



PROCEEDING



ASEAN FORUM AND INTERNATIONAL CONFERENCE ON SPORT SCIENCE AND TECHNOLOGY (AFICSST)

Bali, Indonesia, 8-11 August 2014

**"Bridging The Gap In The Advancement Of Sport Sciences
And Technology Implementation Among South East Asia
Countries"**

**The Deputy Asistant of Sport Science and Technology Division
Deputy Minister of Elite Sports Enhancement
Ministry of Youth and Sports**

ISBN 978-602-8998-22-2



9 786028 998222

<http://www.kemenpora.go.id/AFICSST/>



PROCEEDING



ASEAN FORUM AND INTERNATIONAL CONFERENCE ON SPORT SCIENCE AND TECHNOLOGY (AFICSST)

Bali, Indonesia, 8-11 August 2014

**"Bridging The Gap In The Advancement Of Sport Sciences
And Technology Implementation Among South East Asia
Countries"**

**The Deputy Asistant of Sport Science and Technology Division
Deputy Minister of Elite Sports Enhancement
Ministry of Youth and Sports**

ISBN 978-602-8998-22-2



9 786028 998222

<http://www.kemenpora.go.id/AFICSST/>

SCIENTIFIC COMMITTEE**Chair:**

Prof. Dr. Imam Sujudi, M.A.

Deputy Chair:

Prof. Dr. Tandiyo Rahayu, M.Pd

Members:

Prof. Dr. Hari Setijono, M.Pd
Prof. Dr. Adang Suherman, M.A.
Prof. Dr. M.E. Winarno, M.Pd.
Prof. Dr. Hari Amirullah Rachman, M.Pd.
Dr. Wahjoedi, M.Pd.
Dr. Asep Suharta, M.Pd.
Dr. Dimiyati, M.Si.
Drs. Toto Subroto, M.Pd..

Reviewer:

Dr. Setya Rahayu, M.S.
Drs. Agus Mahendra, M.A.
Bambang Sutiyono, M.Pd.
Herka Maya Jatmika, M.Pd.
Muhammad Alfin, M.Pd.
Prayogi Dwina Angga, S.Or., M.Pd.

CONTENS

COVER	1
PREFACE	2
SCIENTIFIC COMMITTEE	3
CONTENTS	4
MAIN SPEAKER	
THE SCIENTIZATION OF HIGH-PERFORMANCE SPORT: LOOKING FOR BALANCE BETWEEN TECHNOLOGICAL PROGRESS AND ETHICAL RESPONSIBILITY Dr. Bart Crum, The Netherlands	11
THE ROLE OF COMPUTER SCIENCE IN THE ADVANCEMENT OF HIGH PERFORMANCE SPORT Prof. Dr. Martin Lames, TU München, Germany	19
USE OF SPORT SCIENCE AND TECHNOLOGY IN THE PREPARATION OF TEAM USA ATHLETES Randall L. Wilber, PhD, FÁCSM, Senior Sport Physiologist, Athlete Performance Lab, United States Olympic Committee, Colorado Springs, Colorado, USA	23
THE EFFECT OF GROWTH AND MATURATION ON PERFORMANCE: MESSAGES FOR TALENT DEVELOPMENT Professor Gareth Stratton, Applied Sports Technology Exercise Medicine (A-STEM) Research Centre, Swansea University: UK	25
CHANGES IN SERUM CARTILAGE OLIGOMERIC MATRIX PROTEIN (COMP), PLASMA CPK AND PLASMA hs-CRP IN RELATION TO RUNNING DISTANCE IN A MARATHON (42.195 KM) AND AN ULTRA-MARATHON (200 KM) RACE Hyo Jeong Kim, Yoon Hee Lee, & Chang Keun Kim, Associate Professor, Director of Aging, Research Center, Korea National Sport University, South Korea	26
SPORT SCIENCES AND TECHNOLOGY: CHALLENGES AND OPPORTUNITIES IN IMPROVING SPORT PERFORMANCE IN INDONESIA Toho Cholik Mutohir, Professor, Faculty of Sport Sciences, State University of Surabaya, Indonesia	32
USING BIOMECHANICS TO IMPROVE PERFORMANCE Kevin Ball, Institute of Sport, Exercise and Active Living (ISEAL) Victoria University, Melbourne Australia	39
POTENTIAL EFFECTS OF MILD EXERCISE ON THE BRAIN AND COGNITIVE PERFORMANCE: TRANSLATIONAL RESEARCH FROM ANIMAL TO HUMAN Hideaki Soya, Ph.D., Chairman, Laboratory of Exercise Biochemistry & Neuroendocrinology University of Tsukuba Faculty of Health & Sport Sciences, Tsukuba, Japan	43
IMPACT OF THE TALENT DEVELOPMENT ENVIRONMENT ON HIGH PERFORMANCE ATHLETES IN CHINA Ma Xindong & Wu Dongyi: Division of Sport Science & Physical Education, Tsinghua University, Beijing & The School of Social Sciences of Tsinghua University, Beijing	51

