extent than no practice at all [53] and Morris [31] stated that research evidence indicates that imagery is most effective when used in combination with physical practice. Support for the benefits of imagery training for sports performance enhancement also includes interviews or testimonies of outstanding professional athletes, such as Jack Nicklaus (golf), Greg Lougannis (diving), and Chris Evert (tennis) [30]. Examples of activities in which imagery have been used successfully to enhance sports performance include baseball [22], basketball [40, 42], golf [2, 49], gymnastics [39], hockey [47, 48], rugby [14], soccer [28, 36], swimming [38] and tennis [25].

Suinn [51] used a cognitive training technique called Visio-Motor Behavior Rehearsal (VMBR) that combines relaxation training with visual and multi-sensory imagery training. He proposed that relaxation is a foundation that facilitates imagery, so it precedes imagery rehearsal in the VMBR technique. Several studies using VMBR have shown that this technique was effective, suggesting that relaxation is important for imagery [24, 32]. On the other hand, Woolfolk [54] concluded, "while relaxation may interact with imagery, it is not a critical variable in producing imagery effects upon performance" (p. 34). They cited many studies in which imagery was effective even though it was not preceded or accompanied by relaxation. Despite this argument, most researchers and practitioners have claimed that, as a precursor to imagery, relaxation facilitates imagery, arguing that although participants in many imagery studies were not instructed to relax when imaging, relaxation occurred naturally, and relaxation during imagery typically shows significant effects on performance [37]. Perry [37] stated that the role of relaxation as a basis for imagery is still empirically under-studied. There remains a need to examine the role of relaxation in imagery under different circumstances, to monitor the level of physiological arousal, and to determine whether increase in arousal level could be associated with stronger imagery.

Sport Psychology literature suggests that imagery is an effective sport performance enhancement technique [31, 44], which can also be used to manipulate psychological variables, such as anxiety [53], self-confidence [17], and motivation [30]. However, the factors that enhance or detract from the effect of imagery in sport performance are still not clearly understood. This creates a gap in imagery research, which is yet to be examined comprehensively.

Despite the frequent use of music in many sports, and the recognition by many athletes that music can help to create a winning mind-frame, research examining the mechanism by which music influences sport performance is scarce. Several researchers have demonstrated that music has an ergogenic effect on sport performance (see [19, 20]) and can increase exercise duration and heart rate [7, 10]. Music has also been shown to enhance performance in a variety of sports, such as power, endurance, long distance, and sprinting events [19]. For example, in power sports, boxers often walk to the ring with their favourite track blaring in the background. In team endurance sports, such as football and basketball, teams can be found getting "amped up" in the locker room, listening to a playlist of songs specifically designed to prepare them mentally for the game. Performers in long-distance sports, such as tri-athletes or long-distance cyclists, use their MP3 players as synchronised music to motivate them to run or cycle longer and faster [12, 19]. For example, professional athlete, Haile Gebrselassie, used a high-tempo popular music song to synchronise his strides in order to optimise his pace to win a 5000m race in 2003 (cited from [43]). Even for sprinting sports, the eighteen-time Olympic swimming gold medallist, Michael Phelps, in almost every photo shot of him at the pool, can be seen wearing his earphones, attached to his 'Apple iPod', while readying himself for competition.

Researchers have also reported that music creates changes in individuals' mind and body during listening [6]. Music has the power to increase arousal, energize, soothe, change emotional outlook, boost immunity, reduce pain, lower blood pressure, speed recovery, improve focus, and increase IQ [1, 6]. In addition to this, music has been shown to have psychophysical effects, which include lowered perceived effort, arousal control, improved affective states, and synchronization effects [4, 7, 18].

Music has been used to incorporate into imagery interventions in order to create more vivid scenes, increase emotional control, and facilitate the production of imagery. Earlier researchers, including Osborne [35], and Quittner [41] found that participants reported more visual imagery (images) when listening to music, and suggested that music may facilitate the production of imagery. In addition, Dorney [11] found that imagery with music was associated with significant increases in heart rate during preparation for muscular endurance tasks (sit-ups), but heart rate was not related to task performance.

Several studies examining the effect of music on the performance of various tasks have shown that fast-tempo music has enhancing effects on performance, and slow tempo music can be detrimental to sport performance by facilitating relaxation [15, 18]. Aside from the impacts of tempo, arousing music has been shown to increase arousal during exercise, which may also be a contributing factor to enhanced sport performance. Music may be used as part of an effective preparation strategy when power or muscular endurance exercises are performed; in contrast, this same music may also be counter-effective for activities that require high levels of concentration and coordination. Many researchers and applied sport psychologists have proposed that relaxation facilitates imagery (e.g., [37]). Lampl [23] and Meyer [27] have stated that certain kinds of music serve to increase relaxation during performance of a sport task, which may enhance imagery. This indicates that relaxing music can facilitate relaxation, which might be beneficial to imagery, regardless of the task performed.

Based on their review of theoretical and experimental work, Karageorghis [21] proposed that the use of asynchronous motivational music leads to three psychophysical responses: arousal control, reduced ratings of perceived exertion (RPE), and improved mood. Such responses within the context of a single bout of exercise may lead to the long-term behavioural outcomes of increased adherence to exercise. On the other hand, for short-term responses, both mood and arousal may be influenced by music that is played before as well as during a bout of exercise, whereas perceived exertion is affected by music that is played concurrently.

Despite the importance of imagery in sport performance, no research has been identified in the literature that has examined the mechanisms through which music might facilitate imagery. As imagery is a powerful tool, the effect of music played during imagery on the use of imagery to achieve the best effects still needs further study. Nevertheless, there is still much to be learned in relation to various issues that are yet to be fully explored, particularly in the area of psycho-physiological responses, in the study of different types of music on imagery and sport performance. It is important to understand the mechanisms underlying the imagery process, so that the use of imagery can be optimised. According to Morris [31], often researchers examine an idiosyncratic issue in the imagery domain, and then move on to another area of sport psychology research. Thus, until recently, there has been a shortage of systematic applied research on issues, such as the role of music combined with imagery in sport.

In this article we discuss our recent research on the effects of different types of music in facilitating imagery processes that impact on later performance of different types of sport tasks, including power tasks (such as weightlifting) and fine motor skill activities (such as dart-throwing and shooting). This research was designed to examine the extent to which the effect of imagery on sports performance is enhanced by music. We describe two related studies conducted in Australia. Implications for coaches are then discussed.

Study 1: In the first study we aimed to examine whether unfamiliar relaxing and arousing classical music played during imagery affected performance of a fine-motor sport task. In this study, independent groups performed imagery based on the same imagery script accompanied by either a) Unfamiliar relaxing music during imagery (URMI), Unfamiliar arousing music during imagery (UAMI), or No music during imagery (NMI). There were 12 sessions of imagery. Physiological arousal was monitored throughout Session 1 and Session 12 using electrical activity in the skin (GSR), heart rate (HR) and skin temperature (PR). We measured subjective perception of arousal using a measure of state anxiety. Performance was tested before Session 1 and after Session 12. We predicted that relaxing music during imagery would lead to a reduction in physiological and psychological measures of level of arousal, whereas arousing music would lead to an increase in level of arousal. Based on the proposition that arousal during imagery would have the same effect on performance as arousal before or during actual performance, we predicted that relaxing music during imagery would lead to a significantly greater gain score for performance than arousing music in the fine-motor sport task of dart throwing.

