



# PROCEEDINGS

## THE 1<sup>ST</sup> YOGYAKARTA INTERNATIONAL SEMINAR ON HEALTH, PHYSICAL EDUCATION, AND SPORTS SCIENCE.

*Evidence-Based Practice of Sports Science in Education, Performance, and Health.*

October 14<sup>th</sup>, 2017. Eastparc Yogyakarta, Indonesia



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**For Further Information:**

Universitas Negeri Yogyakarta, Indonesia  
 Phone : +62274 550826 (PR Office)  
 Mobile : +62857 2932 3727 (Mr. Satya)  
 +62815 7802 0803 (Mrs. Cerika)  
 Email : yishpess@uny.ac.id  
 Website : yishpess.uny.ac.id



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# YISHPESS PROCEEDINGS

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#### Secretariat:

Universitas Negeri Yogyakarta, Indonesia  
Phone : +62274 550826 (PR Office)  
Mobile : +62857 2932 3727 (Mr. Satya)  
          +62815 7802 0803 (Mrs. Cerika)  
Email : yishpess@uny.ac.id  
Website : yishpess.uny.ac.id



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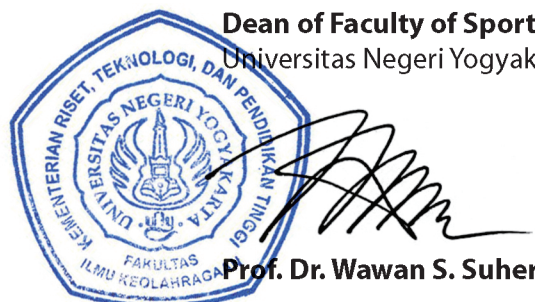
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**October 14<sup>th</sup>, 2017**

## **OPENING SPEECH**

As the Dean of Faculty of Sport Sciences Universitas Negeri Yogyakarta, I would like to welcome and congratulate to all speakers and participants of the First Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) 2017 entitled "Evidence-Based Practice of Sport Science in Education, Performance, and Health".

This international seminar is actually an implementation in the framework of the assessment of the achievements and sports culture in society that can support the achievements of the Indonesian people, so that there will be a significant role of practitioners, academicians, sport people, and sports observers from Universities, Institutions and Sports Organizations to help actively facilitate in the development, assessment of innovative sports science development so as to achieve sport achievements at the National and International level.

Finally, we thank all the committee of YISHPESS for their hard work in organizing this activity, and congratulate the invited speakers and all participants. Hopefully, this seminar is significant for the development of physical education, health, and sports sciences.

**Dean of Faculty of Sport Sciences,**  
Universitas Negeri Yogyakarta  
**Prof. Dr. Wawan S. Suherman, M.Ed.**


## **PREFACE**

*Alhamdulillahirobilalamin*, thank Allah the First Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) has been prepared well and on time. With all humility, we welcome and congratulate the speakers and participants of Yogyakarta International Seminar on Health, Physical Education, and Sport Science (YISHPESS) organized by the Faculty of Sport Sciences, Universitas Negeri Yogyakarta.

The YISHPESS 2017 is designed to updating and applying evidence-based practice in sports science aspects, including: education, performance and health. We hope that the invited speakers of this seminar can reduce the gaps between academic and field to get best output in the daily sport and health practices.

We would like to thank to Rector and the board of Universitas Negeri Yogyakarta for supporting this seminar come true. Praise and be grateful to the Lord, so that this proceeding can be issued. Hopefully, the publication of this proceeding can bring benefits to the participants in particular and readers in general.

Yogyakarta, October 14<sup>th</sup>, 2017  
Chairperson of the Committee



**Dr. Or. Mansur, M.S.**

## CONTENT

**Preface**

**Content**

**Keynote Speaker**

- |   |     |
|---|-----|
| <b>1.THE STRUGGLE OF JERRY LOLOWANG: A CASE STUDY OF CANCER SURVIVOR IN ACHIEVING</b>   | 76  |
| Author: M. Erika Rachman<br>Universitas Sebelas Maret   |     |
| <b>2.PHYSIOLOGICAL PROFILE OF MEMBERS HATHA YOGA EXERCISE</b>   | 83  |
| Author: Galih Yoga Santiko<br>Universitas Negeri Yogyakarta   |     |
| <b>3.THE EFFECT OF INTERACTIVE VIDEO IN TEACHING VOLLEY BALL THROUGH BASIC PASSING TECHNIQUE</b>                                      | 91  |
| Author: Rekha Ratri Julianti<br>Universitas Singaperbangsa Karawang   |     |
| <b>4.THE EFFECT OF DOMINANT PHYSICAL COMPONENTS, AND SELF-BASKET PLEEMBAN ATLET PALEMBANG TOWN SUCCESS FREE THROW</b>                 | 98  |
| Author: Bayu Hardiyono<br>Universitas Binadarma   |     |
| <b>5. DIFFERENCES IN FUTSAL SKILL BETWEEN CLUB AND HIGH SCHOOL PLAYERS</b>  | 105 |
| Author: Agus Susworo Dwi Marhaendro<br>Universitas Negeri Yogyakarta  |     |
| <b>6. DEVELOPMENT OF INTEGRATED PHYSICAL EDUCATION LEARNING MODEL</b>   | 111 |
| Author: Sri Winarni<br>Universitas Negeri Yogyakarta  |     |
| <b>7.THE EFFECT OF BLOCK PRACTICE, SERIAL PRACTICE AND RANDOM PRACTICE TO IMPROVE BASKETBALL FUNDAMENTAL SKILL FOR BEGINNER</b>       | 123 |
| Author: Riyan Pratama<br>Universitas Bina Darma   |     |
| <b>8.THE DIFFERENCES OF INTRUCTIONAL MEDIA AND COORDINATION IN LEARNING OUTCOMES OF GROUNDSTROKES TENNIS ON NOVICE LEVEL ATHLETES</b> | 131 |
| Author: Dian Pujiyanto<br>Universitas Bengkulu  |     |
| <b>9. ANDROID BASED REFERENCE MODEL OF STUDENT'S SKILL COACHING</b>   | 139 |
| Author: Endang Rini Sukamti<br>Universitas Negeri Yogyakarta  |     |

<b>10. TEACHING BADMINTON SMASH BY USING TEAM GAME TOURNAMENT (TGT) MODEL IN SMP MUHAMMADYAH KARAWANG</b>	145
Author: Didik Fauzi Dermawan Universities Singaperbangsa Karawang	
<b>11. EFFECT OF INTENSIVE AND EXTENSIVE INTERVAL METHODS AGAINST ENHANCED SPEED ENDURANCE SPRINT 400 METERS</b>	153
Author: Fajar Adi Nugroho Universitas Pendidikan Indonesia	
<b>12. THE ATTEMPT OF IMPROVING POWERFUL KICK IN SOCCER USING WEIGHT TRAINING</b>	161
Author: Yanuar Dhuma Ardhiyanto Universitas Negeri Yogyakarta	
<b>13. IMPROVING STUDENTS LEARNING ACHIEVEMENT IN RUNNING BASIC LOCOMOTION MOVEMENT THROUGH GAME AT FIFTH GRADE STUDENT OF SD NEGERI 1 SURAKARTA IN THE ACADEMIC YEAR 2013/2014</b>	167
Author: Luli Pitakasari Arnenda Universitas Sebelas Maret Surakarta	
<b>14. THE INFLUENCE OF EXERCISE ON HOW TO THROW SOFTBALL BY USING THE TARGET TOWARDS THE ACCURACY OF THROWING SOFTBALL IN BUFFALOES UNS ATHELETE IN 2012</b>	174
Author: Kristanto Adi Nugroho Universitas Sebelas Maret Surakarta	
<b>15. MANAGEMENT OF DEVELOPING SWIMMING ACHIEVEMENT IN NPC (NATIONAL PARALYMPIC COMMITTEE) OF INDONESIA</b>	181
Author: Nonik Rahmawati Universitas Sebelas Maret Surakarta	
<b>16. CORRELATION OF BODY MASS INDEX AND CARDIORESPIRATORY FITNESS TO THE RISK OF METABOLIC SYNDROME IN ADOLESCENTS</b>	189
Author: Abdullah Al-Hazmy Universitas Sebelas Maret Surakarta	
<b>17. SOLO LAST FRIDAY RIDE AS A SPORT COMMUNITY IN SOLO</b>	190
Author: Rianto Ardi Nugroho Universitas Sebelas Maret Surakarta	
<b>18. DEVELOPING SNAKE LEADERS GAME FOR LEARNING MEDIA OF PHYSICAL EDUCATION SPORT AND HEALTH TO FOURTH GRADE STUDENTS OF MADANI ELEMENTARY SCHOOL IN PALU CITY</b>	195
Author: Marhadi Universitas Tadulako	