SPORT PSYCHOLOGY CONSULTING FOR THAI NATIONAL TEAM: SUCCESS AND CHALLENGE Suebsai Boonveerabut PhD, Department of Sport Science, Faculty of Physical Education, Srinakharinwirot University, Thailand	56
AN ASSESSMENT ON VARIOUS DISCIPLINES AND TECHNOLOGY OF SPORT SCIENCE IN MALAYSIA Mohd Salleh Aman, PhD Sport Centre, University of Malaya	60
 ORAL PRESENTATION	
 Sport Biomechanic & Technology	
VIDEOTAPE FEEDBACK: A REWARDING TECHNIQUE TO IMPROVE KEDENG SPIKE IN SEPAKTAKRAW SPORT I Ketut Semarayasa & I Wayan Artanayasa, Ganesha University of Education, Indonesia	66
SOCCER GAME ANALYSIS WITH VISUAL BASIC PROGRAMMING Mohammad Faruk, State university of Surabaya, Indonesia	70
ELECTRIC POLE HIGH JUMP BASED ON ATMEGA16 MICROCONTROLLER USING DC MOTOR AND REMOTE SYSTEM TO SUPPORT SPORTS ACHIEVEMENT Nova Suparmanto, Widi Putra Guna, & Rizki Edi Juwanto, State University of Yogyakarta, Indonesia	74
A THREE-DIMENSIONAL ANALYSIS OF THE TENNIS SERVE Yadi Sunaryadi, Indonesia University of Education, Indonesia	80
 Sport Exercise & Health	
THE EFFECT OF SINGLE SESSION AEROBIC EXERCISE WITH ERGOCYCLE TO BGL IN PATIENTS WITH TYPE 2 DIABETES MELLITUS Korina Wulandari & Wara Kushartanti, State University of Yogyakarta, Indonesia	84
THE EFFECT OF YOGAROBIC ON RECOVERY HEART RATE AND MENOPAUSE SYMPTOMS IN PERIMENOPAUSAL WOMENS BM. Wara Kushartanti, State University of Yogyakarta, Indonesia	89
ACTN3 GENE: A CANDIDATE GENE FOR SPORT PERFORMANCE (STUDY CASE OF INDONESIAN COMBAT SPORTS ATHLETES) Rachmah Laksmi Ambardini, State University of Yogyakarta, Indonesia	94
CORRELATION BETWEEN PHYSICAL ACTIVITIES AND ALIVE AGE ESTIMATION MEMBER OF AEROBIC GYMNASICS STUDIOS IN SURABAYA Kunjung Ashadi, State University of Surabaya, Indonesia	99
THE IMPORTANCE OF VITAMIN D IN SPORTS Ni Luh Kadek Alit Arsani, Ganesha University of Education, Indonesia	105
THE ROLE OF VITAMIN C AND E AS ANTIOXIDANT IN EXERCISE Putu Adi Suputra & Made Suadnyani Pasek, Ganesha University Of Education, Indonesia	109
THE INFLUENCE OF SPORTSTART ON THE PERCEPTUAL MOTOR DEVELOPMENT OF EARLY AGE CHILDREN Dian Pujiyanto, Bengkulu University, Indonesia	115