Examination of the physiological measures of arousal showed consistent results, indicating that arousal levels for those participants who listened to relaxing music were lower than levels for those who listened to arousing music. Those who didn't listen to music had arousal levels between the URMI and UAMI groups. AS shown in Figure 1, gain scores for performance for URMI, UAMI, and NMI were 37.24 ± 25.94, 17.57 ± 24.30, and 13.19 ± 28.15 respectively. Further statistical tests indicated that there was a significant difference in gain scores on dart-throwing performance between URMI and UAMI ($p = .04$), and between URMI and NMI ($p = .01$). In both cases, the gain score for URMI was significantly larger than that for the comparison conditions. There was no significant difference between UAMI and NMI ($p = .85$). Thus, it appeared that relaxing music played during imagery did enhance later performance more than arousing music for the fine-motor skill.

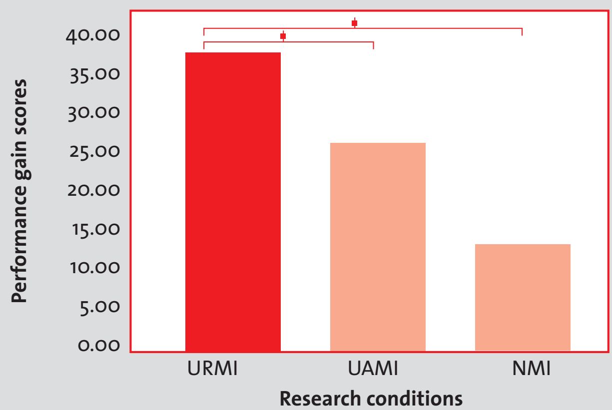

Figure 1.
Dart-throwing performance gain scores for the three music and imagery conditions

DISCUSSION

In terms of performance, it was hypothesised that, because of its relaxing quality, reducing participants' level of arousal, URMI would produce significantly larger gains in performance than UAMI and NMI on the fine motor skills of darts. This hypothesis was supported. This indicates that playing unfamiliar relaxing music during 12 sessions of imagery training had more beneficial effect on later performance of dart-throwing performance than UAMI and NMI. Although UAMI produced the least relaxing conditions during imagery, UAMI still produced a larger improvement in performance than NMI, although the difference was not significant.

In this study, we found that URMI was associated with a significantly larger performance gain score than UAMI or NMI, suggesting that URMI facilitated imagery and dart-throwing performance. In the literature review, relaxing classical music and imagery has showed beneficial effects for concentration tasks and therapeutic settings, using the Bonny method of guided imagery and music [16]. Recently, Karageorghis [20] examined the effect of using voice enhancing technology (VET) and relaxing music on the imagery of break-dancers. They found that the imagery intervention with VET and relaxing music improved relaxation and performance of the break-dancers compared to the control condition (without VET and relaxing music). Imagery with music seems to have effects on performance activities, however, there is still no research examining the effect of relaxing music or arousing music on power / strength tasks during imagery training, and the impact that has on performance.

Conclusion: In conclusion, results in this study provided strong support for the potential of using URMI imagery training to enhance sport performance of a fine-motor sport skill. URMI did produce superior performance compared to UAMI and NMI, however we could not distinguish whether this was because the experience of imagining performance with a low level of arousal transferred to actual performance or whether low arousal during imagery enhanced the effect of imagery on performance of the dart-throwing skill, which then transferred to physical performance. A limitation of this study is that the participants were novices; the effect of music during imagery training for elite athletes could show different results. Thus, it is suggested that further studies should be conducted with elite performers in their own sports to examine whether these findings also apply to elite sport.

Further examination of the effects of relaxing and arousing music in which power-tasks are compared to fine-motor skills has the potential to throw light on whether relaxing or arousing music during imagery is more effective for enhancing performance in low-arousal fine-motor skills and high-arousal power sports tasks for elite athletes. We examined this in the following study.

STUDY 2

We aimed to examine whether relaxing and arousing classical music during imagery would have different effects on performance, depending on the type of sport task, based on the same proposition that arousal during imagery would have the same effect as arousal level during actual performance of the task. Participants were highly skilled performers in a fine-motor sport task – pistol shooting, and an explosive power sport - weightlifting. The study included a pre-test – intervention – post-test design. All participants had moderate to high imagery ability measured by the SIAM and had at least two years of competitive experience at State level. In both sports, participants were assigned at random to one of two interventions: unfamiliar relaxing music during imagery (URMI), and unfamiliar arousing music during imagery (UAMI) using a match-mismatch approach. This produced four conditions: a fine motor task (pistol shooting) with either relaxing (URMI; matched) or arousing (UAMI; mismatched) music, and a power task (weightlifting) with either relaxing (URMI; mismatched) or arousing (UAMI; matched) music. Shooting performance was measured in a standard 10m air-pistol shooting simulated competition at pre-test and post-test, and weightlifting performance was measured on a simulated competition of a standard Olympic event, Clean and Jerk, at pre-test and post-test. All participants completed 12 sessions of imagery over four weeks between the pre-test and post-test.

RESULTS

We found that all intervention groups experienced improvement at post-test compared to pre-test with positive gain scores for shooters' and weightlifters' simulated competition performance, as shown in Figure 2. Further statistical analysis on gain scores revealed that there were significant differences in gain scores of shooting performance between URMI and UAMI, with gain score for URMI (Mean = 16.69) significantly higher than gain score for UAMI (Mean = 1.54). There was also a significant difference in gain scores for weightlifting simulated competition performance. Similar to the shooters' simulated competition performance, gain scores of weightlifting performance for URMI (Mean = 5.77) were higher compared to gain scores for UAMI (Mean = 1.33).

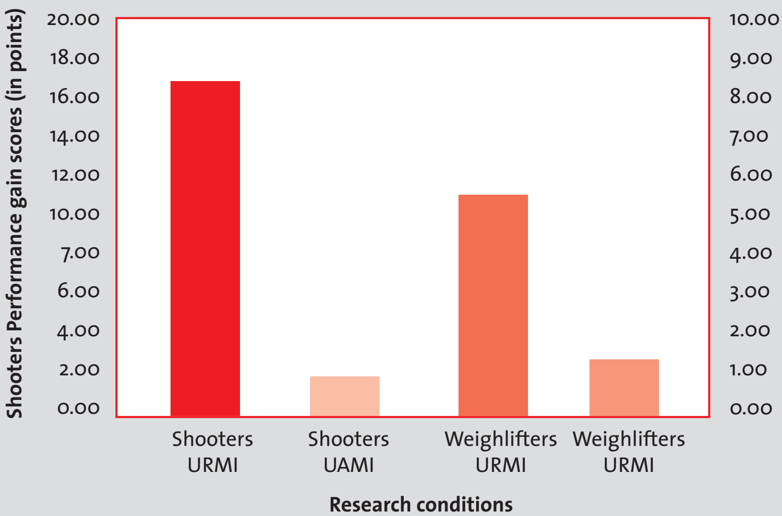

Figure 2. Simulated competition performances on gain-score for shooters and weightlifters.

