

UNIVERSITI TEKNOLOGI MARA

**THE IMPACT OF BALL-ORIENTED
SOCCER MATCH SIMULATIONS
ON ACL INJURY RISK AND
IMPLICATIONS FOR
MULTICOMPONENT INJURY
PREVENTION PROGRAMS**

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ABSTRACT

Anterior Cruciate Ligament (ACL) injury persists to be one of the dominant and dreaded injury in soccer. With costly implications to players, teams, and practitioners, injury prevention exercises and training programmes have been researched specifically with the intention to reduce the likelihood of ACL injury. However, the implementation, adherence, understanding of injury prevention training programmes in Malaysia have been underwhelming. Several factors to the issue include a lack of injury prevalence documentation and a lack of knowledge of injury risk and prevention, among coaches, practitioners, and the players themselves. In the first part of this study, injury rates and conditions were documented from several elite soccer teams in Malaysia across different age groups to get an illustration of the injury prevalence in elite soccer. It was found that most of the injuries that occur in Malaysian elite soccer occurs in the lower limb, specifically in the knee and ankle joints. Coaches, players, and practitioners from soccer teams across various soccer competition levels were then surveyed for their knowledge, attitude, and practices of injury prevention exercise programmes. It was generally agreed that injury prevention was very important, however, the practice of evidence-based injury prevention was reported by just over a third of respondents. Only half of the responding players admitted to being well informed about injury risk factors most players admitted practicing a combination of exercises both proven and unproven efficacy towards preventing injury. This finding suggests a better player education and maintenance of injury prevention programmes as irregular sessions and monotonous sessions were the most common barriers to proper implementation of such programmes. In the second and third part of the study, several selected overground soccer match simulations were reviewed in pursuit of developing an ecologically valid soccer match simulation with the incorporation of ball utility tasks, where similar physiological responses in the newly developed Ball-Oriented Soccer Simulation (BOSS) were similar to a previously existing overground soccer match-play simulation (OSMS; HR: BOSS = 156 ± 5 bpm, OSMS = 160 ± 7 bpm; RPE: BOSS = 14 ± 1 , OSMS = 15 ± 2). Exertions in the BOSS revealed discrepancies between the left and right peak knee abduction moments during bipedal landings, as well as reductions in hamstrings eccentric peak torques, as well as functional hamstrings to quadriceps ratios, suggested a higher risk of injuries. Following a multicomponent injury prevention exercise program (IPEP), it was found that IPEP participants displayed improved tolerance to BOSS exertions. Biomechanical responses in the control group showed more extended knee and hip joint angles compared to the IPEP participants. The findings suggest that the BOSS may replicate similar responses to actual soccer match-play. The BOSS was then used as a fatigue protocol during the investigation towards the temporal efficacy of a multicomponent injury prevention training programme on biomechanical markers of ACL injury. It was found that a multicomponent injury prevention programme improved participants' landing mechanics and allowed a sustained landing kinematic throughout the accumulation of fatigue from soccer-specific exertions.

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TABLE OF CONTENTS

| | Page |
|--|-------------|
| CONFIRMATION BY PANEL OF EXAMINERS | ii |
| AUTHOR'S DECLARATION | iii |
| ABSTRACT | iv |
| ACKNOWLEDGEMENT | v |
| TABLE OF CONTENTS | vi |
| LIST OF TABLES | xv |
| LIST OF FIGURES | xvi |
| LIST OF SYMBOLS | xix |
| LIST OF ABBREVIATIONS | xxi |
| | |
| CHAPTER ONE: INTRODUCTION | 1 |
| 1.1 Research Background | 1 |
| 1.2 Problem Statement | 2 |
| 1.3 Purpose of the Study | 4 |
| 1.4 Study Objectives | 5 |
| 1.5 Study Questions | 6 |
| 1.6 Study Hypotheses | 7 |
| | |
| CHAPTER TWO: LITERATURE REVIEW | 8 |
| 2.1 Introduction | 8 |
| 2.2 Prevalence of Injuries in Soccer | 8 |
| 2.3 Prevalence of Noncontact ACL Injuries in Soccer | 9 |
| 2.4 Noncontact ACL Markers of Injury Risk | 10 |
| 2.5 Perceptions on Soccer Injuries and Injury Prevention Exercise Programmes | 11 |

| | | |
|---|---|-----------|
| 2.6 | The Efficacy, Efficiency, Compliance and Effectiveness of IPEPs in Soccer | 13 |
| 2.7 | Biomechanical Markers of Noncontact ACL Injury Risk | 14 |
| 2.8 | Muscular Strength Markers of Noncontact ACL Injury Risk | 16 |
| 2.9 | Exertion and Fatigue as a Marker of Noncontact ACL Injury Risk | 17 |
| 2.10 | The Effects of Simulated Soccer Match-Play Exertions on Biomechanical Indicators of ACL Injury Risk | 19 |
| 2.11 | Injury Prevention Intervention to Offset the Biomechanical Impairments during Simulated Soccer Match-play | 23 |
| 2.12 | A Brief Review of Injury Prevention Exercise Programs | 24 |
| 2.13 | Summary | 27 |
| CHAPTER THREE: AN AUDIT OF INJURIES IN PROFESSIONAL SOCCER CLUBS | | 28 |
| 3.1 | Abstract | 28 |
| 3.2 | Introduction | 29 |
| 3.3 | Methods | 30 |
| | 3.3.1 Study Design | 30 |
| | 3.3.2 Participants | 31 |
| | 3.3.3 Injury Audit Questionnaire (IAQ) | 31 |
| | 3.3.4 Data Collection Procedures | 31 |
| | 3.3.5 Statistical Analyses | 33 |
| 3.4 | Results | 33 |
| 3.5 | Discussion | 37 |
| | 3.5.1 Limitations | 39 |
| 3.6 | Conclusion | 40 |