ENERGY METABOLISM IN SPORTS I Nengah Sandi & Daniel Womsiwor, Udayana University, Indonesia	118
TRAINING METHODS TO INCREASE FOOTBALL PLAYER'S AGILITY (CASE STUDY IN SMK X DENPASAR) Daniel Womsiwor & I Nengah Sandi, Cenderawasih University, Indonesia	124
THE BALANCE TRAINING AND ANKLE SPRAINS IN BADMINTON PLAYERS (REVIEW) Sri Sumartiningih, State University of Semarang, Indonesia	130
PSYCHOMOTOR THERAPY IN RELATED TO PHYSIOTHERAPY IN SPORT FOR PEOPLE DISABILITIES: A COMPILATION OF VISITING STUDY Bambang Abduljabar, Indonesia University of Education, Indonesia	136
THE EFFECT OF SPEED AGILITY AND QUICKNESS (SAQ) AND PLYOMETRIC ON SPEED AND AGILITY OF MALE FOOTBALL ATHLETES IN TADULAKO UNIVERSITY Didik Purwanto, Tadulako University, Indonesia	141
Sport Psychology & Education	
MENTAL TOUGHNESS AND TEAMWORK ON WOMEN ATHLETES OF MARTIAL ART, GAMES, AND CONCENTRATION SPORTS (STUDY ON ATHLETES OF WEST JAVA NATIONAL OLYMPIC COMPETITION XIX REGIONAL TRAINING CENTRE) Nina Sutresna, Berliana, Ucup Yusup, Etor Suwardar, Suhana, Indonesia University of Education, Indonesia	147
THE EFFECTS OF PSYCHOLOGICAL ASPECTS TOWARDS INDIVIDUAL 100 METERS SPRINTER'S PERFORMANCE Miftakhul Jannah, State University of Surabaya, Indonesia	151
THE PRELIMINARY STUDY OF MENTAL IMAGERY FUNCTIONS IN BADMINTON BENGINNER ATHLETES Yusuf Hidayat & Sukadiyanto, Indonesia University of Education, Indonesia	156
THE IMPROVEMENT OF SELF-CONFIDENCE THROUGH THE IMAGERY TRAINING PROGRAM AMONG WUSHU ATHLETES IN CENTRAL JAVA Heny Setyawati, State University of Semarang, Indonesia	163
THE EFFECT PETTLEP IMAGERY ON ACCURACY RETURNING BADMINTON SERVICE Suwat Luangon, A. Siripatt, and S. Boonveerabut, Srinakharinwirot University, Thailand	167
STRUCTURE OF INTELLECTUAL ON BADMINTON SERVING IMAGERY ABILITY Nualtong Anuttarangoon, S. Boonveerabut, and A. Siripatt, Srinakharinwirot University, Thailand	171
LITERATURE REVIEW ABOUT IMAGERY ON PENCAK SILAT OF MATCH CATEGORY: A COMBINATION OF TWO THEORIES OF IMAGERY Kurniati Rahayuni, Malang State University, Indonesia	175
THE CONTRIBUTION OF PARENTING PATTERN AND SOCIAL ENDORSEMENT TOWARDS SWIMMING ATHLETES ACHIEVEMENT IN YOGYAKARTA SPECIAL DISTRICT Agus Supriyanto, State University of Yogyakarta, Indonesia	182
THE INFLUENCE OF INTEGRATED PSYCHOLOGICAL SKILL TRAINING IN ENHANCING SELF CONFIDENCE OF PPLP DKI JAKARTA TAEKWONDOIN Muhammad Syauqi Putra, University of Indonesia, Indonesia	186
ANXIETY CONTROL THROUGH THE ACTIVE MEDITATION IN HIKING PROGRAM Kardjono, Indonesia University of Education, Indonesia	190

