Orthopedics in Sports Injuries & Sport Sciences

Editor

Prof. Dr. Eren ULUÖZ

ISBN
978-625-375-228-6

Book Title
Orthopedics in Sports Injuries & Sport Sciences

Editor
Eren ULUÖZ
ORCID iD: 0000-0002-4037-0634

Publishing Coordinator
Yasin DİLMEN

Page and Cover Design
Typesetting and Cover Design by Akademisyen

Publisher Certificate Number
47518

Printing and Binding
Vadi Printingpress

Bisac Code
SPO000000

DOI
10.37609/akya.3507

Library ID Card
Orthopedics in Sports Injuries & Sport Sciences / ed. Eren Uluöz.
Ankara : Academician Bookstore, 2024.
122 p. : table, figure. ; 160x235 mm.
Includes References.
ISBN 9786253752286

GENERAL DISTRIBUTION
Akademisyen Kitabevi AŞ

Halk Sokak 5 / A Yenişehir / Ankara
Tel: 0312 431 16 33
siparis@akademisyen.com

www.akademisyen.com

PREFACE

Dear Readers,

In today's modern life, the importance given to human health is increasing day by day. Humanity is facing a rapidly increasing risk of chronic diseases. Health problems that persist for more than one year, require medical or surgical treatment and negatively affect daily life are called chronic diseases. Chronic diseases can develop due to multiple factors and can be kept under control with the right treatment. In some chronic diseases, the negative effects are felt immediately. Some chronic diseases can lead to a decrease in the quality of life, reduce the ability to work, and require limiting or changing some of the daily activities. Psychological symptoms such as loss of self-confidence, depression, anger and helplessness may be observed in people with chronic illnesses due to reduced quality of life, restriction of daily activities or difficulty in accepting the disease. The world of medicine works together with many different disciplines to prevent or recover from diseases. Especially in the last 50 years, people are turning more towards sports activities, exercise and physical activities to protect themselves from the risk of chronic diseases brought about by modern living conditions. In recent years, governmental organizations, private companies and charitable organizations have also supported corporate social responsibility projects to promote sports and sports branches that can be done in different seasons. With these supports, the prevalence of sports in the society is increasing. However, people interest in sports activities, whether they are at recreational, amateur or professional level, also carries some orthopedic injury risks. Orthopedists and sports scientists have been working in a mutually supportive structure for many years on the correct approach to sports injuries. In this book, we aim to offer readers a different perspective with chapters that address sports sciences and orthopedic health of athletes together. In this respect, I hope that this book will be useful for the stakeholders of the subject.

Eren Uluöz

Professor

Department of Sports and Health Sciences

Cukurova University, Sports Sciences Faculty

2024

CONTENTS

AUTHORS

Assoc. Prof. Dr. Özhan BAVLI
Çanakkale Onsekiz Mart University, Faculty of Sport Science

Prof. Dr. F. Pervin BİLİR
Çukurova University, Faculty of Sport Science

MD Mehmet Yiğit GÖKMEN
Department of Orthopaedics and Traumatology, University of Health Sciences, Adana City Training and Research Hospital

Ergin KARINCAOĞLU
Çukurova University, Institute of Medical Sciences

Gürsoy OLCA
Cukurova University Institute of Medical Sciences

Assist. Prof. Dr. Can ÖZGIDER
Çanakkale Onsekiz Mart University, Faculty of Sport Sciences

Prof. Dr. Eren ULUÖZ
Çukurova University Faculty of Sport Sciences

Asst. Prof. Dr. Canan SAYIN TEMUR
Ankara Yıldırım Beyazıt University, Faculty of Sports Science

Dr. Serkan VAROL
Bingöl Provincial Directorate of Youthand Sports

Chapter 1

CLASSIFICATION, TREATMENT, AND REHABILITATION OF LOWER EXTREMITY FRACTURES IN FOOTBALL PLAYERS

Mehmet Yiğit GÖKMEN[1]

INTRODUCTION

Football is a sport followed by billions of people, and millions of individuals worldwide actively play it. Requiring physical attributes such as speed, agility, strength, and endurance, as well as tactical intelligence and technical skills, football places significant physical demands on players. During matches, sudden changes in direction, acceleration, deceleration, jumping, and landing movements subject the lower extremities to repeated microtrauma and acute injuries (1). In this context, lower extremity injuries are among the most common types of injuries in football players, with fractures occupying a particularly significant place among these (2).