DISCUSSION

The primary purpose of the current study was to examine the effect of relaxing and arousing music during imagery training on performance of fine motor and power sports skills. This study examined two propositions. The first proposition is that if music is played at the time athletes are performing imagery, it may be associated with the sports task that is being imagined. Then when the task is physically performed that association will have a similar effect to the effect when music is actually played during or immediately before performance, which has been demonstrated in substantial research (e.g [11, 18, 52]. In that case, arousing music would have a greater facilitating effect for tasks that require high arousal for optimal performance, such as power or endurance tasks, for example, skiing, track sprinting, weightlifting, sprint swimming, wrestling, or sprint cycle racing [19, 33]. On the other hand, relaxing music might be more facilitative to subsequent performance for tasks that require low arousal, including fine motor skills, for example, archery, bowling, golf putting, or shooting (e.g., [33]). The second, and alternative, proposition is that if relaxation enhances imagery, relaxing music may have a facilitating effect on imagery for all types of sports tasks regardless of whether they are power or endurance tasks or fine-motor skill sports. In this study, when highly skilled shooters, who perform a fine motor skill, and highly skilled weightlifters, who perform a power task, performed imagery with unfamiliar relaxing music (URMI) they showed significantly greater improvement in performance than similarly skilled athletes from those sports, who performed imagery with unfamiliar arousing music (UAMI). The results provide support for the second proposition that relaxing music has a facilitative effect on imagery for sports tasks regardless of whether they involve fine-motor or high-arousal power skills. The URMI condition showed a significantly higher gain score compared to the UAMI condition for both shooters and weightlifters. This suggests that URMI provided an imagery environment that was more facilitative for enhancement of later performance than UAMI.

For shooters, we predicted that the URMI condition would show a significantly greater performance gain than the UAMI condition in post-test simulated competition performance. This is because shooting is a fine-motor skills sport, in which low arousal facilitates performance, based on a stable body position, steady pistol arm, and smooth trigger squeeze. In addition, doing imagery with music that is relaxing and reduces level of arousal should help shooters to imagine the calm, controlled state associated with successful performance. Thus, the inclusion of relaxing music should be more facilitative to subsequent performance than accompaniment by arousing music. This was also demonstrated in Study 1 with the fine-motor skill of dart throwing.

However, for weightlifters we did not predict that gain score in performance would be significantly greater in the URMI condition than the UAMI condition. This is because weightlifting is a high-arousal power sport. Thus, we proposed that music during imagery of performance would be most effective when it reflected arousal level during actual performance, so arousing music should produce a greater facilitative effect than relaxing music on subsequent weightlifting performance. The results from this study showed that the use of relaxing music for shooters and weightlifters was associated with a larger gain score than accompanying imagery with arousing music. These results contradict the first proposition and provide support for the alternative proposition that relaxing music has a facilitative effect on imagery for all types of sports tasks, regardless of whether they are power, speed, strength, endurance, combination tasks (such as team ball sports) that require power, speed and skill, or fine-motor skill sports.

Conclusion: In conclusion, the results of this study showed that URMI imagery training was more effective in enhancing sports performance for fine-motor skill and power sports than UAMI. This is the first study that we have been able to identify to systematically examine the effect on level of arousal of different types of music during imagery training related to fine-motor skill and high-arousal power sports. Further, it is the only study that has examined this in elite athletes and using a realistic simulated competition. Athletes in both sports commented that the competitions felt real to them. The finding that performance increased more with relaxing than arousing music in the high-arousal power sport of weightlifting was contrary to expectations, based on research that used music just prior to or during performance of such sports. It suggests that with low-arousal and high-arousal sports imagery is more effective when athletes are more relaxed. We suggest that this study may serve as a stimulus for future research to investigate a variety of psychological interventions using different types of music for enhancing sporting performance.

OVERALL DISCUSSION

From the Study 1 and Study 2 above, we found that unfamiliar relaxing music was superior to unfamiliar arousing music for enhancing performance in fine motor skill sports. This was demonstrated for novices in dart throwing in Study 1 and was replicated with elite pistol shooters in Study 2. These results match the prediction that relaxing music is superior for fine-motor sports. In addition, we found that unfamiliar relaxing music was superior for enhancing performance of elite athletes in the high-arousal power sport of weightlifting (Study 2). We predicted that unfamiliar relaxing music would be a mismatched condition based on the proposition that the arousing characteristics of the music accompanying imagery should match the arousal level at which the sport is actually performed effectively. Similarly, we predicted that unfamiliar arousing music would be a matched condition for enhancing performance in the high-arousal power sport of weightlifting, but we found that it was less effective than unfamiliar relaxing music, which was contrary to the prediction (Study 2). The no music condition was the least effective condition compared to unfamiliar relaxing music and unfamiliar arousing music for the fine-motor sport of dart throwing (Study 1). However, only one study was conducted in which no music was employed and the performance difference with unfamiliar arousing music was not large. It was also the case that I only examined the effect of music during imagery on performance of a power sport with one sport in one study. Thus, the results should be replicated using similar music for other power sport tasks, for example, power lifting, snatch for weightlifters, shot putt, discus, or 50m ergometer sprinting, as well as other high-arousal sports, involving explosive speed or physical contact, such as sprint running, cycling, or swimming, rugby, football, boxing, or wrestling. Similarly, researchers should include a no music condition to compare the effects of imagery on level of arousal and performance of fine-motor skill sports and high-arousal power skill sports.

PRACTICAL APPLICATION FOR COACHES

The findings in both studies have highlighted some positive strategies that could help sport psychologists and coaches to use imagery training effectively with athletes. According to Karageorghis et al. [19,20] the use of the "right" music is important in order to get full benefits of the music for applied use. The results showed that unfamiliar relaxing classical music is more beneficial than unfamiliar arousing classical music for enhancing sporting performance for fine-motor skills sports and also for power skill sports. Thus, by understanding the research on the effect of use of unfamiliar relaxing music, sport psychology practitioners should aim for more effective interventions, based on the use of music during imagery training that is appropriate to the specific task or sporting event, together with consideration of the situational characteristics, to implement strategic intervention packages for diverse sports.

APLIKASI PRAKTIKAL UNTUK JURULATIH

Penemuan dalam kedua-dua kajian telah menekankan beberapa strategi positif yang boleh membantu ahli psikologi sukan dan jurulatih untuk menggunakan latihan imageri dengan lebih berkesan kepada atlet mereka. Menurut Karageorghis et al. [19,20], penggunaan muzik "yang betul" adalah penting untuk mendapatkan kesan menyeluruh daripada muzik tersebut terutamanya dalam aplikasi praktikal. Hasil kajian ini menunjukkan bahawa muzik klasik relaksasi yang tak pernah didengar adalah lebih berkesan berbanding muzik klasik "ransangan tinggi" yang tak pernah didengar untuk untuk meningkatkan prestasi sukan yang menggunakan kemahiran motor halus dan juga sukan yang menggunakan 'power skill'. Oleh itu, dengan memahami kajian tentang kesan penggunaan muzik relaxasi yang tak pernah didengari tersebut, ahli psikologi sukan haruslah berusaha untuk memberikan intenvensi yang lebih berkesan berdasarkan penggunaan muzik semasa latihan imageri yang mana ia hendaklah sesuai dengan tugas khusus ataupun acara sukan. Ia juga hendaklah berserta dengan pertimbangan ciri-ciri keadaan, untuk melaksanakan pakej rawatan strategik kepada pelbagai jenis sukan.