MENTAL HEALTH BENEFITS OF PHYSICAL ACTIVITY AND SPORT PARTICIPATION Made Suadnyani Pasek, Putu Adi Suputra, Made Sri Dewi Lestari, Ganesha University of Education, Indonesia	193
IMAGERY EXERCISE IN GYMNASTICS MOTIVATION AND SELF CONFIDENCE Helmy Firmansyah, Indonesia University of Education, Indonesia	199
THE EFFECT OF PETTLEP IMAGERY ON BADMINTON SERVING ACCURACY Taviphop Peungsoonthonsirimas, A. Siripatt, and S. Boonveerabut, Srinakharinwirot University, Thailand	206
MANAGEMENT OF SPORT TOURISM AS A POTENTIAL FACTOR IN ORDER TO PREVENT SPIKE INCIDENCE OF HIV/AIDS IN BALI Made Kurnia Widiastuti, Putra Adnyana, Ni Putu Dewi Sri Wahyuni, Ganesha University of Education, Indonesia	211
Sport Sociology, Philosophy & Management	
STAGNATION OF SPORT SCIENCES IN THE HEGEMONY OF POSITIVISM PARADIGMS (A REFLECTIVE STUDY UPON THE DEVELOPMENT OF SPORT SCIENCES STUDENT ATTAINMENT IN FACULTY OF SPORT SCIENCES, YOGYAKARTA STATE UNIVERSITY) M. Hamid Anwar & Hari Amirullah Rachman, State University of Yogyakarta, Indonesia	217
LOCAL WISDOM AND SPORTS TOURISM SYNERGY TO IMPROVE AN ECONOMIC VALUE I Ketut Sudiana, Ganesha University of Education, Indonesia	222
ANALIZING GRAND STRATEGY OF THE 2014 – 2024 NATIONAL SPORT PERFORMANCE DEVELOPMENT Wawan S. Suherman, State University of Yogyakarta, Indonesia	226
ASSESSMENT PHYSICAL FITNESS FOR TENNIS PLAYER Ngatman Soewito, State University of Yogyakarta, Indonesia	233
Sport Talent & Assessment	
DEVELOPED LINEAR MODEL TO DETERMINE FITNESS CAPACITY IN SCREENING, COACHING AND TRAINING EVALUATION Bambang Purwanto, B. Pramono, Harliana Asnar E., Airlangga University, Indonesia	238
SPORT TALENT SEARCH IN SCHOOL (WAYS OF SEARCHING TALENTED ATHLETES) Hanik Liskustyawati & Sapta Kunta Purnama, Sebelas Maret University, Indonesia	243
PHYSICAL AND PSYCHOLOGICAL FACTOR AS POTENTIAL INDICATORS SPORT TALENT OF ROWING Nurkholis, State University of Surabaya, Indonesia	248
CONTENT VALIDITY OF FUTSAL SKILL TEST Agus Susworo Dwi Marhaendro, State University of Yogyakarta, Indonesia	256
ANALYSIS OF THE ABILITY WOMEN'S BASKETBALL PLAYERS IN LIMA BASKETBALL COMPETITION 2013-2014 USING FIBA LIVESTAT Budi Aryanto, State University of Yogyakarta, Indonesia	263
COMPARASION OF BODY COMPOSITION AND SOMATOTYPE CHARACTERISTICS OF SPRINTER ATHLETES AT AUE AND YSU Eddy Purnomo, Ria Lumintuarso, Norikatsu Kasuga, Hideki Suzuki, State University of Yogyakarta, Indonesia	268