<b>19. THE EFFECT OF PLYOMETRICS TRAINING AND ACHIEVEMENT MOTIVATION TOWARDS LEG MUSCLE EXPLOSIVE POWER OF VOLLEYBALL ATHLETES IN UNIVERSITAS NEGERI PADANG</b>	205
Author: Muhamad Sazeli Rifki Universitas Negeri Padang	
<b>20. THE PSYCHOLOGICAL CHARACTERISTICS OF INDONESIAN SEA GAMES ATHLETES IN 2017 VIEWED FROM SPORT MARTIAL ARTS AND ACCURACY</b>	210
Author: Bintara Universitas Negeri Yogyakarta	
<b>21. EXPECTATION APPRECIATION AND PUBLIC PERCEPTION TO THE PHENOMENON OF STREETWORKOUT COMMUNITY</b>	216
Author: Hari Hanggoro Universitas Sebelas Maret	
<b>22. DEVELOPING OF TRADITIONAL GAMES AS NATION CULTURE THROUGH IN PHYSICAL EDUCATION LEARNING FOR ELEMENTARY SCHOOL STUDENTS</b>	221
Author: Asriansyah Universitas PGRI Palembang	
<b>23. CONTRIBUTION OF FLEXIBILITY, STRENGTH, AND BALANCE ON THE CARTWHEEL OF PKO STUDENTS CLASS 2016</b>	229
Author: Ratna Budiarti Universitas Negeri Yogyakarta	
<b>24. EFFECT SHORT-TERM AQUAROBIC EXERCISE ON DHEA-S LEVELS IN WOMEN</b>	239
Author: Siti Baitul Mukarromah Universitas Negeri Semarang,	
<b>25. PREDICTION OF THE INCIDENCE RATE OF CARDIOVASCULAR DISEASE FOR THE EMPLOYEES AND LECTURERS OF YOGYAKARTA STATE UNIVERSITY BASED ON THE POST-EXERCISE RECOVERY HEART RATE</b>	240
Author: Cerika Rismayanthi Universitas Negeri Yogyakarta	
<b>26. EFFECTIVENESS OF UMAC-CPF EXERCISE MODEL ON MOTOR ABILITY OF INDONESIAN CP FOOTBALL PLAYERS</b>	247
Author: Fadilah Umar Universitas Sebelas Maret	
<b>27. DEVELOPMENT OF WEB-BASED TRACER STUDY AT THE DEPARTMENT OF SPORTS COACHING EDUCATION</b>	256
Author: Subagyo Irianto Universitas Negeri Yogyakarta	



<b>28. MOUNTAINEERING ACTIVITIES OF MERBABU AS SPORTS RECREATION SOCIETY (PHENOMENOLOGY STUDY ABOUT SOCIETY CONDUCTING ACTIVITIES OF MOUNTAINEERING IN THE MOUNT MERBABU NATIONAL PARK)</b>	261
Author: Faisal Adam Rahman Universitas Sebelas Maret	
<b>29. INCREASE VO<sub>2</sub>MAX BADMINTON ATHLETES USE EXERCISES FOOTWORK WITH METHOD HIIT (HIGH INTENSITY INTERVAL TRAINING)</b>	265
Author: Donie Universitas Negeri Padang	
<b>30. THE EFFECT OF EXERCISE MODEL BASED ON INTERACTIVE MULTIMEDIA TO SEPAKTAKRAW SKILLS</b>	270
Author: Didik Purwanto Universitas Tadulako	
<b>31. SOCCER TRAINING MODEL IN YOUTH ATHLETE BASED ON THE LONG-TERM ATHLETE DEVELOPMENT (LTAD)</b>	275
Author: Komarudin Universitas Negeri Yogyakarta	
<b>32. LEARNING RESULTS IMPROVEMENT OF FOREARM PASSING RESULTS OF VOLLEY BALL GAME THROUGH DRILL METHODS ON STUDENTS XI.IPS.1 IN PUBLIC SENIOR HIGH SCHOOL I TELAGASARI KARAWANG</b>	280
Author: Akhmad Dimyati UNSIKA	
<b>33. PHYSICAL EDUCATION AND SPORT IN SCHOOLS: APPLICATION SOCCER LIKE GAMES</b>	292
Author: Mochamad Ridwan Universitas Negeri Surabaya	
<b>34. THE DIFFERENCES OF PHYSICAL FITNESS LEVELS BETWEEN POOR AND EXCESSIVE NUTRITIONAL STATUS</b>	297
Author: Sepriadi Universitas Negeri Padang	
<b>35. THE STUDY OF KNOWLEDGE ABOUT FIRST AID (P3K) AND BASIC LIFE SUPPORT PRINCIPLES IN YOGYAKARTA COMMUNITY</b>	305
Author: Eka Novita Indra Universitas Negeri Yogyakarta	
<b>36. THE INFLUENCE OF TEACHING STYLE AND MOTOR ABILITY ON THE BOTTOM PASSING LEARNING OUTCOMES IN THE VOLLEYBALL</b>	314
Author: Ahmad Muchlisin Natas Pasaribu Universitas Muhammadiyah Tangerang	

<b>37. EFFECTIVENESS OF SHOOTING TRAINING MODEL FEBI FUTSAL GAMES ON THE IMPROVEMENT OF SHOOTING RESULT ON FUTSAL SPORTS FOR BEGIN PLAYER</b>	321
Author: Febi Kurniawan Universitas Singaperbangsa	
<b>38. DIFFERENCES OF LEARNING ACHIEVEMENTS INTERGRADE AND GENERAL CLASS SPORT CLASS BASED ON LEVEL EDUCATION OF PARENTS IN CLASS VII SMP N 4 PURBALINGGA</b>	327
Author: Audi Akid Hibatulloh Universitas Negeri Yogyakarta	
<b>39. LEARNING MODELS OF PHYSICAL ACTIVITY BASED ON MOTOR PERCEPTION KINDERGARTEN STUDENT</b>	334
Author: B.Suhartini Universitas Negeri Yogyakarta	
<b>40. DESIGN OF MEASURABLE SPORTS CLUB IN ELEMENTARY SCHOOL IN BALI PROVINCE</b>	341
Author: Suratmin Universitas Pendidikan Ganesha	
<b>41. ANALYSIS OF PHYSICAL CONDITION OF SOCCER ATHLETE'S PORDA OF BEKASI CITY</b>	348
Author: Apta Mylsidayu Universitas Islam 45 Bekasi	
<b>42. HEALTH AND HEALTHY LIFESTYLE ENHANCEMENT THROUGH SPORT AND PHYSICAL EDUCATION CREATIVE APPROACH</b>	356
Author: Wing Prasetya Kurniawan Universitas Nusantara PGRI Kediri	
<b>43. THE EFFECTS OF PHYSICAL EXERCISE THROUGH GAME-MODEL AND CIRCUIT-MODEL EXERCISES APPROACH ON THE MAXIMUM AEROBIC CAPACITY</b>	367
Author: Umar Universitas Negeri Padang	
<b>44. DIFFERENCES INFLUENCE OF INTERVAL DRILL EXERCISE BETWEEN ACTIVE AND PASSIVE ON SKILLS OF ATHLETE AT THE AGE OF CHILDREN</b>	377
Author: Hariyuda Anggriawan Universitas Sebelas Maret	
<b>45. EXERCISE FOR CHILDREN WITH AUTISM SPECTRUM DISORDERS</b>	383
Author: Anita Suryani Universitas Indonesia	

<b>46. THE EFFECT OF KICKING SPEED, STRENGTH AND LEG MUSCLE EXPLOSIVE POWER ON THE ABILITY OF DOLLYO CHAGI OF TAEKWONDO DOJANG ATHLETE</b>	390
Author: Nurul Ihsan Universitas Negeri Padang	
<b>47. CORRELATION BETWEEN PROTEIN INTAKE WITH MUSCLE STRENGTH OF ATHLETES</b>	398
Author: Wilda Welis Universitas Negeri Padang	
<b>48. DEVELOPMENT OF MONITORING BOOKS FOR SWIMMING</b>	404
Author: Nur Indah Pangastuti Universitas Negeri Yogyakarta	
<b>49. THE DIFFERENCE IN THE EFFECTS OF BIRTH TYPES ON THE MOTOR SKILLS OF CHILDREN AT AN EARLY AGE</b>	411
Author: Pangung Sutapa Universitas Negeri Yogyakarta	
<b>50. THE EFFECT OF SUPPLEMENT SOYBEAN MILK AND WHEY PROTEIN IN LOAD EXERCISESTOWARD THE INCREASING HYPERTROPHY OF THIGH MUSCLES</b>	417
Author: Khairuddin Universitas Negeri Padang	
<b>51. PHYSICAL ACTIVITY OF CHILDREN IN DIENG PLATEAU BANJARNEGARA REGENCY (PHENOMENOLOGICAL STUDIES FROM THE VIEWPOINT OF SPORTS VALUES)</b>	424
Author: Dody Tri Iwandana Universitas Sebelas Maret	
<b>52. PICTURE MEDIA DEVELOPMENT FOR PENCAK SILAT LEARNING IN HIGH SCHOOLS</b>	427
Author: Nur Rohmah M., M.Pd Universitas Negeri Yogyakarta	
<b>53. THE EFFECT OF IMAGERY ON BEGINNER TENNIS PLAYERS' FOREHAND DRIVE SKILL</b>	436
Author: Risti Nurfadhila Universitas Negeri Yogyakarta	