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USING BRUNEL MOOD SCALE TO MEASURE MOOD STATES:
A Brief Guideline for Coaches

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ABSTRACT

This manuscript provides a step-by-step guide on how to obtain profile of mood states using Brunel Mood Scale as a measurement tool. Using Microsoft Excel as an example of potential statistical softwares that can be used, this manuscript shows how coaches can compute their athletes' mood scores. It also provides cut-off scores to categorize mood into 6 different categories for ease of scores interpretation. It is believed that the information within this manuscript has the potential to inform coaches of how to profile their athletes' mood states and provide the necessary interventions when needed.

INTRODUCTION

The relationship between mood and performance has been a major focus in sports psychology research [1]. Mood can be defined as a set of the feelings, ephemeral in nature, varying in the intensity and duration, usually involving more than one emotion [2]. Moods may occur in an absence of specific objects or situations. For example, if a person is in a sad mood, it is not uncommon that it is not directed towards any particular situation or object. Mood may sustain for a long period in a person, and yet it is something that he or she may not be able to comprehend any specific reason behind such experience.

MEASURING MOOD STATES

Understanding athletes' profile of mood states may help coaches to intervene if it is interfering with athletes' performance. In order to obtain athletes' mood states profile, coaches can use several existing measure of mood such as Profile of Mood States Inventory (POMS) [3] and Brunel Mood Scale (BRUMS) [4]. POMS has been the choice of many practitioners in understanding athletes' mood states. Indeed, O'Connor [5] revealed that 66% the surveyed consultants in his study used some types of questionnaire in their works and POMS was among the most used questionnaires. Similar findings were also found in studies conducted by Gould, Tammen, Murphy, and May [6]. Despite its popularity, several researchers have argued that POMS administration process is time consuming [7]. Indeed, to counter this limitation, Terry et al. [7] has developed Profile of Mood State-Adolescents (POMS-A).

Derived from POMS, POMS-A is a 24-item measure of mood states among adolescents. Similar to POMS, POMS-A assesses 6 subscales: anger, confusion, depression, fatigue, tension, and vigor. Based on multi-sample analyses, Terry and colleague [7] reported strong psychometric properties of this scale. More recently, the validity and reliability of this questionnaire has been established among adult population and has since been renamed Brunel Mood Scale (BRUMS) [4].

BRUNEL MOOD SCALE [4]

BRUMS is a scale developed to measure mood among adolescent and adult population. The questionnaire consist of 24 mood descriptors such as 'angry', 'energetic', 'nervous', and 'unhappy'. Each mood descriptor is attached on a 5 - point response scale (0 = not at all, 1 = a little, 2 = moderately, 3 = quite a bit, 4 = extremely) where respondents indicate their mood. The general instruction consists of the standard response time frame is "How you feel right now". However, other timeframes such as 'How you feel in the previous week' can also be used.

It contains six subscales; (1) Anger, (2) Confusion, (3) Depression, (4) Tension and (5) Fatigue for negative mood, and (6) Vigour represents positive mood. Item in each subscale are listed in the following table

Table 1:
Subscale-specific items in BRUMS

FACTORS/ SUBSCALES	ITEMS	
1. ANGER	Annoyed (7), bitter (11), angry (19), bad tempered (22)	7,11,19,22
2. CONFUSION	Confused (3), mixed up (9), muddled (17), uncertain (24)	3,9,17,24
3. DEPRESSION	Depressed (5), downhearted (6), unhappy (12), miserable (16)	5,6,12,16
4. FATIGUE	Worn out (4), exhausted (8), sleepy (10), tired (21)	4,8,10,21
5. TENSION	Panicky (1), anxious (13), worried (14), nervous (18)	1,13,14,18
6. VIGOUR	Lively (2), energetic (15), active (20), alert (23)	2,15,20,23

HOW TO OBTAIN MOOD SCORES USING BRUMS

As mentioned above, BRUMS contains six specific mood states. These specific mood scores can be obtained by averaging subscale-specific item. For example, to obtain the score for Vigour, the scores for item 2 (Lively), Item 15 (energetic), item 20 (active) and item 23 (alert) are summed and divided by 4 (i.e., the number of item within that subscale). Similarly, to obtain the score for Tension, the scores for item 1 (Panicky), Item 13 (Anxious), item 14 (Worried) and item 18 (Nervous) are summed and divided by 4 (i.e., the number of item within that subscale). The same procedure is used to obtain the scores for the remaining of the subscales.

Figure 1 below illustrates a sample response on some of BRUMS items. As mentioned above, the score given for each response category is 0 (not at all), 1 (a little) 2 (moderately), 3 (quite a bit) and 4 (extremely). Using this example, Item 1 (Panicky) is recorded as 1, Item 2 (lively) is recorded as 2 and so forth

Figure 1.
BRUMS sample item scores

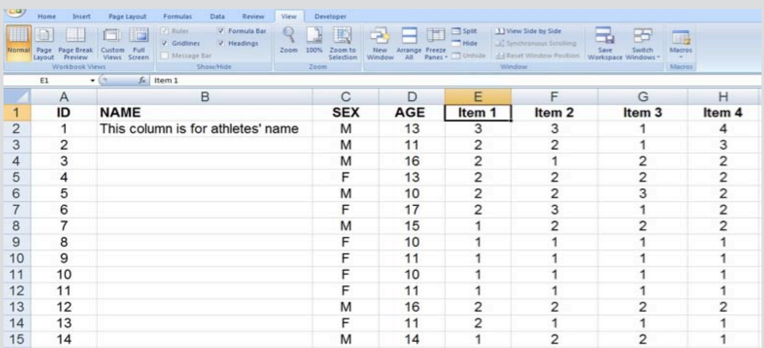
	Not at all	A little	Moderately	Quite a bit	Extremely
1. PANICKY		✓			
2. LIVELY			✓		
3. CONFUSED		✓			
4. WORN OUT				✓	
5. DEPRESSED			✓		
6. DOWNHEARTED				✓	
7. ANNOYED		✓			
8. EXHAUSTED					✓
9. MIXED-UP			✓		
10. SLEEPY			✓		

The same procedure is applicable for all the subscales. The overall score for each subscale can be obtained manually or using special software such IBM Statistical Package for Social Science (SPSS) or Microsof Excel. This is espeacially useful if one wishes to obtain mood scores for a large number of respondents.

