

**MODEL of TRAINING METHODS for VOLLEYBALL  
MOVEMENTSPEED and SHORT DISTANCE RUNING SPEED  
IN TRACK and FIELD**



**LI DAPENG**

**1606824040**

**Thesis**

**PASCASARJANA**

**UNIVERSITAS NEGERI JAKARTA**

**2026**

## Abstrak

Kecepatan adalah atribut fisik penting dalam bola voli dan atletik, yang didukung oleh mekanisme biomekanik dan neuromuskular yang sama seperti akselerasi dan daya ledak. Studi ini bertujuan untuk mengembangkan model pelatihan terintegrasi secara ilmiah yang menjembatani kesenjangan antara teknik lari cepat linier dan gerakan multidireksional spesifik bola voli. Penelitian ini berfokus pada peningkatan akselerasi, kelincahan, dan kecepatan reaktif atlet melalui kombinasi sistematis prinsip lari cepat atletik dan pengkondisian spesifik olahraga.

Dengan menggunakan pendekatan Penelitian dan Pengembangan (R&D) berdasarkan model Borg dan Gall, studi ini melibatkan analisis kebutuhan awal, desain prototipe, validasi ahli, dan uji coba lapangan. Model yang dikembangkan terdiri dari empat komponen inti: (1) Pelatihan Akselerasi, (2) Kecepatan Gerakan Bola Voli, (3) Plyometrik dan Daya Ledak, dan (4) Kecepatan Reaktif dan Kelincahan. Setelah divalidasi oleh tiga ahli, model tersebut diuji pada 30 atlet bola voli selama periode intervensi enam bulan.

Data kuantitatif dikumpulkan menggunakan pengukuran pra-uji dan pasca-uji, termasuk lari cepat 20m dan 30m untuk kecepatan linear, dan gerakan lateral, lari bolak-balik kelincahan, dan tes waktu reaksi untuk performa spesifik olahraga. Uji t sampel berpasangan mengungkapkan peningkatan yang signifikan secara statistik ( $p < 0,05$ ) di semua variabel. Secara khusus, waktu lari cepat 20m meningkat sebesar 10,34%, kecepatan gerakan lateral sebesar 10,41%, dan waktu reaksi menunjukkan peningkatan tertinggi sebesar 18,37%.

Temuan ini menegaskan bahwa model terintegrasi tersebut valid, praktis, dan sangat efektif. Model ini berhasil mentransfer interoperabilitas pelatihan antara lari cepat di lintasan dan bola voli, secara signifikan mengoptimalkan performa kecepatan atlet secara keseluruhan.

## Abstract

Speed is a pivotal physical attribute in both volleyball and track and field, underpinned by shared biomechanical and neuromuscular mechanisms such as acceleration and explosive power. This study aims to develop a scientifically integrated training model that bridges the gap between linear sprinting techniques and volleyball-specific multidirectional movements. The research focuses on enhancing athletes' acceleration, agility, and reactive speed through a systematic combination of track and field sprint principles and sport-specific conditioning.

Employing a Research and Development (R&D) approach based on the Borg and Gall model, the study involved a preliminary needs analysis, prototype design, expert validation, and field trials. The developed model comprises four core components: (1) Acceleration Training, (2) Volleyball Movement Speed, (3) Plyometric and Explosive Power, and (4) Reactive Speed and Agility. Following validation by three experts, the model was tested on 30 volleyball athletes over a six-month intervention period.

Quantitative data were collected using pre-test and post-test measurements, including 20m and 30m sprints for linear speed, and lateral movement, agility shuttle, and reaction time tests for sport-specific performance. Paired sample t-tests revealed statistically significant improvements ( $p < 0.05$ ) across all variables. Notably, the 20m sprint time improved by 10.34%, lateral movement speed by 10.41%, and reaction time demonstrated the highest enhancement at 18.37%.

The findings confirm that the integrated model is valid, practical, and highly effective. It successfully transfers the training interoperability between track sprinting and volleyball, significantly optimizing athletes' overall speed performance.

### APPROVAL OF THESIS PROPOSAL

Promotor

Co - Promotor



DR.Aan Wasan S.SOS.M.Si

Date: .....



Dr.Eva Julianti P,SE,M.Ec

Date:.....

Knowing,

Magister Programme Coordinator Physical  
Education Postgraduate Universitas Negeri  
Jakarta



Dr. Sujarwo, M.Pd

Date:.....

Name : Li Dapeng  
No.Registration : 1606824040  
Year : 2024

## STATEMENT OF ORIGINALITY

I, the undersigned : Li Dapeng  
Name : Li Dapeng  
Student ID (NIM) : 1606824040  
Study Program : Physical Education  
Faculty :  
Degree Level : S2  
University : Universitas Negeri Jakarta (UNJ)

Hereby declare that the Thesis/Dissertation entitled: [RESEARCH ON THE INTEROPERABILITY OF TRAINING METHODS FOR VOLLEYBALL MOVEMENT SPEED AND SHORT-DISTANCE RUNNING SPEED IN TRACK AND FIELD ] is entirely my own original work. It has not been submitted previously, in whole or in part, to obtain any academic degree at any university or institution.