<b>54. THE EFFECT OF HONEY SUPPLEMENTATION BEFORE PHYSICAL ACTIVITY TOWARDS THE PLASMA MALONDIALDEHYDE LEVEL IN MALE WISTAR RATS (<i>RATTUS NORVEGICUS</i>)</b>	443
Author: Krisnanda DA Universitas Negeri Yogyakarta	
<b>55. THE LEARNING RESULT OF FOOTBALL BASIC TECHNIQUE SKILL</b>	451
Author: Arsil Universitas Negeri Padang	
<b>56. BREAKING THE CHAIN OF “KLITIH” THROUGH CHARACTER EDUCATION IN PHYSICAL EDUCATION</b>	458
Author: Pasca Tri Kaloka Universitas Negeri Yogyakarta	
<b>57. PHYSICAL EDUCATION LEARNING THROUGH TRADITIONAL GAMES TO IMPROVE COOPERATION AND RESPONSIBILITY AT ELEMENTARY SCHOOL</b>	466
Author: Ranintya Meikahani Universitas Negeri Yogyakarta	
<b>58. MODEL DEVELOPMENT BASIC DRIBLING FOOTBALL-BASED TRAINING TECHNIQUES FOR BEGINNING ATHLETES AGED 8-12 YEARS</b>	474
Author: Ahmad Atiq Universitas Tanjungpura Pontianak	
<b>59. THE MODEL OF GAMES TO DEVELOP FUNDAMENTAL MOVEMENT OF KINDERGARTEN STUDENTS</b>	481
Author: Uray Gustian Universitas Tanjungpura	
<b>60. DEVELOPMENT OF MEDIA-BASED TRAINING 3GS (TRIPLE GAME SET); MONOPOLY, SNAKES LADDERS AND FENCING PUZZLE FOR CHARACTER EDUCATION EFFORTS IN BEGINNER ATHLETES</b>	489
Author: Faidillah Kurniawan Universitas Negeri Yogyakarta	
<b>61. STUDENTS'S PERCEPTION TOWARDS INTEGRATED LEARNING METHOD USING VIRTUAL MICROSCOPE IN HISTOLOGY COURSE</b>	498
Author: RL Ambardini Universitas Negeri Yogyakarta	

<b>62. THE DEVELOPMENT OF TOPURAK (TOTOK-PUKUL-GERAK) MANIPULATION MODEL FOR KNEE JOINT REPOSITION</b>	504
Author: BM. Wara Kushartanti Universitas Negeri Yogyakarta	
<b>63. THE EFFECTIVENESS OF TRAINING GUIDED IMAGERY IN LOWERING ANXIETY ON ATHLETES</b>	511
Author: Donie Universitas Negeri Padang	
<b>64. EFFECT OF FRESH COW MILK AND PASTEURIZATION MILK TOWARD GLUCOSE IN SOCCER PLAYERS ACCOMPANIED BY PHYSICAL ACTIVITY.</b>	517
Author: Rini Syafriani Institut Teknologi Bandung	
<b>65. THE CONTRIBUTION OF LEG MUSCLE STRENGTH AND DYNAMIC BALANCE TOWARDS THE ABILITY OF DOLLYO CHAGI KICK</b>	524
Author: Yogi Setiawan Universitas Negeri Padang	
<b>66. LAY UP SHOOT SKILL OF FIK UNP STUDENTS (EXPERIMENTAL STUDY OF TEACHING METHOD AND LEARNING MOTIVATION TOWARD LAY UP SHOOT SKILL OF FIK UNP STUDENTS)</b>	529
Author: Hendri Neldi Universitas Negeri Padang	
<b>67. THE EFFECT OF PRACTICE AND GAME LEARNING APPROACH ON THE CHEST PASS LEARNING ACHIEVEMENT ON EXTRACURRICULAR BASKET BALL PLAYING</b>	536
Author: Puthut Endiarto Universitas Sebelas Maret	
<b>68. THE INFLUENCE OF CIRCUIT TRAINING METHOD ON THE ENHANCEMENT OF PHYSICAL FITNESS OF SPORTS EDUCATION DEPARTMENT STUDENTS</b>	541
Author: Sefri Hardiansyah Universitas Negeri Padang	
<b>69. EFFECT OF PHYSICAL ACTIVITY ON OXIDATIVE STRESS: A REVIEW OF IMPACT AND IMPLICATION AFTER TRAINING</b>	548
Author: Wildan Alfia Nugroho Universitas Sebelas Maret	
<b>70. SPORT DEVELOPMENT INDEX IN SEVERAL CITIES/REGENCIES IN JAVA ISLAND : A REVIEW OF BENEFITS AND OUTCOME</b>	554
Author: Boy Sembaba Tarigan Universitas Sebelas Maret	

<b>71. THE EFFECT OF MANIPULATION TRAINING COMPLEX TO MAXIMUM STRENGTH</b>	559
Author: Mansur Universitas Negeri Yogyakarta	
<b>72. MANAGEMENT OF FACILITIES SPECIAL CLASS OF SPORT (KKO) IN SMA NEGERI 4 YOGYAKARTA</b>	569
Author: Tri Ani Hastuti Universitas Negeri Yogyakarta	
<b>73. DEVELOPMENT OF LEARNING ATHLETIC LEARNING MODELS RELEASE DIRECTLY BASED GAMES IN ELEMENTARY SCHOOL</b>	578
Author: Hartati Universitas Sriwijaya	
<b>74. THE EFFECT OF COOPERATIVE LEARNING MODEL OF TEAM GAMES TOURNAMENT ON LAY UP SHOOT TOWARDS THE LEARNING OUTCOMES (EXPERIMENTAL STUDY) ON BASKETBALL SMP NEGERI KARAWANG</b>	586
Author: Rahmat Iqbal Universitas Singaperbangsa Karawang	
<b>75. THE EFFECTS OF PRACTICE METHOD AND ACHIEVEMENT MOTIVATION ON MAXIMUM VOLUME OXYGEN OF FOOTBALL PLAYERS</b>	594
Author: Didin Tohidin Universitas Negeri Padang	
<b>76. THE EFFECT OF PROTEIN SUPPLEMENT ON MAXIMUM STRENGTH TOWARD THE MEMBERS OF ONE GYM FITNESS CENTER PADANG</b>	600
Author: Adnan Fardi Universitas Negeri Padang	
<b>77. THE EFFECT OF PACITAN SWEET ORANGE JUICE TO MALONDIALDEHYDE LEVEL (MDA) AFTER ECCENTRIC ACTIVITY</b>	606
Author: Indra H.S Universitas Negeri Surabaya	
<b>78. COMMUNITY INTERESTS FOLLOWING TRADITIONAL SPORT ACTIVITIES IN CAR FREE DAY ACTIVITIES</b>	611
Author: Mia Kusumawati Universitas Islam "45" Bekasi	
<b>79. THE EFFECT OF TWO ACTIVE RECOVERIES IN REDUCING LACTIC ACID OF BADMINTON ATHLETES</b>	617
Author: Ainur Rasyid PGRI Sumenep	
<b>80. THE EFFECT OF AEROBIC DANCE AND CYCLING ON THE PSYCHOLOGICAL WELL-BEING OF TEENAGERS</b>	623
Author: Rizki Kurniati Universitas Pembinaan Masyarakat Medan	

- 81. SURVEY OF THE LEISURE TIME ACTIVITIES OF THE STUDENTS OF FACULTY OF SPORTS SCIENCE, UNIVERSITAS NEGERI YOGYAKARTA** 632  
Author: Dapan  
Universitas Negeri Yogyakarta
- 82. ANTROPOMETRY AND PHYSICAL FITNESS FACTORS DETERMINANT DRIBBLING AND PASSING FUTSAL ABILITY OF STUDENT EXTRACURRICULAR AGED 12-15 YEARS** 637  
Author: Nizamuddin Nur Ramadaniawan  
Universitas Sebelas Maret
- 83. MULTI STATION REBOUNDER TOOL DEVELOPMENT AS A GUIDE FOR TRAINING INSTRUMENT BASED ON INDEPENDENT FOOTBALL** 643  
Author: Santoso Nurhadi  
Universitas Negeri Yogyakarta
- 84. DEVELOPMENT OF TOOL DETECTOR LJDOF-SDH FOR LONG JUMP AS A MEDIA FOR BASIC MOTOR OF TRACK AND FIELD LEARNING BASED ON SENSOR** 651  
Author: Sriawan  
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## THE EFFECTS OF PRACTICE METHOD AND ACHIEVEMENT MOTIVATION ON MAXIMUM VOLUME OXYGEN OF FOOTBALL PLAYERS

<sup>1</sup>Didin Tohidin, <sup>1</sup>Endang Sepdanius

<sup>1</sup>Faculty of Sport Science, Universitas Negeri Padang  
ddt19882@yahoo.co.id, endangsepdanius@rocketmail.com

### Abstract

**Objectives:** This research aimed to see the effect of continuing practice method and interval practice method and achievement motivation towards the improvement of VO<sub>2</sub>Max ability of football players.