FORMETRIC MEASUREMENT OF POSTURE AND SPINAL ALIGNMENT FOR SOUTH SULAWESI'S NATIONAL ATHLETES IN INDONESIA Muhammad Nadjib Bustan, Baharuddin Talib, Ians Aprilo, Khairil Anwar, State University of Makassar, Indonesia	274
ANTHROPOMETRIC, PHYSIOLOGICAL AND BIOMOTORIC PROFILES OF MALE JUNIOR SEPAK TAKRAW PLAYERS Nining Widyah Kusnanik, State University of Surabaya, Indonesia	278
EDUCABILITY STUDENT PROFILE MOTOR SKILLS EDUCATION HEALTH AND PHYSICAL RECREATION FACULTY OF SPORT AND HEALTH GANESHA EDUCATION UNIVERSITY I Wayan Artanayasa, Ganesha University of Education, Indonesia	282
DEVELOPING A MODEL OF EXERCISE FOR PERFORMANCE SPORTS QUALITY EVALUATIONS (EMLO) KONI NORTH SUMATRA PROVINCE Imran Akhmad, Suharjo, Rahma Dewi, State University of Medan, Indonesia	287
AUTHENTIC ASSESSMENT INSTRUMENT DEVELOPMENT FOR SKILL IN PHYSICAL EDUCATION, SPORT, AND HEALTH Hariadi, State University of Medan, Indonesia	294
FUNCTIONAL EVALUATION OF SHOULDER BASED ON CONSTANT SCORE ON PORDA JABAR BASEBALL TEAM Leonardo Lubis, Padjajaran University, Indonesia	301
POSTER PRESENTATION	
THE EFFECTIVENESS OF SIDE ARM THROW COMPARED WITH OVERHAND THROW IN SOFTBALL Fajar Awang Irawan, Semarang State University, Indonesia	307
CAPABILITY OF THE FUNCTIONAL MOVEMENT SCREEN IN PREDICTING INJURIES AMONG ATHLETES: A REVIEW Rex John G. Bawang, Benguet State University	311
THE EFFECT OF 2.5% GLUCOSE ADMINISTRATION TOWARD FUTSAL PLAYERS AEROBIC ENDURANCE IN TUNGGUL HITAM PADANG WEST SUMATERA Anton Komaini, State University of Padang, Indonesia	315
THE EFFECT OF PLYOMETRICS TRAINING TO ENHANCE LEG POWER FOR LAY UP PRACTISING (CASE STUDY IN BASKETBALL EXTRACURRICULAR SMP NEGERI 1 SINGOSARI) Fuad Noor Heza, State University of Malang, Indonesia	319
STRENGTH AND CONDITIONING FOR 110 METER HURDLES Robin Darwin B. Tuliao	324
EFFECTS OF DYNAMIC AND STATIC STRETCHING ON THE SUBSEQUENT PITCHING PERFORMANCE IN COLLEGIATE BASEBALL PLAYERS Theresa May B. Garin	328
SOLUTION-FOCUSED BRIEF COUNSELING (SFBC) FOR SPORT ACHIEVEMENT MOTIVATION IN SPORTS COACHING EDUCATION Siti Hajar, Tunas Pembangunan University, Indonesia	333
POA-BASED SNAKES AND LADDERS GAME: IMPROVING ELEMENTARY STUDENTS' MULTILATERAL ABILITY Margono, Yogyakarta State University, Indonesia	337

- THE EFFECTIVENESS OF FAIR PLAY REWARDS IN SPORTSMANSHIP, FAIR PLAY, AND CHARACTERS
IN U12 SOCCER GAME
Wachid Sugiharto, IKIP PGRI Palembang, Indonesia 343
- SOCIAL INTERACTION AMONG FOOTBALL PLAYER ETHNO-PHENOMENOLOGY APPROACH AT
PERSIBA BANTUL
Komarudin, State University of Yogyakarta, Indonesia 350
- RELATIONSHIP BETWEEN SPORT COMMITMENT AND ATHLETE BURNOUT AT RAGUNAN JUNIOR
HIGH SCHOOL STUDENT ATHLETE
Riwanto & Sri Fatmawati, University of Indonesia, Indonesia 357
- HEALTH PROMOTING AND EXERCISE BEHAVIORS OF PEOPLE WITH PHYSICAL DISABILITIES IN
THAILAND
Apanchanit Siripatt, D. Suksom., S. Taweepornpathomkui, S. Khongprasert, and K. Srihirun, Srinakharinwirot
University, Thailand 363
- THE EFFECT OF FEEDING WITH DIFFERENT GLYCEMIC INDEXES ON OXIDATIVE STRESS OF
COLLEGE ATHLETES
Wilda Welis, State University of Padang, Indonesia 364

ASSESSMENT PHYSICAL FITNESS FOR TENNIS PLAYERS

Ngatman Soewito
State University of Yogyakarta

ABSTRACT

Revolution of the game at this recently change quite rapidly. The changes are not just happen in terms of the pattern of the game alone, but the length of time the game is also included in it. In a tennis game, play duration can not be predicted in advance, therefore a tennis player should be able to prepare with good physical fitness. To monitor the level of physical fitness of tennis players accurately requires a reliable assessment instrument. Based on the problems then this article will present a description of the assessment that is used to assess the fitness level of tennis players.