Lower extremity fractures are serious orthopedic issues that can lead to career-ending injuries in football players. These fractures often result from high-energy trauma, landing on uneven surfaces, or physical contact between players. Tibia and fibula fractures, in particular, may occur during high-impact collisions or as a result of overuse (3). Additionally, specific injuries frequently seen in football players, such as fifth metatarsal fractures, are associated with sport-specific mechanisms and hold particular significance in terms of recovery. For instance, fifth metatarsal fractures, commonly referred to as "Jones fractures," pose challenges due to poor vascular supply, leading to difficulties in healing and an increased risk of nonunion (4,5).

The management of lower extremity fractures in football players extends beyond merely achieving anatomical correction of the fracture. A primary goal of treatment is ensuring the athlete's safe and efficient return to their previous performance level as quickly as possible. Accordingly, surgical treatment methods

[1] MD, Department of Orthopaedics and Traumatology, University of Health Sciences, Adana City Training and Research Hospital, mehmet_yigit_gokmen@hotmail.com, ORCID iD: 0000-0003-1243-2057

comprehensive approach encompasses surgical treatment, rehabilitation, long-term follow-up, and psychological support. A multidisciplinary strategy that considers the athlete's individual needs and the demands of the sport is the most effective method for achieving both short-term recovery and long-term success.

Future research should focus on developing new treatment methods and technologies to improve the management of lower extremity fractures in football players. Regenerative medicine applications, the use of biological agents, and advanced motion analysis systems have the potential to revolutionize treatment approaches in this field. Additionally, expanding the implementation of injury prevention programs will contribute to safer and more sustainable career trajectories for football players.

Enhancing interdisciplinary collaboration and individualizing treatment protocols in the management of lower extremity fractures will not only safeguard the health and performance of athletes but also advance the field of sports medicine. Coordination among surgeons, physiotherapists, sports physicians, strength and conditioning coaches, and psychologists is vital. A well-planned and effectively executed treatment process ensures that football players not only recover fully but also continue to achieve success on the field.

REFERENCES

1. Maffulli N, Longo UG, Gougoulias N, Caine D, Denaro V. Sport injuries: a review of outcomes. *British Medical Bulletin*. 2011;97(1):47-80. doi:10.1093/bmb/ldq026
2. Lakshakar P, Sathe P, Sathe A. Common Sports Injury in Football Players: A Review. *Int J Sci Healthcare Res*. 2022;7(2):26-34. doi:10.52403/ijshr.20220405
3. Boden BP, Lohnes JH, Nunley JA, Garrett Jr. WE. Tibia and fibula fractures in soccer players. *Knee Surgery, Sports Traumatology, Arthroscopy*. 1999;7(4):262-266. doi:10.1007/s001670050160
4. Attia AK, Taha T, Kong G, Alhammoud A, Mahmoud K, Myerson M. Return to Play and Fracture Union After the Surgical Management of Jones Fractures in Athletes: A Systematic Review and Meta-analysis. *Am J Sports Med*. 2021;49(12):3422-3436. doi:10.1177/0363546521990020
5. Beddard L, Roslee C, Kelsall N. Acute and stress fractures of the metatarsals in athletes. *Orthopaedics and Trauma*. 2024;38(1):46-50. doi:10.1016/j.mporth.2023.11.008
6. Miller B, Phillips M, Krech L, et al. Outcomes of simultaneous versus staged intramedullary nailing fixation of multiple long bone lower extremity fractures. *Injury*. 2023;54(7):110831. doi:10.1016/j.injury.2023.05.062
7. Dijkstra HP, Pollock N, Chakraverty R, Ardern CL. Return to play in elite sport: a shared decision-making process. *Br J Sports Med*. 2017;51(5):419-420. doi:10.1136/bjsports-2016-096209
8. Mitchell A, Gimpel M. A Return-to-Performance Pathway for Professional Soccer: A Criteria-based Approach to Return Injured Professional Players Back to Performance. *JOSPT Open*. 2024;2(3):166-178. doi:10.2519/josptopen.2024.1240