**Methods:** The design of this research was true experimental with 2x2 level plan. Collecting sample in this research was by using purposive sampling technique. Distribution of sample group was based on the results of achievement motivation test. The results of achievement motivation were arranged from high to low. 27% from the highest scores (20 samples) was included into high achievement motivation group, while 27% from the lowest scores was stated by low achievement motivation group. To divide the samples, each practice method used matching paired technique. There were 10 players in continuing practice method group with high achievement motivation, 10 players in interval practice method group with high motivation, 10 players in continuing practice method group with low motivation, 10 players in interval practice method with low motivation. VO<sub>2</sub>Max ability of pre and post test of 4 groups was taken by Multistep Fitness test. The results were analyzed by using two paths ANAVA and Tuckey test if there was found the interaction between practice method variable with achievement motivation variable.

**Result:** 1) There was an interaction between practice method and achievement motivation ( $F_{count} = 172.34 > T_{table} = 4,11$ ), 2) Continuing method (A<sub>1</sub>) was more effective than interval method (A<sub>2</sub>) ( $Q_h = 3.17 > Q_t = 2.93$ ), 3) Continuing practice method with high achievement motivation (A<sub>1</sub>B<sub>1</sub>) the result was more effective than interval practice method with high achievement motivation (A<sub>2</sub>B<sub>1</sub>) ( $Q_h = 3.96 > Q_t = 3.79$ ), 4) Interval method with low achievement motivation (A<sub>2</sub>B<sub>2</sub>) the result was not more effective than continuing method with low achievement motivation (A<sub>1</sub>B<sub>2</sub>) ( $Q_h = 1.63 < Q_t = 3.79$ ).

**Conclusions:** Continuing practice method with high achievement motivation has significant effect towards the improvement of VO<sub>2</sub>Max of football players. Therefore, continuing method needs to be implemented and achievement motivation needs to be maintained in every exercise.

**Keywords:** Practice Method, Achievement Motivation, VO<sub>2</sub>Max

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### INTRODUCTION

Physical condition is one of the factors that determine the achievement in football. Physical condition is useful to maintain playing skills during 2x45 minutes in normal time to obtain the efficiency in applying techniques and tactics (Harbhajan & Gurpreet, 2013). Based on the observation of football players PS.UNP it was found that the players were often fatigue in second half. The players were often left by the opponents in scramble for the ball. The cause of the fatigue is declining endurance capability of players. The endurance is determined by VO<sub>2</sub>Max capacity of players. From data obtained, there was still seen if the players had VO<sub>2</sub>Max in enough categories about 12 players, 25 players had good category and 3 players had high category. A football player actually should have good VO<sub>2</sub>Max category in order to undertake the task well.

VO<sub>2</sub>Max is maximum oxygen volume that is used by someone usually counted in L/minute (Hairy, 2003). VO<sub>2</sub>Max is body's ability to consume oxygen maximally per minute in maximum burden (Nawawi, 2008). VO<sub>2</sub>Max is influenced internally and externally. Internally VO<sub>2</sub>Max is influenced by lung, blood quality (hemoglobin), heart, blood vessels, muscles and motivation. Externally VO<sub>2</sub>Max is influenced by practice method. Practice method has an impact in increasing VO<sub>2</sub>Max. This impact is influenced by acute physiological response from result of specific practice of different athletes that influence maximum cardiac output (Roels, 2005; Randers et al, 2013). Besides that, psychologically motivation directly related to desire, willingness and purpose of the players in the process of practice



(Zuber, Zibung&Conzelmann, 2014).Practice that is done with high motivation will have a maximum impact in increasing body organs functions that contribute in increasing VO2Max.

Practice method that mostly used in increasing VO2Max is continuing practice method and interval practice method. These methods are mostly done and compared because interesting to be researched. A number of researches existing give strengthening of the result of this research. The research that was done by Majid, Seyyed&Tahere (2013); Denis et al (1982); MacDougall et al (1998) and Harmer et al (2000) showed that both of these methods give the significant effect in heart index, respiratory and blood parameter. All aspects have the functions in improving aerobic fitness of athletes. However, the different result ofthe research that was done by Franch et al (1998). Billat (2001), Smith et al (1999), Laursen et al (2002) showed the result that there was no significant effect from both practice methods towards VO2Max.The differences from this research were caused by the differences of duration and practictime implementation. The practice was longer and intense thus it has different effect to VO2Max.The differentiation wascaused by a change in aerobic power ability, lactate threshold, lactate production and return, lactate tolerance, acid base balance in muscles and systemic, formation of energy, muscle temperature, mitochondria, structure of proteins, globular enzymatic protein and gene activation(Whyte, Gregory, 2006: 30).

Based on the above explanation, it is jointly continuing practice method and interval practice method and achievement motivation thus (1) VO2Max of player that was given continuing practice method was higher than interval practice method group, 2) There was an interaction between practice methods with achievement motivation towards VO2Max capacity of PS. UNP players, 3) On high achievement motivation, VO2Max ability of PS. UNP with continuing practice method was higher than interval practice method. 4) On low achievement motivation, VO2Max of players with interval practice method was not higher than continuing practice method. The advantages of this research are the suitable method is found for the football players and seeing the role of motivation in improving VO2Max of football players.

## METHOD

The design of this research was true experimental with 2x2 level plan. Collecting sample in this research was by using purposive sampling technique. Distribution of sample group was based on the results of achievement motivation test by using achievement motivation questioner with reliability coefficient 0.947. The results of achievement motivation were arranged from high to low. 27% from the highest scores (20 samples) was included into high achievement motivation group, while 27% from the lowest scores was stated by low achievement motivation group. To divide the samples, each practice method used matching paired technique. There were 10 players in continuing practice method group with high achievement motivation, 10 players in interval practice method group with high motivation, 10 players in continuing practice method group with low motivation, 10 players in interval practice method with low motivation. VO2Max ability of pre and post test of 4 groups was taken by Multistep Fitness test. The results were analyzed by using two paths ANAVA and tuckey test if there was found the interaction between practice method variable and achievement motivation variable.

## RESULTS

### Data Description

Table 1. Data description of eight groups research data that consist of range, mean, deviation standard, minimum and maximum score

Data group	n	Range	Maximum	Minimum	Median	Mode	Mean	Deviation Std
Group A1	20	16	56.2	40.2	49.9	50.8	49.045	3.9009
Group A2	20	10.9	54.8	43.9	48.45	48.5	48.235	3.2640
Group B1	20	16	56.2	40.2	50.4	50.6	49.745	3.6959
Group B2	20	11.6	54.3	42.7	46.95	48.4	47.625	3.3095
Group A1B1	10	16	56.2	40.2	50.7	50.8	50.57	3.2955
Group A2B1	10	10.3	54.8	44.5	48.6	48.5	49.14	3.4059

Group A1B2	10	11.6	54.3	42.7	47.75	48.4	47.02	3.7225
Group A2B2	10	10.4	54.3	43.9	46.65	46.5	47.33	3.0118

### Normality test

Table 2. Summary of the results of normality test of practice method data and achievement motivation from research plan

Group	N	Lo	Lt	Summary
A1	20	0.1020	0.1900	Normal
A2	20	0.1750	0.1900	Normal
B1	20	0.1004	0.1900	Normal
B2	20	0.1575	0.1900	Normal
A1B1	10	0.1385	0.2580	Normal
A1B2	10	0.1789	0.2580	Normal
A2B1	10	0.1657	0.2580	Normal
A2B2	10	0.1896	0.2580	Normal

### Homogeneity test

#### Variance Homogeneity Test Two Groups Treatment

Table3. Summary of Variance Homogeneity Test Result group A<sub>1</sub> and A<sub>2</sub> and B<sub>1</sub> and B<sub>2</sub>

Group	N	Variance	F count	F <sub>table</sub> (0,95)	Description
A1	20	16.65	1.48	2.21	Homogeneous
A2	20	11.28			
B1	20	14.95	1.26	2.21	Homogeneous
B2	20	11.83			