The method used in this research is the study of the relevant literature, expert opinion of of tennis, and the measurement of physical conditioning expert, and on the basis of some research results so that it can be concluded that is a proper assessment can be used to assess the level of physical fitness of tennis players. Several series of assessments to measure the level of physical fitness of tennis players among which are: (1) screening for the condition of tennis players, (2). measurement of the posture of tennis players, (3). skeletal muscle system testing of tennis players, (4). administration of the questionnaire to the tennis players, 5). overall health testing, and (6). perform a series of batteries assessment of the components of physiological conditioning biomotor of tennis players. With the standardized assessment instrument is expected to provide knowledge and can be used as a guide for the tennis coaches to prepare the physical fitness condition of tennis players. Also his instrument will help the tennis coach to monitor the level of physical fitness the tennis players periodically.

Keywords: Assessment, Physical Fitness, Tennis.

INTRODUCTION

Along with the advancement of science and technology in the game of tennis, if observed, tennis trend is currently prioritizing the speed game and power game, with the level of accuracy that is so amazing. If at first a lot of tennis players play with baseliner pattern (Bjorn Borg, Chris Evert and Ivan Lendl) through the race of the consistency of the shot, the modern tennis era brought the game features that rely on speed and power games.

In a tennis game, the length of time a tennis player in a match can not be predicted in advance. In the match of the Australian Open 2013 Semi Final between Novak Djokovic opposed Stanislas Wawrinka lasted for 4 hours 53 minutes. Australian Open 2013 Final between Novak Djokovic and Andy Murray lasted 5 hours 57 minutes. From these facts can certainly be imagined how important the level of readiness, excellent physical endurance, for a tennis player. To have physically fit, of course, is a necessary program of physical exercise, which is programmed properly, in a period, which is long enough.

To monitor the level of physical fitness of tennis players, is needed an appropriate assessment instrument and reliable, so the coach can keep up with the level of physical fitness of tennis players periodically. Some assessment to measure the level of physical fitness of tennis players in the protocol has been designed and developed by some experts of physical conditioning. Through this article will describe some test instruments for conducting assessment of physical fitness for tennis players that can be used to see the level of the physical condition of a tennis player. With the instruments that can be used to measure the level of physical fitness of tennis players precise and reliable, it is expected to be very helpful in putting together an exercise program, modifying, and evaluating programs of physical fitness exercises tennis players appropriately.

The Nature of Tennis Games

Stroke technique in the game of tennis by Douglas (1992: 28-29) can basically be divided into three kinds, namely: groundstrokes (forehand & backhand groundstrokes groundstrokes), volley (forehand volley and backhand volley), and serve. The characteristics of the tennis game can be categorized in this type of open skill, because the success of blow influenced by environmental factors, such as; sunlight, wind direction, type of surface and the opponent playing field (Cayer, 1988: 26).

The Role of Physical Condition for Tennis Players

According Sukadiyanto (2002: 47) as good as any technical abilities possessed a tennis player, without the support of good physical fitness, the tennis player will have difficulty in the game. Despite the smaller size of a tennis court (when compared to the size of a football field), and by looking at the characteristics of the game of tennis, where the ball is moving very fast, the player must move quickly covering field to hit the ball with emphasis on accuracy (precision) and control the ball. In addition, tennis matches also take place in marathon, while the length of time a tennis match can not be predicted, then in addition to the level of technical mastery, mental rigidity, the demands of the physical condition of readiness, is in the top priority.

According to Miguel Crespo et al. (1998: 146) the benefits that can be obtained, if the physical condition of the tennis players, are good, among which are: (1) The ability of the circulatory system and heart work better; (2) Can improve the performance of tennis players; (3) Delaying fatigue and can make a quick recovery after a workout or game; (4) Reduce the risk of injury; (5) Strength, speed, endurance, flexibility, and the ability of other biomotor be increased; (6) Motion is shown to be economical; (7) Recovery of body organs becomes faster after exercise; (8) Psychologically, the tennis player who has good physical qualities will be more confident and better prepared to face the challenges of training and game situations.

Assessment Physical Fitness Test for Tennis Players

To monitor and evaluate the development of the physical condition of a tennis player periodically required a precise and accurate assessment to see how far the condition of the physical fitness of tennis players. According Djemari Mardapi (2008: 1) assessment are all methods used to assess individual performance can be done through testing or through observation. With these instruments, it is expected that every tennis player or coach can monitor the progress of the physical condition of the tennis players from time to time.