9. Daas S, Jlidi M, Baghdadi N, et al. Risk factors for malunion of distal tibia fractures treated by intramedullary nailing. *J Orthop Surg Res*. 2024;19(1):5. doi:10.1186/s13018-023-04472-3
10. d'Hooghe P, Pereira H, Zaffagnini S. Football Ankle Fractures and Return to Sport: A Review on the Arthroscopic Approach. In: Van Dijk CN, Neyret P, Cohen M, Della Villa S, Pereira H, Oliveira JM, eds. *Injuries and Health Problems in Football*. Springer Berlin Heidelberg; 2017:129-142. doi:10.1007/978-3-662-53924-8_13
11. Marsh JL, Slongo TF, Agel J, et al. Fracture and Dislocation Classification Compendium - 2007: Orthopaedic Trauma Association Classification, Database and Outcomes Committee. *Journal of Orthopaedic Trauma*. 2007;21(Supplement):S1-S6. doi:10.1097/00005131-200711101-00001
12. Sikka R, Fetzer G, Hunkele T, Sugarman E, Boyd J. Femur Fractures in Professional Athletes: A Case Series. *Journal of Athletic Training*. 2015;50(4):442-448. doi:10.4085/1062-6050-49.5.10
13. Bandeira-Rodrigues E, Vasta S, Leitão JC, Monllau JC. Femur Fractures. In: Van Dijk CN, Neyret P, Cohen M, Della Villa S, Pereira H, Oliveira JM, eds. *Injuries and Health Problems in Football*. Springer Berlin Heidelberg; 2017:243-256. doi:10.1007/978-3-662-53924-8_21
14. Pesch S, Greve F, Zyskowski M, et al. High return to sports rates after operative treatment of patella fractures. *Eur J Med Res*. 2023;28(1):366. doi:10.1186/s40001-023-01359-1
15. Lenehan B, Fleming P, Walsh S, Kaar K. Tibial shaft fractures in amateur footballers. *Br J Sports Med*. 2003;37(2):176-178. doi:10.1136/bjsm.37.2.176
16. Canton G, Sborgia A, Maritan G, et al. Fibula fractures management. *WJO*. 2021;12(5):254-269. doi:10.5312/wjo.v12.i5.254
17. Wall R, Plant C, Chapman AW. Ankle fractures in the athlete: epidemiology, anatomy and management considerations. *Orthopaedics and Trauma*. 2024;38(1):2-6. doi:10.1016/j.mporth.2023.11.001
18. Ruta DJ, Parker D. Jones Fracture Management in Athletes. *Orthopedic Clinics of North America*. 2020;51(4):541-553. doi:10.1016/j.ocl.2020.06.010
19. Luo EJ, Anastasio AT, Stauffer T, et al. Jones Fracture in the National Football League. *Sports*. 2023;12(1):7. doi:10.3390/sports12010007
20. Dheenadhayalan J, Nagashree V, Devendra A, Velmurugesan PS, Rajasekaran S. Management of open fractures: A narrative review. *Journal of Clinical Orthopaedics and Trauma*. 2023;44:102246. doi:10.1016/j.jcot.2023.102246
21. Stathas I, Kalliakmanis A, Kekelekis A, Danassi Afentaki D, Tsepis E, Fousekis K. Effectiveness of an On-Field Rehabilitation framework for return to sports in injured male professional football players: a single-blinded, prospective, randomised controlled trial. *BMJ Open Sport Exerc Med*. 2024;10(1):e001849. doi:10.1136/bmjsem-2023-001849
22. Gastaldo M, Gokeler A, Della Villa F. High quality rehabilitation to optimize return to sport following lateral meniscus surgery in football players. *Ann Joint*. 2022;7:36-36. doi:10.21037/aoj-21-32
23. Wascher DC, Bulthuis L. Extremity trauma: field management of sports injuries. *Curr Rev Musculoskelet Med*. 2014;7(4):387-393. doi:10.1007/s12178-014-9242-y
24. Robertson GA. Fractures in sport: Optimising their management and outcome. *WJO*. 2015;6(11):850. doi:10.5312/wjo.v6.i11.850