#### Variance Homogeneity Test Four Groups Treatment

Table4. Summary of Variance Homogeneity Test Result Four Groups Research Plan

Group	Variance Separate	Variance Combination	Price B	$\chi^2_h$	$\chi^2_t(0.95)(3)$	Description
A <sub>1</sub> B <sub>1</sub>	19.08	1.1471	41.2960	1.3382	7.81	Homogeneous
A <sub>1</sub> B <sub>2</sub>	15.60					
A <sub>2</sub> B <sub>1</sub>	12.37					
A <sub>2</sub> B <sub>2</sub>	9.07					

### Hypothesis Testing

Table5. Summary of the Results of Two Paths ANAVA towards VO<sub>2</sub>Max Data of Football Players

Variance Source	JK	D k	RJK=JK/d k	Fh= RJK/RJK(D)	Ft (a=0,05)	Ft(a=0,0 1)
Between method(a)	6.56	1	6.56	5.04*	4.11	7.24
Between achievement motivation (b)	220.1 3	1	220.13	168.96*	4.11	7.24
Interaction (AxB)	224.5 2	1	224.52	172.34*	4.11	7.24
In group (D)	46.90	3 6	1.30			
Deduction total	498.1 2	3 9				

Based on the summary of the result of two paths ANAVA above, it can be mentioned that: (1) Hipotesis Awal ( $H_0$ ) stated that there was a difference of practice method influence between continuing method group and interval accepted method because the result showed  $F_{count} = 5.04 > F$

table = 4,11. It can be concluded that VO2Max ability of football player PS. UNP that was trained by using continuing method was more effective than interval method. (2) HipotesisAwal ( $H_0$ ) stated that there was no difference influence of high achievement motivation group with low achievement motivation group rejected because the results showed  $F_{count} = 168.96 > F_{table} = 4,11$ . (3) Alternative hypothesis ( $H_a$ ) stated that there was an interaction between practice method and achievement motivation with VO2Max accepted because the result showed  $F_{count} = 172.34 > F_{table} = 4,11$ . It can be concluded that there was an interaction between practice method and achievement method towards VO2Max of football players PS. UNP.

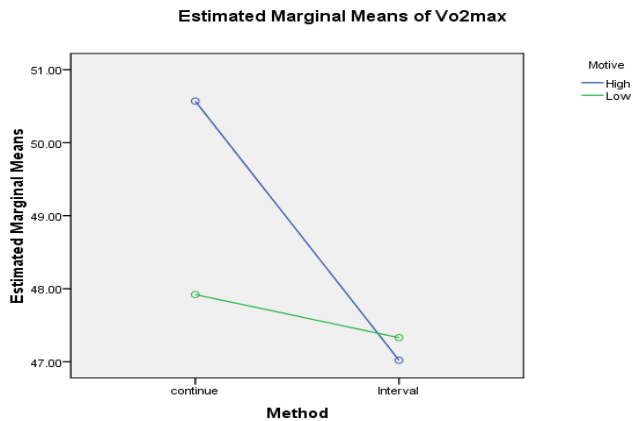


Figure1.

Interaction between Practice Method with Achievement Motivation towards VO2Max Ability of Football Players PS.UNP

Through research hypothesis that has proved that stated there was an interaction between practice method and achievement method towards VO2Max PS.UNP therefore the analysis needs to be continued by Tuckey test. Summary of Tuckey test result is in table 6:

Table 6. Next Phase of ANAVA Result with Tuckey Test

Compared group	Dk	Qh	Qt ( = 0.05)	Description
A1 and A2	1.27	3.17	2.95	Significant
A1B1 and A2B1	1.64	3.96	3.79	Significant
A1B2 and A2B2	1.64	1.63	3.79	No

Based on the result of next test by Tuckey test, it can be mentioned that: (1) Research hypothesis that stated the result of continuing method ( $A_1$ ) was more effective than interval method ( $A_2$ ) was accepted ( $Q_h = 3.17 > Q_t = 2.93$ ). (2) Research hypothesis that stated the result of continuing practice method group with high achievement motivation ( $A_1B_1$ ) was more effective than interval practice method group with high achievement motives ( $A_2B_1$ ) was accepted ( $Q_h = 3.96 > Q_t = 3.79$ ). (3) Research hypothesis that stated the result of interval method with low achievement motivation ( $A_2B_2$ ) was more effective than continuing method with low achievement motivation ( $A_1B_2$ ) rejected ( $Q_h = 1.63 < Q_t = 3.79$ ) rejected.

## DISCUSSION

The result shows that there is an interaction between practice method and achievement motivation that can be explained as motivation is a trigger in applying practice program. Motivation is an actual process or source of trigger and individual behavior support to meet the needs to achieve

the particular purpose (Setyobroto, 2005). Achievement motivation is as an encouragement to be better than self ability and others (Rabideu, 2005). The result shows that motivation gives encouragement towards individual to do sport in intrinsic and extrinsic so that unconsciously the activity that is done can improve physical ability (Kilpatrick et al, 2005).

One form of encouragement that is done to achieve the purpose in an activity is strong motivation based. If encouragement can lead someone to practice maximally therefore the maximum result can be achieved. Practice method is easy to do if there is a strong motivation based to get the achievement. The result shows that continuing practice method group with high achievement motivation is more effective than interval practice method group with high achievement motivation. There is a result that interval method with low achievement motivation is not significantly different with continuing method with low achievement motivation. It can be concluded that achievement motivation has an important part to achieve practice goals.

Achievement motivation is someone orientation to keep effort to obtain the best result maximally and maintain the spirit in failed then go on to accomplish the task because of feeling proud to finish well (Setiadarma; 2007). Motivation occurs as a result of desire to get achievement and to have good ability (Murray, Figure 2 explains the process of achievement motivation until the particular purpose.

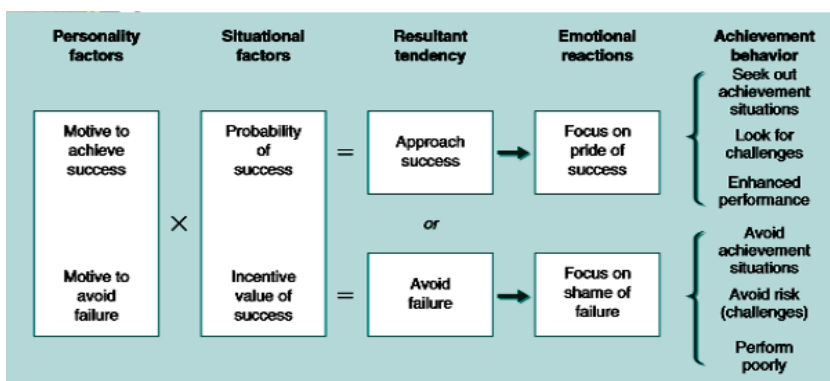


Figure 2. Need Achievement Theory (Murray: 1983)

Figure 2 above explains that motivation to achieve success is in the situation that enables someone to be successful. Result from that situation causes someone to make an approach that can raise their emotion to reach their success. It is seen from the above explanation, high motivation must be owned by football players of PS. UNP to achieve a practice program that has been made to improve VO2Max in football.

### CONCLUSION AND SUGGESTION

Continuing practice method with high achievement motivation has a significant effect towards the improvement of VO2Max of football players. Because of that, continuing method needs to be implemented and achievement motivation should be kept in every practice.

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## THE EFFECT OF PROTEIN SUPPLEMENT ON MAXIMUM STRENGTH TOWARD THE MEMBERS OF ONE GYM FITNESS CENTER PADANG

<sup>1</sup>Adnan Fardi, <sup>1</sup>Erizal N, <sup>1</sup>Angga Okta Pratama

<sup>1</sup>Faculty of Sport Science, Universitas Negeri Padang

adnan\_fardi@yahoo.com, erizal\_nurmai@yahoo.com, anggaoktapratama24@gmail.com

### Abstract

**Objectives :** The problem in this research was late maximum strength increase experienced by members of fitness at the moment doing weight training. This was caused by a lack of knowledge of fitness members about nutrition. The grant protein supplements manufacturer can be used as an alternative to increase the maximum power which is owned by the fitness members. The purpose of this research is to know the effect of protein supplement on maximum strength toward the members of One Gym Fitness Center Padang

**Methods:** The type of this research is quasi experiment. The population is all of the active members of *One Gym Fitness Center Padang*. The sample of this study is 26 people selected by using *purposive random sampling*, who are listed at *One Gym* less than a month. They were divided into two groups, 13 members in experimental group and 13 members in control group. For experimental group, the members were given the protein supplement after doing the exercise at One Gym Fitness during 16 times which each of the members consumed 1.5 gr/weight/day proteins. For control group, the members were not allowed to consume protein exaggeratedly. They also were not given the protein supplement during conducting the research. The instrument used in this research was the maximum power test using one repetition maximum method. The data analyzed by using t-test with  $\alpha = 0.05$ .