According Machar Reid et al., (2003: 18-47) a coach must consider several steps that must be done if he wants to make an assessment to measure the level of physical fitness of tennis players. Before starting the stages of assessment, of course, a coach determines the destination (goal) that should be considered and reflected in the development of physical fitness level tennis players, such as the expected target by tennis players, so that they can prepare any of the process, with ripe, when of the expected peak performance can be achieved, and others.

The stages of assessment to determine the level of physical fitness of tennis players are as follows:

- a) Conducting Screening (inspection / checking). Screening or examination consisted of medical screening and musculo skeletal screening. Medical screening is a thorough examination of the condition as well as to detect possible health risks of bodily injury of tennis players. While screening a musculo skeletal examination system which serves to examine skeletal muscle (musculo skeletal) tennis players to consider the posture / height, flexibility, strength, and balance.
- b) Medical screening is a process that is very helpful to identify the parts of the body which allows the injured both in training and matches. Thus will provide sufficient knowledge to coaches and tennis players to prevent the injuries. Stages of medical screening will help to identify factors that may hinder performance tennis players.

- c) Measuring the posture of tennis players. Measurement of height and weight tennis players, to see their anatomical shape. Armed with the knowledge of the anatomical shape of a tennis player, it is expected to be taken into consideration in preparing the training program to the tendency of the risk of injury if physical exercise program given.
- d) Tests on the skeletal muscle system. Skeletal muscle testing is intended to see how far the posture, flexibility, strength, and stability tennis players can be observed. The parts of testing of the musculoskeletal system are generally done in the area: trunk / spine, shoulder girdle, elbow and forearm, wrist and hand, pelvic girdle, hip and thigh, knee and shank, ankle and foot.
- e) Giving questionnaire to tennis players. Administration of the questionnaire is intended to explore the data as complete as possible on the background of a tennis player, and tennis players families that will not be found in the assessment the carried out in field. In general, the questionnaire contains several questions related to health conditions, family medical history, injury history has ever experienced, and the nutrition.
- f) The medical examination of tennis players, which consists of: ear, nose, throat, skin, heart, chest, lungs, stomach, nerves, joints, and others.
- g) Testing the components of physical fitness of tennis players

Batteries Physiological Assessment of Tennis Players

Various components and types of physical fitness assessment specifically for tennis players have been designed by experts in the tennis physical conditioning. Of various physical fitness assessment draft sequence the tennis player, the following table is presented biomotor components, and the types of tests that can be used to make an assessment of the physical fitness of tennis players.

Table 1. Series of batteries Tes Physiological Assessment of tennis players

The Component of Physical Fitness	Field Test	Laboratory Test
<i>Anthropometrics Test</i>	<ol style="list-style-type: none"> 1. Height test 2. Weight test 	Beside measure the height and weight, it's also test the thickness of fat in the body use skinfold caliper in 7 areas and triceps, biceps, subscapular, supraspinatus, mid-abdominal, front thigh dan medial calf
<i>Flexibility Test</i>	All the flexibility test that use in musculoscreening. Item of flexibility test in musculo screening scheletal such as: trunk/spine, shoulder girdle, elbow and forearm, wrist and hand, pelvic girdle, hip and thigh, knee and shank, dan ankle and foot.	All the flexibility test that use in musculo screening. some flexibility test that used in screening musculo scheletal such as: trunk/spine, shoulder girdle, elbow and forearm, wrist and hand, pelvic girdle, hip and thigh, knee and shank, dan ankle and foot
<i>Aerobic Endurance Test</i>	The tennis player aerobic endurance test can be measured by using those item test below: <ol style="list-style-type: none"> 1. Multistage Fitness Test. 2. Aerobic Cooper. 3. 1½ Mile Run 	The laboratory test that used to aerobic endurance test: VO2 Max Test, like: staged track test, use treadmill or use ergocycle
<i>Anaerobic Endurance Test</i>	The instrumen to measure endurance of anaerobik can use Tennis Specific Agility Endurance Test, like: <ol style="list-style-type: none"> 1. Planned agility test. 2. Spider drill. 	The instrumen to measure endurance of anaerobik can use Tennis Specific Agility Endurance Test, like: <ol style="list-style-type: none"> 1. Planned agility test. 2. Spider drill. 3. Killer Line Sprint (Ann Quinn)