25. Taberner M, Van Dyk N, Allen T, et al. Physical preparation and return to sport of the football player with a tibia-fibula fracture: applying the 'control-chaos continuum.' *BMJ Open Sport Exerc Med*. 2019;5(1):e000639. doi:10.1136/bmjsem-2019-000639
26. Marder RA, Chapman MW. Principles of Management of Fractures in Sports. *Clinics in Sports Medicine*. 1990;9(1):1-11. doi:10.1016/S0278-5919(20)30753-5
27. Wood AM. Complications. In: Khodaee M, Waterbrook AL, Gammons M, eds. *Sports-Related Fractures, Dislocations and Trauma*. Springer International Publishing; 2020:105-115. doi:10.1007/978-3-030-36790-9_11
28. Waldrop N, Cain L, Emblom B, Ryan M. Functional Return to Play after Surgical Treatment of Lower-Extremity Injuries using Global Positioning System Profiles in Elite College Football Players. *Foot & Ankle Orthopaedics*. 2017;2(3):2473011417S000401. doi:10.1177/2473011417S000401
29. Mittal R, Banerjee S. Proximal femoral fractures: Principles of management and review of literature. *J Clin Orthop Trauma*. 2012;3(1):15-23. doi:10.1016/j.jcot.2012.04.001
30. Chang WR, Kapasi Z, Daisley S, Leach WJ. Tibial shaft fractures in football players. *J Orthop Surg Res*. 2007;2(1):11. doi:10.1186/1749-799X-2-11
31. Jeelani A, Arastu MH. Tibial plateau fractures – review of current concepts in management. *Orthopaedics and Trauma*. 2017;31(2):102-115. doi:10.1016/j.mporth.2016.10.005
32. Hennings R, Souleiman F, Heilemann M, et al. Suture button versus syndesmotic screw in ankle fractures - evaluation with 3D imaging-based measurements. *BMC Musculoskelet Disord*. 2021;22(1):970. doi:10.1186/s12891-021-04834-0
33. Chloros GD, Kakos CD, Tastsidis IK, Giannoudis VP, Panteli M, Giannoudis PV. Fifth metatarsal fractures: an update on management, complications, and outcomes. *EFORT Open Reviews*. 2022;7(1):13-25. doi:10.1530/EOR-21-0025
34. Hamilton GA, Doyle MD, Ligas CJ. Management of Talus Fractures. *Clinics in Podiatric Medicine and Surgery*. 2024;41(3):451-471. doi:10.1016/j.cpm.2024.01.005
35. Kubisa MJ, Kubisa MG, Pałka K, Sobczyk J, Bubieńczyk F, Łęgosz P. Avascular Necrosis of the Talus: Diagnosis, Treatment, and Modern Reconstructive Options. *Medicina*. 2024;60(10):1692. doi:10.3390/medicina60101692
36. Steinmetz S, Brgger A, Chauveau J, Chevalley F, Borens O, Thein E. Practical guidelines for the treatment of patellar fractures in adults. *Swiss Med Wkly*. Published online January 15, 2020. doi:10.4414/smw.2020.20165
37. Coslick AM, Lestersmith D, Chiang CC, Scura D, Wilckens JH, Emam M. Lower Extremity Bone Stress Injuries in Athletes: an Update on Current Guidelines. *Curr Phys Med Rehabil Rep*. 2024;12(1):39-49. doi:10.1007/s40141-024-00429-7
38. Wentz K, Marcolina A, Argo LR. Fracture Rehabilitation. In: Robertson GAJ, Maffulli N, eds. *Fractures in Sport*. Springer International Publishing; 2021:97-108. doi:10.1007/978-3-030-72036-0_7
39. Öztürk Ö, Ülkü K. Elit sporcularda ayak ve ayak bileği çevresi yumuşak doku yaralanmaları. *TOTBİD Dergisi*. 2024;23(5):466-478. doi:10.5578/totbid.dergisi.2024.64
40. Diliçıkık U, Tıraş M, Elvan D. Return-to-play and physiotherapy principles following shoulder and elbow problems in athletes. *TOTBİD Dergisi*. 2023;22(3):306-314. doi:10.5578/totbid.dergisi.2023.47
41. Elsevier H, Cannada LK. Management of Pain Associated with Fractures. *Curr Osteoporos Rep*. 2020;18(3):130-137. doi:10.1007/s11914-020-00578-3