USING MICROSOFT EXCEL TO GENERATE BRUMS SCORE

As mentioned above, using specific software allow provide the advantage of time saving, especially for a large dataset. To use Microsof Excel, Open the software and start by labelling the first row of each column. The row represents each athlete while column represent the questionniare items such as name, age, sex, and all questionniare items. For examle, in Figure 2 below, colum 1 is labelled as ID, followed by Sex and Age of athletes. The remaining colums are labelled as Item 1 or any other labels that you are comfortable with such as Mood 1. Alternatively, you can write down specific mood descriptor as in Figure 3.

Figure 2:
General Items labels



	A	B	C	D	E	F	G	H
1	ID	NAME	SEX	AGE	Item 1	Item 2	Item 3	Item 4
2	1	This column is for athletes' name	M	13	3	3	1	4
3	2		M	11	2	2	1	3
4	3		M	16	2	1	2	2
5	4		F	13	2	2	2	2
6	5		M	10	2	2	3	2
7	6		F	17	2	3	1	2
8	7		M	15	1	2	2	2
9	8		F	10	1	1	1	1
10	9		F	11	1	1	1	1
11	10		F	10	1	1	1	1
12	11		F	11	1	1	1	1
13	12		M	16	2	2	2	2
14	13		F	11	2	1	1	1
15	14		M	14	1	2	2	1

Figure 3.
Alternative item labels using specific mood descriptors

	A	B	C	D	E	F	G	H
1	ID	NAME	SEX	AGE	Panicky (1)	Lively(2)	Confused(3)	Worn out (4)
2	1	This column is for athletes' name	M	13	3	3	1	4
3	2		M	11	2	2	1	3
4	3		M	16	2	1	2	2
5	4		F	13	2	2	2	2
6	5		M	10	2	2	3	2
7	6		F	17	2	3	1	2
8	7		M	15	1	2	2	2
9	8		F	10	1	1	1	1
10	9		F	11	1	1	1	1
11	10		F	10	1	1	1	1
12	11		F	11	1	1	1	1
13	12		M	16	2	2	2	2
14	13		F	11	2	1	1	1
15	14		M	14	1	2	2	1

The next step is to enter all of the information as reported by athletes in each column. The scores for each questionaire item is entered as illustrated and explained above (Figure 1). Next, using the Statistics functions in Excel, coaches may obtain the basic scores for each athlete such as mean, sum, standard deviation and others.

To obtain the sum for any given subscale, place the cursor in an empty cell at the end of the row, then type the following formula = SUM (E2, Cell number 2, cell number 3 ect). E is the corresponding column and 2 is the corresponding row number. This is then followed by the remaining cell correponding to the item. Each cell must be separated by a coma. To obtain the score for all athletes within the database, copy the formula and paste it to the remaining cells within that column. For details instruction of how to obtain the sum scores for different data layouts, refer to Microsoft Excel guides.

VALIDITY AND RELIABILITY OF MALAYSIAN ADAPTED BRUMS

So far we have been using the original BRUMS items in the prior examples. However, BRUMS has been translated into Malaysian language and has been extensively used in research and practice. An important issue in using questionnaire to measure athletes' psychological construct is the issue of validity and reliability of a questionnaire. Validity refers to the accuracy, while reliability is the consistency of the test scores. Both of these aspects are crucial in ensuring the credibility of the scores obtain using any questionnaire. Studies examining the validity and reliability suggest that BRUMS may be used to measure athletes' mood states, but it is with some limitations. This limitation includes difficulties for some respondents, especially younger respondents, to distinguish the subscale specific items which may render the score for the specific subscales less meaningful. However, there is no issue for coaches to use BRUMS to obtain scores for the general positive and negative mood states, regardless of respondents' age groups. For details technical explanation of the validity and reliability indices of BRUMS and the issue highlighted above, readers are encouraged to consult the publication by Hashim et al. [8] and Lan et al. [9].

DATA INTERPRETATION

Once the score has been obtained, the next step is to interpret the score. The following score can be used as a rough guideline in interpreting athletes score in relation how athletes feel. This categorization is based on Lan et al. [9] study involving SUKMA athletes.

Table 2.
Cut-off scores for mood categories

SCORE CATEGORIES/ SUBSCALES	TENSION	ANGER	DEPRESSION	FATIGUE	VIGOUR	CONFUSION
Not at all	0	0	0	0	0	0
A little	1-3	1-2	1-2	1-3	1-7	1-2
Moderately	4-6	3-4	3-4	4-6	8-11	3-5
Quite a bit	7-9	5-7	5-7	7-8	12-14	6-7
Extremely	10-16	8-16	8-16	9-16	15-16	8-16

CONCLUSION

In this manuscript, we have provided a brief guideline on how to use BRUMS to obtain athletes' mood states. Understanding athletes' mood states is important in ensuring that it can be properly regulated and not interfering with athletes' performance. If mood states regulation is needed, coaches may use a number of psychological skill methods such as relaxation, self talk, thought stopping, imagery and other regulation methods to help athletes to regulate their mood.

PRACTICAL IMPLICATION

This manuscript provides a step-by-step guide on how to obtain profile of mood states using Brunel Mood Scale as a measurement tool. It has the potential to inform coaches of their athletes' mood states and provide necessary intervention when needed.

APPLIKASI PRAKTIKAL UNTUK JURULATIH

Maniskrip ini membekalkan panduan langkah demi langkah untuk memperolehi tahap mood dengan mengguanak Brunel Mood Scale sebagai alat ukur. Ia ada potensi untuk memberikan jurulatih tentang tahap mood atlet mereka dan menggunakan intervensi yang bersesuaian apabila diperlukan.

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THE INFLUENCE OF KINESIO® TAPING ON SHOULDER MUSCLE STRENGTH OF TENNIS PLAYERS

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ABSTRACT

Little is known about Kinesio taping on healthy muscle strength. The purpose of this study was to determine the effects of the application of Kinesio® tape on shoulder muscle strength of healthy tennis players. Thirty male tennis players (age: 24 ± 6 years, weight: 75.38± 11.43 kg, height: 177.05 ± 7.19cm) with no history of shoulder pain were recruited. Shoulder muscle strength were measured before and 30 minutes after taping, by Isokinetic dynamometer to determine the effects of taping on shoulder muscle strength among three groups of Kinesio® tape, Rigid Tape and No tape. T tests were used. The result revealed no significant difference in muscle peak torque and muscle power of healthy tennis players in both groups. Findings indicated that Pectoralis Major at 300°/sec had the highest pre and post mean difference in peak torque and average power in Kinesio tape group among all conditions and had the lowest ones in No Tape group among all conditions ($p < 0.05$). The results imply that this study cannot confidently suggest that Kinesio® produce the observed concentric strength changes in healthy muscles.

Keywords:
Isokinetic Dynamometer, Peak torque, Average Power, Mechanoreceptors

INTRODUCTION

In order to improve performance in sports, several intervention techniques are applied to athletes. For example, a cutaneous stimulation to enhance muscle contraction has been widely used in rehabilitation and in various sports.