**Results:** The research results showed that the mean of the maximum strength of the arm muscles of experimental group is 28.46 (*Pretest*) and 52.31 (*Posttest*) ( $t_{16,98} > t_t 1.782$ ); the mean of leg muscles is 60.77 (*Pretest*) and 83.85 (*Posttest*) ( $t_{14,85} > t_t 1.782$ ). The mean of the maximum strength of the arm muscles of control group is 30.00 (*Pretest*) and 41.15 (*Posttest*) ( $t_{7,94} > t_t 1.782$ ) and the mean of leg muscles is 61.92 (*Pretest*) and 71.15 (*Posttest*) ( $t_{5,48} > t_t 1.782$ ).

**Conclusions:** It can be concluded that there was a significant effect of manufacture protein supplement on maximum strength toward the member one Gym Fitness.

**Keywords:** protein supplement, maximum strength

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### INTRODUCTION

Health and fitness are the most valuable treasure and cannot be exchanged for any human use. Therefore, each person has a desire and craves for the healthy body, fit, and an amazing look. In order to achieve it, running healthy living pattern and exercise regularly are required. Basically, every kind of sport gives healthy and fitness toward a person's body. In addition, the other function of sport for a person's body is, it can improve and beautify the posture or the shape of a person's body. In the human body, there are several muscles that need to be trained to support performance in doing daily life activities, including the arm muscles, chest muscles, abdominal muscles, and leg muscles. These muscles have functions and respective roles which are very important in the body to perform daily activities such as refusing, hitting, lifting, running and so on. Thus, it needs to be trained to function as it should.

Weight training is the most appropriate way to train existing muscles in the body to function perfectly. The main function of doing weight training is to increase strength. Strength is the ability of the muscles to lift and resolve the maximum given load, thus if the strength of a muscle is trained regularly and surely programmed, then the muscles will be able to cope with and also withstand loads given in

daily activities without feeling exhausted. Consequently, regular and programmed weight training will improve the maximum strength of the muscles.

Weight training can be done independently by using the body as a burden, like: push-ups, sit-ups, and pull-ups. In addition, weight training can also be carried out at fitness centers (Fitness Center). A Fitness Center is a special place that is available to perform sports activities. Fitness Center provides a variety of tools to do weight training.

In order to get a maximum exercise and increasing strength, weight training needs to be done on an ongoing basis and programmed. Therefore, in doing weight training, it needs to be arranged a workout program, so the aim of weight training can be achieved perfectly. In addition to exercising regularly and programmed, consuming nutrients are also highly influential on muscles growth. Actually, in daily life, humans consume a wide variety of nutrients. According to [1] Welis & Syafrizar (2009:6-33) In general, nutrients can be classified into two: 1) Macro Nutrients such as carbohydrates, proteins, and fats. 2) Micro-Nutrients such as vitamins and minerals, water, and electrolytes.

*One Gym* is one of Fitness Center in Padang which provides the tools and offers a variety of training programs to its members. In practice, the members often have difficulty to get the maximum strength at the time doing weight training, whereas the members has done the exercise program that is recommended by the instructor of *One Gym* fitness center.

Granting the manufacturer supplements can be used as an alternative for members of *One Gym* fitness center to support the increasing the maximum power. So, the goal of the exercise which is done can be achieved maximally.

## **METHOD**

The method used in this research was quasi experiment (Quasy-Experimental Design). Based on [2] Yusuf (2013:81), "methods of alphabets experiment is to find out whether or not there is a result of something that is imposed on the research subject .

The experimental design used in this study is a Two-Group Pre test – Post test Design, in line with [3] Sugiyono (2011:74) that said, "on the design, there are Pre-test before being given treatment", the results of the treatment can be accurately known, because it can be compared to the situation before the treatment is given. One group (the independent) were given preferential treatment by administering weight training manufacturers supplement who were also given preferential treatment as much as 16 times and then measured again (Post-test), meanwhile for the comparison group was the control group who were given weight training the same treatment without the use of supplements in any form.

This research was conducted in *One Gym* Fitness Center, on April 11th until May 6th, 2017. The population of this research was all the fitness member registered in *One Gym* Padang, there were 561 people as the population. A sample of these studies amounted to 26 people, and then divided into two groups, a total numbers of samples of the experimental group (the group given manufacturer supplements) were 13 people and so as control group that also had 13 people. The way of taking samples in this research was purposive sampling technique, then, in determining the Group, it was chosen randomly.

Protein supplement which was used in this research was high-protein milk powder. It was provided as 168 gr (25 grams protein). This measure has been adjusted by the sample's average protein requirement per day through a Food Recall 2 X 24 hrs. A measurement of arm muscles strength was done by using maximal strength test method of One Repetition Maximum with the movement of the Barbell Arm Curl, meanwhile Squat was used for measuring the leg muscles strength.

In order to test the hypothesis of the research the researcher used the t Test with  $\alpha = 0.05$ .

## RESULTS

The research shows that there is increase of the maximum strength toward both of the groups. It can be seen from the table below:

**Table 1 Hypothesis' analysis of Maximum Strength of Control and Experimental Group**

Group	Maximum Strength	Mean		$t_h$	$t_t$ $\alpha=0.05$	conclusion
		Pre-Test	Post -Test			
Control	Arm Muscle	30	41,15	$t_h7,94$	1.78	Significant
	Leg Muscle	61,92	71,15	$t_h5,48$	1.78	Significant
Experimental	Arm Muscle	28,46	52,31	$t_h16,98$	1.78	Significant
	Leg Muscle	60,77	83,85	$t_h14,85$	1.78	Significant

As the table of the result above, it can be seen that there was a difference at the mean of pre- and Post test of maximum arms muscle strength in control group. This control group did not consume protein supplements and natural supplements in weight training to increase maximum strength, it was evidenced by the obtained  $t_h = 7,94 > t_t = 1.78$ . It is proven that weight training affects the maximum strength that is owned by a person's muscles. If it is seen from the average count of Pre-test and Post-test, the control group experienced a maximum increasing arm muscles strength 11.15 kg or 37.17% of the average of the initial tests.

[4] Chandler & Brown (2008:98-99) state that weight training can maintain muscle strength and endurance, improve coordination of muscle nerves and bone density. Furthermore he stated that weight training can lead to dramatic changes to the body. A lot of people doing weight training said that by having a well-built body not only make people feel good, but it also affects the way relate or interact with others, increasing the strength and endurance of muscles, and increasing coordination of muscles and nerves.

From the opinion that stated above, it can be concluded that by doing regularly, programmed and sustainability weight training, a person's maximum strength can be improved. It happens because the influence of the physiological process during the weight training, the muscles trained experienced an increasing in maximum strength enhancement functions.

Next for the results of the analysis of the second hypothesis testing, it was found the differences between the mean of pre test and Post test- of maximum leg muscles strength in control group. This control group did not consume protein supplements and natural supplements in weight training to increase maximum strength, evidenced by the obtained  $t_h = 5.48 > t_t = 1.78$ . Based on the hypothesis test results proved that the weight training affects the maximum strength of the leg muscles of a person. If it was seen from the mean count between Pre-test with Post-test, the control group experienced an increasing in the maximum strength of the leg muscles 9.23 Kg or 14.97% of the mean pre-test. It was proven that weight training which was done by the samples that were in the control group had physiological effects against her body. So the maximum strength of leg muscles were experiencing increased after giving trained.

A study of [5] Mancuso and Howley (1993) show that he conducted research on the effect of weight training toward the 10 students in the United Kingdom got the results that by doing weight training on a regular basis for 8 weeks, it can increase a strength on someone on mean 20% of the initial load. It means that if it is associated with this research that had been done over the last 4 weeks, the samples had increased load of a mean 14.91%.

Based on the opinion above, it can be concluded that by doing weight training regularly, programmed and sustaining maximal can increase a person's legs muscle strength. It happens because the effect of the physiological process during the weight training, the muscles trained experienced increasing in maximum strength enhancement functions.



For the analysis of the third hypothesis testing, it was found that there was a difference mean of pre-and Post test-for arm muscles experimental group . Experimental group in this research was a group that consumes the protein supplement in weight training to increase the maximum power of the arm muscles, this was evidenced by  $t_h = 16,98 > t_t = 1.78$ . If it was viewed from the difference in the mean, the maximum strength of the arm muscles of this experiment group had increased 23.85 kg. It means that the maximum strength of the arm muscles on this experimental group experienced an increasing from the mean pre-test 83.80%.

An increasing of maximum strength of the arm muscles occurred in experimental group in this study caused by exercise factor which was done regularly, programmed and continuously. In addition, other factors which also determined the maximum arm muscles increasing strength in this experimental group was the effect of supplements that consumed by the sample in this group. [6] Coulman (2014) argues that "*the Muscles need protein to get big and strong, when you're working on building them, you'll have to fuel them with a lot of protein-heavy food*". From this opinion, it can be concluded that muscle requires protein for a big and powerful body, by doing exercise regularly basis then we should give the intake of nutrients in the form of protein. It means that along with increasing of the size of the muscle, the function of the muscle will also grow. With the increasing of size of a muscle, then the strength of it will also increase.