42. Winter L, Huang Q, Sertic JVL, Konczak J. The Effectiveness of Proprioceptive Training for Improving Motor Performance and Motor Dysfunction: A Systematic Review. *Front Rehabilit Sci*. 2022;3:830166. doi:10.3389/fresc.2022.830166
43. Buckthorpe M, Della Villa F, Della Villa S, Roi GS. On-field Rehabilitation Part 2: A 5-Stage Program for the Soccer Player Focused on Linear Movements, Multidirectional Movements, Soccer-Specific Skills, Soccer-Specific Movements, and Modified Practice. *Journal of Orthopaedic & Sports Physical Therapy*. 2019;49(8):570-575. doi:10.2519/jospt.2019.8952
44. Aydoğan Z, Kerkez Fİ, Can S, Manav G. Spor Yaralanmalarının Psikolojik Etkilerinin Değerlendirilmesi. *Akdeniz Spor Bilimleri Dergisi*. 2022;5(2):278-290. doi:10.38021/asbid.1122253
45. Dluzniewski A, Casanova MP, Ullrich-French S, Brush CJ, Larkins LW, Baker RT. Psychological readiness for injury recovery: evaluating psychometric properties of the IPRRS and assessing group differences in injured physically active individuals. *BMJ Open Sport Exerc Med*. 2024;10(2):e001869. doi:10.1136/bmjsem-2023-001869
46. Ayyadurai P, Perumal S, Sivaraman A, Gopalakrishnan J, Thiagarajan KA, Singh U. A Review of Football Injuries and the Role of 3D Biomechanical Analysis in Injury Prevention. *Journal of Postgraduate Medicine, Education and Research*. 2021;54(4):206-212. doi:10.5005/jp-journals-10028-1420
47. Sadigursky D, Braid JA, De Lira DNL, Machado BAB, Carneiro RJF, Colavolpe PO. The FIFA 11+ injury prevention program for soccer players: a systematic review. *BMC Sports Sci Med Rehabil*. 2017;9(1):18. doi:10.1186/s13102-017-0083-z
48. Eickhoff AM, Cintean R, Fiedler C, Gebhard F, Schütze K, Richter P. Influence of Weight Bearing on Postoperative Complications after Surgical Treatment of the Lower Extremity. *Z Orthop Unfall*. 2023;161(05):526-531. doi:10.1055/a-1740-4445
49. Neumann MV, Strohm PC, Reising K, Zwingmann J, Hammer TO, Suedkamp NP. Complications after surgical management of distal lower leg fractures. *Scand J Trauma Resusc Emerg Med*. 2016;24(1):146. doi:10.1186/s13049-016-0333-1
50. Miller D, Marsland D, Jones M, Calder J. Early return to playing professional football following fixation of 5th metatarsal stress fractures may lead to delayed union but does not increase the risk of long-term non-union. *Knee Surg Sports Traumatol Arthrosc*. 2019;27(9):2796-2801. doi:10.1007/s00167-018-5104-2
51. Yang J, Zhang X, Liang W, et al. Efficacy of adjuvant treatment for fracture nonunion/delayed union: a network meta-analysis of randomized controlled trials. *BMC Musculoskelet Disord*. 2022;23(1):481. doi:10.1186/s12891-022-05407-5
52. Agarwal A. Malunions: Introduction and Brief Overview. In: Agarwal A, ed. *Malunions*. Springer US; 2021:1-12. doi:10.1007/978-1-0716-1124-1_1
53. Sebastian AS, Sathikumar AS, Thomas AB, Varghese J. Arthroscopic Arthrolysis of Knee: Timing, Technique and Results. *JOIO*. 2024;58(2):210-216. doi:10.1007/s43465-023-01081-4
54. Palmieri-Smith RM, Cameron KL, DiStefano LJ, et al. The Role of Athletic Trainers in Preventing and Managing Posttraumatic Osteoarthritis in Physically Active Populations: a Consensus Statement of the Athletic Trainers' Osteoarthritis Consortiuma. *Journal of Athletic Training*. 2017;52(6):610-623. doi:10.4085/1062-6050-52.2.04
55. Carlson Strother C, Dittman LE, Spinner RJ, Bishop AT, Shin AY. Surgical management of peroneal nerve injuries. *Acta Neurochir*. 2023;165(9):2573-2580. doi:10.1007/s00701-023-05727-y