The application of taping is widely used among athletes both in rehabilitation [3,15,16] and in the prevention of sport injuries [8,25] and sometimes it is used to support muscle activities and thrive their playing [3,5]. Kinesio® taping is a technique which was proposed to increase stimulation of the mechanoreceptors to either stimulate or limit movement and correct muscle function by strengthening muscle weakness [9, 13]. To date, it appears that no study has investigated the effect of Kinesio® tape on the strength of healthy shoulder muscles and compared its effect with other alternatives.

Kinesio® Tape (KT) is a new and popular elastic tape proposed by Kenzo Kase, that claims to roll up fascia to align the tissue in its desired position, increase stimulation of the mechanoreceptors to either stimulate or limit movement, provide a positional stimulus to the skin, and to correct muscle function by strengthening muscle weakness [10, 13, 24]. It has special weave and viscosity that allows ventilation [1,10]. Such tape can provide opportunity for joints to increase their loading and for muscles to increase their activities, as well as to even out the movements and power of the joint during the performance [4,10, 20]. Murray et al. [18] had pointed out that using Kinesio® taping on the quadriceps muscles had shown improvement in joint range of motion in the knee, incited EMG activities and increased the quadriceps femoris' muscle strength for two patients [10, 18].

With the knowledge that today sports such tennis has become a global profession which requires huge amount of equipment and facilities, education and training, skill and proficiency [6] and all the athletes are attempting dramatically to enhance their performance in order to gain a better level of proficiency and also make their partisans satisfied, there are not enough investigations to define whether taping method can improve any factor of tennis players' body and if it is able, it is not clear that which type of tape, elastic or non-elastic, is the better option for them.

Therefore the purpose of this study is to determine if the use of Kinesio® tape, in healthy tennis players, is effective on the strength of the shoulder Internal and External Rotators.

METHODS

Experimental Approach to the Problem:
The study followed a randomized, control comparison design. The overall design incorporated a trial to determine if Kinesio® would perform any changes in the muscle strength of the shoulder. The muscles were chosen for this study were the Pectoralis Major as the shoulder internal rotator and the Infraspinatus as the shoulder external rotator. All subjects completed baseline and endpoint trial. Subjects were randomly assigned to two groups: group 1, Kinesio® taping; group 2, No taping group as control. We compared all outcomes within and between the two groups.

Shoulder rotation was chosen for its ability to challenge rotation of the shoulder joint during a functional activity that was relatively familiar to the participant, as internal and external rotation of the shoulder are two of the basic and important movements in serves, forehands and backhands. Outcome measures included Pectoralis Major peak torque and average power and Infraspinatus peak torque and average power. Each outcome was tested before and after tape application.

SUBJECTS

Thirty male tennis players between the age of 18 to 30 years old (age: 24 ± 6 years, weight: 75.38 ± 11.43 kg, height: 177.05 ± 7.19 cm, Shoulder Girth Diameter: 31.023 ± 5.83 cm) volunteered to participate in this study. Demographic particulars of the participants are shown in Table 1.

DATA INTERPRETATION

Table1:
Anthropometric Details of the participants

VARIABLES	N	MIN	MAX	M	SD
Weight (Kg)*	30	53.8	1071	75.38	11.44
Height (Cm)*	30	166.2	190.8	177.05	7.2
Shoulder girth in relaxed position (Cm)	30	11.0	32.0	26.76	5.0
Shoulder girth in elbow Flexion (Cm)	30	12.3	38.0	31.02	5.83
Dominant Hand					
Right hand	26				
Left hand	4	N/A	N/A	N/A	N/A

* Kg: Kilogram,
* Cm: Centimeter

Ethical approval from the Ethics Committee in Scientific Research Centre at University of Malaya was received and written informed consent was obtained from all subjects. The subjects were financially compensated for their participation.

TEST PROCEDURE

The subjects initially attended baseline testing and familiarization visits to ensure they have an understanding of the experimental protocol. After familiarization trail, before doing the movements, 5 minutes warm up procedure was performed to promote performance and prevent injury. The warm up exercises included some stretching movements and some eccentric and concentric contractions. Subjects' shoulder external and internal rotations were assessed using the Isokinetic dynamometer with three angular velocities of 60°/sec, 180°/sec and 300°/sec.

Each participant undertook 30 maximal concentric contraction of shoulder External and Internal rotation, 10 repetition for angular velocities of 60°/sec, 10 repetition for 180°/sec and 10 repetition for 300°/sec and their peak torque and Average power values were recorded by Biodex isokinetic dynamometer. They were allowed to rest for 30 seconds between each set. The group for each participant was chosen randomly by a third person. Taping was performed by a certified trainer to guarantee the correct taping technique. After taping application, participants were given 30 minutes rest. According to the (Kase) technique [12,13]. Kinesio® tape should be applied at least 30 minutes before vigorous activity. This period of time will allow the tapes to provoke neuromuscular system and also stimulate their joint sense of proprioception.

KINESIO® TAPING METHOD

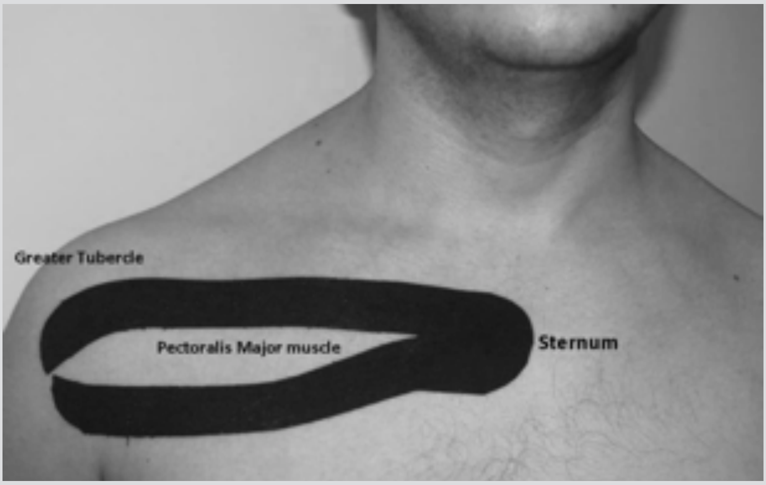
According to Dr Kase there are two types of tape application for muscle:

1. Facilitation technique
2. Inhibition technique [11].

For Facilitation technique which was used in this study, tape has to be applied from origin to insertion of the muscle with 25% of stretching and according to the Kase technique [11] tension was never placed in the anchor or end of the strips.

For Pectoralis Major muscle a Y shape strip of Kinesio Tex® was measured and cut. Anchor was attached with no tension at cartilage surface in shoulder neutral position and then muscle was placed in stretched position (shoulder in 900 flexion, horizontally abduction and external rotation with slight elbow flexion) and tapes is stretched 25% and again end is placed with no tension at Greater Tubercle of Humerus (Figure3).

Figure 3:
Pectoralis Major Facilitation Technique



For the InfraSponatus muscle a single strip Kinesio Tex® was measured and cut. The anchor was attached with no tension at 2 cm lateral of the medial border of the scapula just inferior to the scapular spine in shoulder neutral position and then muscle was placed in stretched position (shoulder in 900 flexion, horizontally adduction and internal rotation with slight elbow flexion) and the tapes were stretched 25% and again end the was placed with no tension at the Greater Tubercle of the Humerus (Figure 4).