Based on the explanation above, it can be concluded that the muscle function increases if trained regularly, programmed, and sustainable. To support a better improvement, a person needs a sufficient nutritional intake to his or her muscles. In this case the use or consuming supplements of protein with high-protein milk type is one of the alternatives to maximize the increase in maximum strength possessed by a person.

The results of the fourth hypothesis analysis showed that there was a difference of mean between Pre-test and Post-test of maximal strength of leg muscle of experimental group. This group consumed a protein supplement of weight training to increase maximal leg muscle strength, this is evidenced by  $t_h = 14,85 > t_t = 1.78$ . When viewed from the average difference, the maximal strength of the experimental group's leg muscles had increased by 27.08 kg. This means that the maximum strength of arm muscle in this experimental group experienced an increase of 44.57%.

Increased maximum strength of leg muscles that occurred in the experimental group in this study was caused by exercise factors that were done regularly, programmed and sustainable. In addition, another factor that also greatly determines the increase in maximal strength of the leg muscles in this experimental group was the effect of the supplements consumed by the samples in this group. [7] Zabalada and Naclerio (2016) argue "*Whey protein as upper and lower body strength*". Consuming high-protein milk will increase upper and lower body strength. This means whey protein influence on the power possessed by someone. If seen from the content of its function supplement manufacturer (Whey Protein) is high milk protein for muscle. As has been well known that muscle requires adequate intake of protein as a staple food for a person, with the fulfillment of nutritional intake required by the muscle coupled with the exercises performed then the function of the muscle will also increase. In this case, the relation was the increase in the maximal strength of the leg muscles experienced by the samples. As further, the result of the fifth and sixth hypothesis analysis can be seen from the data below:

**Table 2. Hypothesis Analysis of Maximum Strength for Fifth and Sixth Hypothesis**

Maximum Strength	Mean		$t_h$	$t_t$ $\alpha=0.05$	conclusion
	Control (Post-Test)	Experiment (Post-Test)			
Arm Muscle	41,15	52,31	4,67	1,71	Significant
Leg Muscle	71,15	83,85	5,55	1,71	Significant

Based on the table above, the results of the fifth and sixth hypothesis testing results proved that there were differences in the effect of the protein supplement to the maximal strength of the arm muscle and leg muscle of the study sample. Groups that consumed protein supplement had maximal arm muscle and leg muscle strength when compared to the control group. This could be seen from the results of the fifth hypothesis testing that said that the protein supplements give a better effect on the increase of the maximal arm muscle strength than the weight training without provision of this supplement was evident from  $t_h = 4.67 > t_t = 1.71$ . Along with that protein supplement also gave a better effect on the maximal strength increase of the leg muscles. This could be seen at  $t_h = 5.55 > t_t = 1.71$  for the sixth hypothesis

If seen from the increase in the average count between two research groups, experiment group had increased the average that was better than the control group. An increase of the average maximum arm muscles strength count for group experiment was 23.25 kg. Meanwhile, for the control group only experienced an increase 11.15 kg. It means the supplement protein give better effect than the weight training without consuming supplements to increase maximum strength of arm muscle on weight training. For the maximum strength of leg muscle of experimental group, it also improved the average higher than control group that was 27,08 kg. While the control group only increased as 9.3 kg.

[8] Zabalada and Naclerio (2016) state that "Whey protein alone or as a part of a multi-ingredient appears to maximize lean body mass or fat-free mass gain, as well as upper and lower body strength." From the above opinion concluded that the protein supplement in the form of high-protein milk will maximize body mass without fat and increase fat-free muscle mass. This means that when consuming high-protein milk, then the muscle growth will occur maximally because the addition of mass is not derived from fat, but from fat-free muscle. Furthermore, the journal also explained that consuming supplements manufacturer of high-protein milk will also increase the upper and lower body strength. This can be interpreted that by consuming high-protein milk will increase overall muscle strength (a person's body)

According to [9] Cribb PJ, et all (2007) "Whey Protein seems to promote greater strength of gains and muscle morphology during RE training, the hypertrophy responses within the groups varied". They say that whey protein or high-protein milk will provide an increase in strength and muscle hypertrophy, but the increase varied. The increase can be interpreted variations caused by factors exercise. This means that when consuming high-protein milk, then the muscle growth will occur maximally.

Based on the above opinion, it can be concluded that the protein supplement can increase the maximum strength of the muscles of the arm and leg muscles of a person. However, the increase in maximum strength and arm muscles of the leg muscle varies. This is due to the exercise factor performed by that person. In addition to regular exercise, the body desperately needs a sufficient nutritional intake to improve physiological function, in short with regular and programmed load training, and consuming protein supplements of high-protein milk can increase a person's maximum strength.

## CONCLUSIONS

As the result of the research above, it can be concluded that:

1. Weight training gives a significant effect on increasing the maximum strength of the arm muscles of the control group.
2. Weight training gives a significant effect on increasing the maximal strength of the thigh muscles of the control group.
3. Protein supplement gives an effect to the maximum arm muscle of the member of One Gym Fitness Center Padang

4. Protein supplement gives an effect to the maximum arm muscle strength of members of One Gym Fitness Center Padang.
5. There is a difference in the maximum muscle strength of the arm between the experimental group and the control group.
6. There is a difference in maximal thigh muscle strength between the experimental group and the control group.

In short, there was an increase of maximum strength toward both of the groups. However, the experimental group experienced higher increase of maximum strength than the control group. It demonstrated that the protein supplement, given to experimental group, gave a significant effect toward the increase of individual's maximum strength. Hence, it is concluded that nutrition influences the result of an individual's treatment. Moreover, consuming protein supplement can be as an alternative way to fulfill the need of muscle. With the sufficient protein requirement needed by muscle then the function of the muscle is also increase.

As a final remark, since this research focused on the increase of maximum strength of muscle, it is hoped that other researchers can find other effect of the protein supplement manufacturers which increase one's maximum strength, it is related to the innovation and development of science in the science of sport.

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## THE EFFECT OF PACITAN SWEET ORANGE JUICE TO MALONDIALDEHYDE LEVEL (MDA) AFTER ECCENTRIC ACTIVITY

Indra H.S<sup>1</sup>, Ananda PB<sup>1</sup>, Gatot D<sup>1</sup>

<sup>1</sup>Universitas Negeri Surabaya,  
indrasusanto@unesa.ac.id, anandabkt@gmail.com, gatotdarmawan@unesa.ac.id

### Abstract

**Objectives:** This research aim is to evaluate the effect of Pacitan orange Juice to Mallondialdehyde Level (MDA) after doing Eccentric Activity

**Methods:** This is an experimental laboratories with post control group design. 30 male students of Sport Science Faculty between 18 to 20 years old were recruited by purposive random sampling. The sample was divided into two groups, 15 people as experimental and 15 people as control.

Both groups performed pull up activities, which include two sets with seven repetitions, and one minute paused. After completing pull up activities, 750 ml of orange juice was given to the experimental group, while control group got 750 ml of mineral water. After 1 hour, each group took blood-sampling test to determine the levels of malondialdehyde and lactic acid after eccentric exercise.

**Result:** The result showed that the average MDA of control group was  $8.489 \pm 2.55$  while mean MDA of treatment group was  $6.095 \pm 1.99$ . The t-test showed significant results between the control group and the treatment group with  $p_{value} = 0.008 < 0.05$

**Conclucions:** Pacitan orange juice revealed decrease the MDA levels after having eccentric activities. With regard to this, it can be concluded that with this treatment can respond to free radicals. The response is able to counteract ROS, which is containing the high antioxidant.

**Keywords:** Pacitan sweet Orange Juice, Malondialdehyde Level, Eccentric Activity

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## INTRODUCTION

Physical activity or exercise will have a positive impact on the body, among others, to be healthier and fit. In addition to producing a positive impact, it is rare to think about the negative effects of physical activity, so this negative impact still needs to be examined. One of the negative impacts is the formation of oxidant compounds followed by the occurrence of oxidative stress events (Harjanto, 2003). Oxidative stress occurs due to an imbalance between the production of free radicals and the body's antioxidant defense system. To improve an achievement in sport many athletes are required to practice constantly regardless of time for rest or recovery.