The Component of Physical Fitness	Field Test	Laboratory Test
	3. Killier Line Sprint (Ann Quinn)	
Strength Test	<i>The Item test that used to measure strength such as:</i> 1. <i>The Push-Up Test.</i> 2. <i>Grip Strength Test</i> 3. <i>Maximum Bodyweight Dips.</i> 4. <i>Maximum Bodyweight Chin-ups</i>	
Upper Body Power Test	Some instrument that can be used to measure upper power body such as: 1. Overhead Medicine Ball Throw Test. 2. Sidearm Medicine Ball Throw Test (right and left hand)	the instrument to measure upper power body in laboratory such as: 1. Service (ball) Speed. 2. Raquet Velocity
Lower Body Power Test	Some instrument that can be used to measure lower power body such as: 1. Vertical Jump Both Leg. 2. Vertical Jump Right Leg. 3. Vertical Jump Left Leg. 4. Vertical Jump With Three Step Run-Up. 5. Standing Long Jump/Hop.	Generally, instrument to measures upper power body in laboratory is Elastic Potential (derived from force plat form data)
Speed test	Instrument that usually used for measure the player speed such as: 1. Fast running 20 meters 2. Fast running 10 meters 3. Fast running 5 meters	Test instrument laboratory that used to measure the player speed is fast running 5 meters or fast running 10 meters with electronic timing gates
Agility and Coordination Test	Test item that usually used for measure the agility and coordination player such as: 1. Movement to the forehand side 2. Movement to the backhand side 3. Backward movement test 4. Pannet agility test 5. The hexagon test 6. Sprint 20 yards 7. Spider drill	Laboratory test that usually used for measure the agility and coordination such as: 1. Movement to the forehand side 2. Movement to the backhand sid 3. Backward movement test 4. Pannet agility test (use electronic timing gates)

(Source: Reid , Machar: Quinn ,Ann: Crespo, Miguel, 2003: 29 - 46).

CONCLUSION

The level of success of a tennis player can be affected by several factors, one of these factors is the physical condition of fitness when playing. Trend of the modern game of tennis currently, relying on speed and power game along with the level of accuracy of the shot, which is so high. With the trend of the game, of course, excellent physical condition is necessary for a tennis player. The length of time a tennis player in a match can not be predicted in advance, so that the physical condition of the preparation program absolutely must be done correctly and programmed.

Preparation of appropriate training programs, and monitoring the progress of the physical condition of the exercise program for tennis players gradually, must be done carefully. Therefore we need a proper assessment to assess the level of ability, and physical condition of tennis players progress periodically, on the basis of the components biomotor are expected to possess by a tennis player. The assessment instrument that can be used to measure the level of physical fitness of tennis players consists of: screening for the condition of tennis players, measuring the posture of tennis players, musculoskeletal system testing of tennis players, giving questionnaires to tennis players, testing overall health, as well as perform assessment batteries to the test circuit components of biomotor.

REFERENCES

- Cayer, Louis. (1988). *Mini Tennis/Novice Tennis Instructor*. Canada: National Coaching Certification System.
- Crespo, Miguel; Miley, Dave. (1998). *Advanced Coaches Manual*. Bank Lane, Roehampton, London: International Tennis Federation.
- Djemari Mardapi. (2008). *Teknik Penyusunan Instrumen Tes & Nontes*. Mitra Cendekia Press: Yogyakarta.
- Douglas, Paul. (1992). *The Handbook of Tennis*, England: Pelham Books.
- Reid, Machar; Quinn, Ann; Crespo, Miguel. (2003). *Strength and Conditioning for Tennis*. Bank Lane, Roehampton, London: International Tennis Federation.
- Sukadiyanto. (2002). *Teori dan Metodologi Melatih Fisik Pemain tenis*. Yogyakarta: Fakultas Ilmu Keolahragaan, Universitas Negeri Yogyakarta.