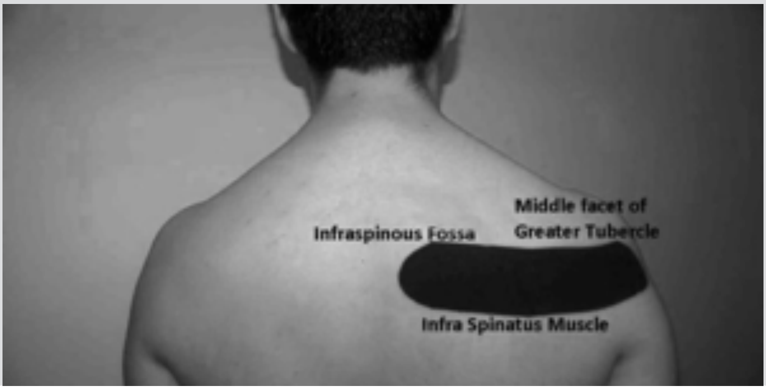


Figure 4:
Infraspinatus Facilitation Technique

INSTRUMENTATION

The Biodex isokinetic dynamometer (Biodex multi-joint system-pre, USA) was adopted to assess concentric muscle strength at a speed of 60 °/s, 180 °/s and 300 °/s. Isokinetic dynamometer was set and adjusted according to its manual: the subject was seated and the chair was rotated to 0°. The back of the chair was nearly vertical. Additionally, the power head was positioned parallel to the chair, and was rotated 20° from neutral in the horizontal plane and tilted 50° in the vertical plane. The axis of the dynamometer was placed in the longitudinal axis of the Humerus through the olecranon. The subject was strapped with two criss-crossing shoulder straps and one lap strap to minimize accessory motion. Seat and arm rest adjustments were customized to the individual, so that the shoulders were level. The dynamometer's axis of rotation was aligned approximately with the olecranon process of the dominant arm. All the adjustment figures were recorded for each subject to apply for the endpoint measurement.

STATISTICAL ANALYSIS

Data are presented as mean ± SD. Statistical analyses were completed using SPSS software (International Business Machines Corporation, SPSS 20, Chicago, IL, USA). T-test was used and the Bonferroni adjustment was set to evaluate the differences in concentric muscle strength. There were four dependent variables: shoulder external rotation peak torque, shoulder internal rotation peak torque, shoulder external rotation average power and shoulder internal rotation average power. The independent variable for this study was Kinesio. Participant's peak torque and Average power were calculated in three different angular velocities: 60°/sec, 180°/sec 300°/sec. Statistical significance was set at $p<0.05$.

RESULTS

Final data for analysis consisted of 3 groups of 10 healthy tennis players with no history of pain or injury in their shoulder in past six months. Evaluation of comparison of peak torque and average power of Pectoralis major and Infraspinatus muscles by isokinetic assessments are shown in Table 2. The T-Test for two conditions indicated that Pectotalis Major at 300°/sec had the highest pre and post mean difference in peak torque and average power in Kinesio tape group among all conditions and had the lowest ones in No Tape group among all conditions ($p < 0.05$) (Figure 3 & 4).

No statistically significant differences were existed between groups. Additionally, no significant interaction effect existed between assessments and conditions ($p > 0.05$) (Table 2).

Table 2.
Comparison of peak torque, and Average Power of Pectoralis Major and Infraspinatus muscles among the two conditions

OUTCOME	VELOCITY (°/S)	MUSCLE	KT	NT	P-VALUE	F
Peak	60	Pec Maj	3.13±12.31 1.26±10.86	-0.70±9.84 .20±4.17	.74 .92	.30 .08
Torque	180	Pec Maj	1.91±15.33 -.11±9.33	.61±5.68 .94±4.79	.95 .94	.50 .06
(N.M)	300	Pec Maj	6.33±13.31 .93±7.45	-3.58±10.02 1.04±3.08	.181 .921	1.82 .08
Average	60	Pej Maj	2.74±10.89 -.59±7.44	78±6.80 -.08±3.036	.85 .87	.17 .14
Power	180	Pec Maj	8.84±29.88 -.96±21.57	6.73±11.89 3.06±5.18	.97 .75	.03 .29
(W)	300	Pej Maj	16.47±38.51 -1.25±2	-4.95±19.30 -2.78±10.80	.19 .73	1.75 .32

°/sec: Degree per second, N.M: Newton.Meter, W: Watt
KT: Kinesio taping; NT: No taping; Pec Maj: Pectoralis Major, Inf Spin: Infraspinatus, P <0.05

DISCUSSION

The purpose of this study was to assess the usefulness of Kinesio® tape on shoulder muscle strength. The main findings of this study suggest that Kinesio® neither increases nor decreases strength in healthy muscles. However, Kinesio® tape was effective on the peak torque and average power of Pectoralis Major and on the peak torque of Infraspinatus,.

Kinesio® tape and its strength improving feature have been concentrated in recent study according to neuromuscular facilitatory theory. There has been, however, unconvincing proof to either support or disprove this theory. Dr. Kenzo Kase claimed that one of the effects of Kinesio® tape is to increase muscle strength [13]. Vithoulka [24] displayed that the application of Kinesio® tape could enhance isokinetic peak torque in healthy normal females upon application of tape. Similarly, Lee et al. demonstrated a significant enhance in grip strength subsequent the application of Kinesio® tape [14], While Lee found no changes in latency, amplitude, and motor nerve conduction velocity of arm muscles [17].

Our results agree with the Fu study results which examined the immediate and postpone effectiveness of Kinesio® tape on muscle strength in hamstring and quadriceps, when taping is applied to the anterior thigh of healthy athletes. They concluded that Kinesio® tape was not effectual on isokinetic peak torque of participants [7]. In the same way, in a study by Huang demonstrated no significant differences in electromyography activity for the medial gastrocnemius, tibialis anterior and soleus muscles [10]. Similarly, Callegari et al. [2] established the claims that Kinesio® tape would be supported in its role in strength enhancing properties. The training program employed in their study was inadequate to make strength changes in shoulder external rotation strength in either group.

The influence of Kinesio® tape, in conjunction with a training program, could not be established from their study too.

The finding of the present study disagrees with those previous studies, such as the study by Nelson [19] who discovered that Kinesio® tape enhances the variety of motion, facilitates muscle function, increases circulation, and regularizes muscle length/tension ratios creating optimal force. Further studies recommended the effectiveness of Kinesio® tape on isokinetic peak torque of muscles [21,23,26]. For instance, Melissa Schneider [21] determined Kinesio® tape used in healthy collegiate tennis player is effective in lessening tiredness by keeping strength of the forearm extensors, which are frequently connected with lateral epicondylitis. The result of their research indicated that Kinesio® tape, used for healthy collegiate tennis player, is connected with less of a decline in muscular strength than that seen in a "no tape" condition [21].