Muscle damage is one of the most frequent causes of physical impairment in sports. An estimated 30% - 50% of all injuries to sports activities are caused by damage to soft tissues such as muscle (Fernandes et.all, 2011). In every sport there is always muscle contraction, one of the muscle contractions that occurs in sports activity is the eccentric contraction. Eccentric contractions tend to cause greater muscle damage compared to concentric contractions (Foss LM., 1998)

Eccentric contraction is a contraction in the muscle that has a length increase. Continuous muscle contractions will cause xanthine oxidase (XO) and NADPH oxidase (NOX) activity to increase so that oxygen radical formation is also increased (Nishino T, et all, 2005). Continuous muscle contraction and with high intensity will result in fatigue, stiffness and muscle pain (Clarkson P.M, Hubal MJ, 2002). This is a sign of one of the muscle damage that can cause various disturbances whether it is mechanical, electrical and chemical. Damaged muscle will be followed by the formation of reactive oxygen species (ROS) for body defense (Ong NO, Chia SE., 2001)

Under normal circumstances the formation of ROS will be offset the formation of endogenous antioxidants such as SOD (superoxide dismutase), GPx (glutathione peroxidase), and catalase. When the formation of antioxidants is less than the formation of free radicals, oxidative stress will occur, which will attack polyunsaturated fatty acid (PUFA) and produce among other malondialdehyde (MDA), and damage DNA (deoxyribonucleic acid) and protein (Halliwell B, Gutteridge JMc., 1996). Anti-oxidants are electrons or reductants. This compound has a small molecular weight, but is able to activate the development of oxidation reactions, by preventing the formation of radicals. Antioxidants are also compounds that can inhibit oxidation reactions, by binding to free radicals and highly reactive molecules, cell damage will be inhibited (Paulsen G., 2009).

Orange is a fruit in Indonesia as one of the horticulture commodities that have priority to be developed. The one-year harvest period can be more than once and easily found in fruit market and supermarket stalls at relatively cheap prices and can be reached by all people. In addition, oranges are fruits favored by the community both as fresh fruit and processed. Orange has many benefits that are needed by the body. In Orange, the active ingredients that are important for health include vitamin C, flavonoids, carotenoids, limonoids, and minerals. Vitamin C is an antioxidant because it acts as an electron donor, so it can prevent other compounds from oxidation due to free radicals. Flavonoids are one of the antioxidants in the body, which can prevent cell damage caused by free radical activity. The main flavonoids in oranges are naringin, narirutin, and hesperidin (Iorio, E.L. 2007) contained in the skin of the fruit, seed (Tripoli, E. et.all, 2007) and pulp (Cano et.all, 2008).

Based on the above description, it is necessary to examine the effect of giving sweet orange juice to malondialdehyde (MDA) level after eccentric activity. The expected benefit of this research is to reduce the negative impact of physical activity, so that positive impact of physical activity in the form of improvement of health status or improvement of sport achievement can be maximal.

## **METHOD**

### *Design*

This is an experimental laboratories with post control group design.

### *Material / Subject of the research*

The subjects in this research is Student of Sport Science Program of Surabaya State University, with criterion of inclusion of man, age 18 to 20 years, have same weight and arm length, healthy condition based on examination by doctor, and not sports actors. Exclusion criteria include not willing to take the test, active on the dominant sports exercise using upper extremities and amounted to 30 people.

### *Instrumentation and procedure*

Peripheral venous blood was collected from the antecubital vein of the subjects. Blood samples were transported and stored in the biochemistry laboratory where analyses were performed strictly following international guidelines (Banfi G and Dolci A, 2003 ). The following parameters were measured for malondialdehyde [MDA]. *Procedure Measurement Malondialdehyde (MDA)*. MDA has been identified as the product of lipid peroxidation that reacts with thiobarbituric acid to give red species absorbing at 535 nm. All blood samples inserted into the sample rack and sorted according to the colour of the blood sample. 1 ml of patient or control serum was combined with 2 ml of Trichloroacetic acid (TCA) – Thiobarbituric acid (TBA) – Hydrochloric acid (HCL) solution and mixed

thoroughly, when heated for 15 minutes in boiling water bath. After cooling, the precipitate was removed by centrifugation at 3000 rpm for 10 minutes. The absorbency was determined at 535 nm against reagent blank, which was containing the entire reagent minus the serum.

### Statistical Analysis

Descriptive statistics were determined for each variable recorded. Data are presented as mean  $\pm$ SD, Normality test to measure whether data obtained has normal distribution so it can be used in parametric statistic (inferential statistics). Paired t-test and independent t-test was applied for Statistical evaluation of the data generated using SPSS (Statistical Package for Social Studies) Version 19.0 Software. The Statistical significance level was put at 'p' value  $< 0,05$  with Confidence Interval (CI) of 95 %.

## RESULT AND DISCUSSION

### Result

The result of the research is the measurement data obtained from the whole variable data that is independent variable, dependent variable, and control variable. Data obtained from the results of research in the form of lactic acid and MDA blood samples from people try after the treatment of eccentric activity in the form of pull up, which tested with a significance level of 5% and processed with SPSS program.

In accordance with the design of data analysis, the initial step of the analysis will begin by performing descriptive statistical analysis aimed at obtaining a description of the distribution and for data summary for the presentation of results. The sample in this research is the students of sport science program of Surabaya State University which amounted to each group of 15 people.

In this study the sample is given the eccentric activity using pull up test done three sets, each set of 7 reps with pause between one minute set. The pull-up activity aims to provide an eccentric strain

After the pull up test, the control group was given mineral water drink of 750 ml. While the treatment group was given sweet orange juice drink as much as 750 ml.

Table 1. MDA in the control group was found to average  $8,489 \pm 2,55$ ; MDA in the treatment group was found to average  $6,095 \pm 1,99$ .

Table 2 shows that the normality test results by using Shapiro-Wilk Test are normally distributed with  $p > 0,05$ . While normality test on MDA variable of control group and treatment is are normally distributed

**Table 1. Mean $\pm$ SD of Malondialdehyde (MDA)**

Group	Sample (N)	Mean $\pm$ SD MDA (nmol/ml)
Control	15	8,489 $\pm$ 2,55
Treatment	15	6,095 $\pm$ 1,99

**Table 2. Normality test**

Group	Sample (N)	MDA (nmol/ml)
Control	15	0,233
Treatment	15	0,388

F value > 0.05 then it can be concluded statistically that the variants between the two groups are equal. In the above results obtained value of  $F = 0.019$  and the value of  $p$  (sig) is = 0.008. So it can be concluded there is a significant difference between MDA between control group and treatment group (table 3)

**Table 3 Statistical result of independent samples test**

	Sample (N)	F	Sig (2-tailed) Independent Samples Test
MDA	30	0,019	0,008

### *Discussion*

This research is a laboratory experimental research, with research design used is posttest only control group design. Sampling in this research is student of Sport Science program of Surabaya state univeristy with criterion of inclusion of man, age 18 until 20 years, have same weight and arm length, healthy condition

Based on examinations by doctors, not sports actors. Exclusion criteria include unwilling to take the test, active in the dominant sports exercise using upper extremities. Both groups performed a pull up test performed three sets, each set of 7 reps with pauses between sets of one minute. After doing a pull up test the control group was given a 750 ml aquadest drink, while the treatment group was given a drink of pacitan sweet orange juice of 750 ml Intermittent 2 hours after drinking both groups were taken intravenous blood for lactic acid and MDA examination.

Average result of MDA control group  $8,489 \pm 2.55$ ; while mean MDA treatment group was  $6,095 \pm 1,99$ . In Table 5.4 the free t test showed significant results between the control group and the treatment group where  $p = 0.008 < 0.05$ . In this study the sample is given the action of eccentric activity in the form of pull up which is activity with high intensity. MDA decline in the treatment group in this study resulted from giving a feeling of pacitan sweet orange-rich antioxidants in counteracting free radicals caused by the eccentric activity of the pull up. This is in line with blood orange juice is a bioavailable source of antioxidants, which may be enough to improve the antioxidant defense system in acute time (Vogt, M., and Hoppeler, Hans H., 2014) . Meanwhile, according to research that dietary supplementation with ROC (Red Orange Complex) on handball athletes can reduce oxidative stress (MDA) and can protect against short-term and long-term health consequences in athletes involved in regular training program (Bubbico A and Kravitz L., 2010.).

The pull-up treatment and the provision of of pacitan sweet orange juice are expected to respond to free radicals in the body. The response is able to ward off ROS with an added pacitan sweet orange juice that is believed high antioxidants. Research conducted concluded that the treatment of high intensity in humans for 8 weeks can increase aerobic capacity and decrease lipid peroxidation and characterized by decreased levels of MDA (Donne ID et.all, , 2003).

## CONCLUSIONS AND SUGGESTIONS

Physical activity is very important for human health. Pacitan sweet Orange juice reveals decreased levels of MDA after doing eccentric activity. With regard to this, it can be concluded that with this treatment can respond to free radicals. The response is able to counteract ROS, which contains high antioxidants

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**For Further Information:**

Universitas Negeri Yogyakarta, Indonesia  
 Phone : +62274 550826 (PR Office)  
 Mobile : +62857 2932 3727 (Mr. Satya)  
 +62815 7802 0803 (Mrs. Cerika)  
 Email : [yishpess@uny.ac.id](mailto:yishpess@uny.ac.id)  
 Website : [yishpess.uny.ac.id](http://yishpess.uny.ac.id)

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