I also declare that all sources of information and references used in this thesis/dissertation have been properly acknowledged in accordance with academic writing standards and ethical guidelines applicable at Universitas Negeri Jakarta.

If in the future this work is proven to contain plagiarism or academic misconduct, I am willing to accept any sanctions in accordance with the academic regulations of Universitas Negeri Jakarta.

This statement is made truthfully and without any coercion.

Jakarta, 03 March 2026

Li Dapeng 李大鹏





KEMENTERIAN PENDIDIKAN, KEBUDAYAAN, RISET DAN TEKNOLOGI  
UNIVERSITAS NEGERI JAKARTA  
UPT PERPUSTAKAAN

Jalan Rawamangun Muka Jakarta 13220  
Telepon/Faksimili: 021-4894221  
Laman: [lib.unj.ac.id](http://lib.unj.ac.id)

LEMBAR PERNYATAAN PERSETUJUAN PUBLIKASI  
KARYA ILMIAH UNTUK KEPENTINGAN AKADEMIS

Sebagai sivitas akademika Universitas Negeri Jakarta, yang bertanda tangan di bawah ini, saya:

Nama : Li Dapeng  
NIM : 1606824040  
Fakultas/Prodi : Fakultas Ilmu Keolahragaan dan Kesehatan/S-2 Pendidikan Jasmani  
Alamat email : 19985889222@163.com

Demi pengembangan ilmu pengetahuan, menyetujui untuk memberikan kepada UPT Perpustakaan Universitas Negeri Jakarta, Hak Bebas Royalti Non-Eksklusif atas karya ilmiah:

☐ Skripsi ☒ Tesis ☐ Disertasi ☐ Lain-lain (.....)

yang berjudul :

Model of Training Methods for Volleyball Movementspeed and Short Distance Runing Speed in Track and  
Field

Dengan Hak Bebas Royalti Non-Eksklusif ini UPT Perpustakaan Universitas Negeri Jakarta berhak menyimpan, mengalihmediakan, mengelolanya dalam bentuk pangkalan data (*database*), mendistribusikannya, dan menampilkan/mempublikasikannya di internet atau media lain secara *fulltext* untuk kepentingan akademis tanpa perlu meminta ijin dari saya selama tetap mencantumkan nama saya sebagai penulis/pencipta dan atau penerbit yang bersangkutan.

Saya bersedia untuk menanggung secara pribadi, tanpa melibatkan pihak Perpustakaan Universitas Negeri Jakarta, segala bentuk tuntutan hukum yang timbul atas pelanggaran Hak Cipta dalam karya ilmiah saya ini.

Demikian pernyataan ini saya buat dengan sebenarnya.

Jakarta July 13, 2026

Penulis

Li Dapeng

(  
nama dan tanda tangan  
)

## TABLE OF CONTENT

|                                                                   |    |
|-------------------------------------------------------------------|----|
| TABLE OF CONTENT.....                                             | ii |
| CHAPTER I INTRODUCTION .....                                      | 1  |
| A. Background of The Problem .....                                | 1  |
| B. Research Focus .....                                           | 5  |
| C. Problem Formulation .....                                      | 7  |
| D. Research purposes .....                                        | 7  |
| E. State of the Art .....                                         | 7  |
| CHAPTER II LITERATURE STUDY .....                                 | 11 |
| A. Speed As A Fundamental Component Of Athletic Performance ..... | 11 |
| B. Movement Speed Characteristics in Volleyball .....             | 15 |
| C. Short-Distance Sprint Performance in Track and Field .....     | 18 |
| D. Training Methods for Speed Development .....                   | 22 |
| E. Interoperability of Training Methods Across Sports .....       | 26 |
| F. Research Related of Theory .....                               | 30 |
| CHAPTER III RESEARCH METHOD .....                                 | 35 |
| A. Purpose Research .....                                         | 35 |
| B. Time and Place of Research .....                               | 35 |
| C. Research Approach, Method and Design .....                     | 36 |
| CHAPTER IV RESEARCH RESULT .....                                  | 41 |
| A. Research Results .....                                         | 41 |
| B. Preliminary Study Results .....                                | 41 |
| C. Product Development Results .....                              | 44 |
| D. Expert Validation Statistical Results .....                    | 55 |
| E. Small Group Trial Statistical Results (n=15) .....             | 58 |
| F. Large Group Trial Statistical Results (n=30) .....             | 60 |
| G. Paired Sample t-Test Results .....                             | 64 |
| H. Effectiveness Test Results .....                               | 66 |
| CHAPTER V CONCLUSION AND RECOMMENDATIONS .....                    | 71 |
| A. Conclusion .....                                               | 71 |
| B. Recommendation .....                                           | 72 |
| REFERENCES .....                                                  | 75 |