A protocol set out by Kase et al [13] stated that "The tape needs approximately 20 minutes to gain full adhesive strength." The current study tested subjects 30 minutes after tape application, and it may be inferred that the results would have differed if tape application were applied at least 24 hours before the trial, as has shown to be effective in previous studies [21] such as one performed by Slupik [22] which showed that the effects of Kinesio® tape can be lasted up to 3 days after application [22]

Finally, the use of healthy subjects, with no proprioceptive deficits from injury, limits the generalizability of the study results. Future research should look at the effects of KT over a long period of time, such as a tennis match, to generate greater fatigue to the shoulder internal and external rotators. Another study should focus on the effects of KT on tennis athletes diagnosed with rotator cuff tendinitis to test the effect that KT may have on perceived pain and strength deficits.

PRACTICAL APPLICATION FOR COACHES

This study cannot confidently suggest that Kinesio® tape produces greater muscle strength in healthy shoulders. This method can help the researchers to study about the effect of Kinesio® taping on appropriate subject groups having muscle weakness, swelling, spasms or soreness. Based on the varied effects of Kinesio® tape, different intervention techniques were recommended for different purposes. The findings may implicate benefits for shoulder muscle strength and rotation force when using Kinesio® tape.

APPLIKASI PRAKTIKAL UNTUK JURULATIH

Hasil kajian tidak dapat secara yakinnya menyatakan Kinesio® tape dapat menghasilkan kekuatan yang lebih pada bahu yang sihat. Cara ini dapat membantu penyelidik untuk mengkaji kesan Kinesio® tape ke atas otot yang lemah, bengkak atau lemah. Berdasarkan berbagai kesan Kinesio® tape, teknik intervansi yang berbeza untuk tujuan adalah dicadangkan. Hasil kajian ini boleh memberi faedah kepada kekuatan otot bahu dan kuasa putaran bila menggunakan Kinesio® tape.

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CONFLICT OF INTEREST STATEMENT

All authors state that they do not keep any commercial, financial or personal relationships which may lead to a conflict of interests that could inappropriately influence (bias) their work. Furthermore, results of the present study do not constitute endorsement of any product by the authors or the NSCA.

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CONTINUING COACH EDUCATION PROGRAMME (C.C.E)

2014 calendar

AKADEMI KEJURULATIHAN KEBANGSAAN

MONTH	NO.	COURSE	DATE	ORGANISER	VENUE	STATUS
FEB	1	FACE (BASIC) - NUTRITION	22 FEB	MS WILAYAH PERSEKUTUAN LABUAN	MS WILAYAH PERSEKUTUAN LABUAN	
MAC	2	ADVANCED COACH EDUCATION (ACE) - MODULE 1 & MODULE 2	3-6 MAC	NSC	NSC BUKIT JALIL, KUALA LUMPUR	
	3	FACE (BASIC) - SPORTS MASSAGE	10-11 MAC	MSN KEDAH	ALOR STAR	
	4	FACE (BASIC) - SPORTS MASSAGE	22-23 MAC	MSN JOHOR	DEWAN GEMILANG MSN JOHOR (LARKIN)	
APRIL	5	FACE (BASIC) - SPORTS INJURY	5 APRIL	MSN PP	MSN PULAU PINANG	
	6	ADVANCED COACH EDUCATION (ACE) - MODULE 1	21-24 APRIL	IPG MALAYSIA	INSTITUT KWSP, KAJANG	
	7	FACE (BASIC) - NUTRITION	26 APRIL	UNIMAP	UNIMAP, KANGAR PERLIS	
MEI	8	FACE (BASIC) - FUNCTIONAL MOVEMENT & TECHNICAL ANALYSIS	10 MEI	UTHM, JOHOR	UTHM, BATU PAHAT JOHOR	
JUN	9	FACE (BASIC) SPORTS MASSAGE & NUTRITION	17 - 19 JUN	IPG MALAYSIA	INSTITUT KWSP, KAJANG	
JUL	10	FACE (BASIC) - SPORTS MASSAGE	12-13 JUL	UNIMAP	UNIMAP, KANGAR PERLIS	
OGOS	11	FACE (BASIC) - SPORTS MASSAGE	16-17 OGOS	UNIZA	UNIZA, KUALA TERENGGANU	
	12	FACE (BASIC) - SPORTS INJURY	23 OGOS	MS WILAYAH PERSEKUTUAN LABUAN	MS WILAYAH PERSEKUTUAN LABUAN	
SEPT	13	FACE (BASIC) - FUNCTIONAL MOVEMENT & TECHNICAL ANALYSIS	6 SEPT	IKIP, KUANTAN	IKIP, KUANTAN PAHANG	TBC
	14	ADVANCED COACH EDUCATION (ACE) - MODULE 1	9-11 SEPT	MSN KELANTAN	KOTA BAHRU	
	15	FACE (BASIC) - FUNCTIONAL MOVEMENT & TECHNICAL ANALYSIS	20 SEPT	KOLEJ KOMUNITI LANGKAWI, KEDAH	KOLEJ KOMUNITI LANGKAWI, KEDAH	
	16	ADVANCED COACH EDUCATION (ACE) - MODULE 1	24 - 26 SEPT	MSN SABAH	MSN SABAH	
OKT	17	BASIC COACHING EDUCATION (BCE)	9-12 OKT	NSC	NSC BUKIT JALIL, KUALA LUMPUR	
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NOV	19	FACE (BASIC) - FUNCTIONAL MOVEMENT & TECHNICAL ANALYSIS	1 NOV	MSN SABAH	KENINGAU SABAH	
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DEC	21	FACE (BASIC) - NUTRITION	6 DIS	MSN PERLIS	KANGAR PERLIS	

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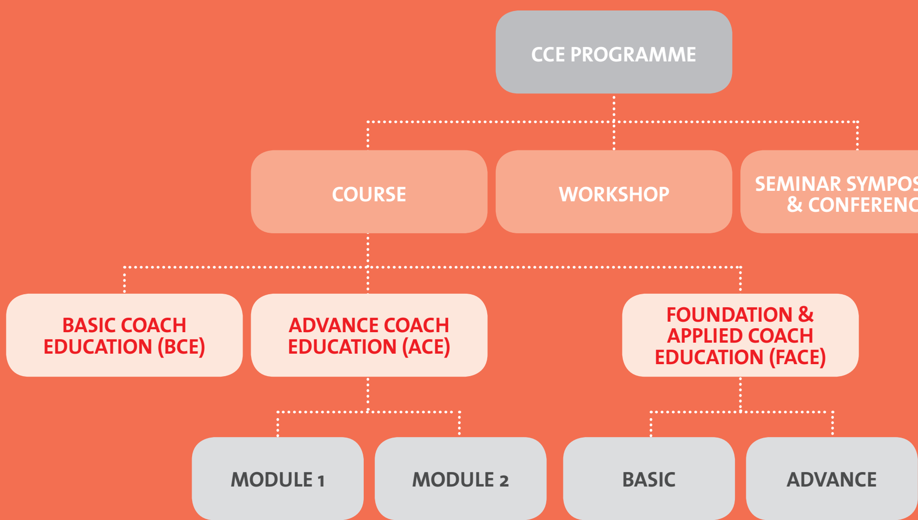

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