56. Pang Z, Zhu S, Shen YD, et al. Functional outcomes of different surgical treatments for common peroneal nerve injuries: a retrospective comparative study. *BMC Surg*. 2024;24(1):64. doi:10.1186/s12893-024-02354-x
57. Nefiss M, Bousrih A, Kooli K, Teborbi A, Riahi H, Chelli Bouaziz M. Clinical Management of Surgical Site Infections. In: Rammeh Rommani S, Ladeb MF, eds. *Histopathology of Bone and Joint Infections*. Springer Nature Switzerland; 2024:61-81. doi:10.1007/978-3-031-54888-8_4
58. Gomez-Espejo V, Olmedilla A, Abenza-Cano L, Garcia-Mas A, Ortega E. Psychological readiness to return to sports practice and risk of recurrence: Case studies. *Front Psychol*. 2022;13:905816. doi:10.3389/fpsyg.2022.905816
59. Villa FD, Villa SD, Mendes JE. Multidisciplinary Sport Medicine Team. In: Rocha Piedade S, Imhoff AB, Clatworthy M, Cohen M, Espregueira-Mendes J, eds. *The Sports Medicine Physician*. Springer International Publishing; 2019:3-11. doi:10.1007/978-3-030-10433-7_1
60. Lavoie-Gagne O, Gong MF, Patel S, et al. Traumatic Leg Fractures in UEFA Football Athletes: A Matched-Cohort Analysis of Return to Play, Reinjury, Player Retention, and Performance Outcomes. *Orthopaedic Journal of Sports Medicine*. 2021;9(9):23259671211024218. doi:10.1177/23259671211024218
61. Dönmez G, Babayeva N, Torgutalp ŞŞ, Korkusuz F, Doral MN. Return to Play After Intra-articular Knee Fractures. In: Doral MN, Karlsson J, Nyland J, Benedetto KP, eds. *Intraarticular Fractures*. Springer International Publishing; 2019:409-415. doi:10.1007/978-3-319-97602-0_44
62. Gervis M, Pickford H, Hau T, Fruth M. A review of the psychological support mechanisms available for long-term injured footballers in the UK throughout their rehabilitation. *Science and Medicine in Football*. 2020;4(1):22-29. doi:10.1080/24733938.2019.1634832
63. Michailidis Y. Relation of Jump and Change of Direction Inter-Limb Asymmetries with Fitness in Youth Male Soccer Players. *Medicina*. 2023;59(10):1749. doi:10.3390/medicina59101749
64. Mandroukas A, Michailidis Y, Metaxas T. Muscle Strength and Hamstrings to Quadriceps Ratio in Young Soccer Players: A Cross-Sectional Study. *JFMK*. 2023;8(2):70. doi:10.3390/jfmk8020070
65. Barengo N, Meneses-Echávez J, Ramírez-Vélez R, Cohen D, Tovar G, Bautista J. The Impact of the FIFA 11+ Training Program on Injury Prevention in Football Players: A Systematic Review. *IJERPH*. 2014;11(11):11986-12000. doi:10.3390/ijerph111111986
66. Cornish SM, Barnes MJ. Editorial: Nutrition and muscle recovery after exercise. *Front Sports Act Living*. 2024;6:1413822. doi:10.3389/fspor.2024.1413822
67. Edouard P, Ford KR. Great Challenges Toward Sports Injury Prevention and Rehabilitation. *Front Sports Act Living*. 2020;2:80. doi:10.3389/fspor.2020.00080
68. Uluöz, E. Investigation of sport injury patterns in female futsal players. International *Journal of Sport Culture and Science,* 2016, 4.4: 474-488. doi:10.14486/IntJSCS606

Chapter 2

EFFECT OF AQUATIC EXERCISE ON RECOVERY FROM SPORTS INJURIES

Özhan BAVLI[1]

1.BENEFITS OF AQUATIC THERAPY

Aquatic therapy, also known as hydrotherapy, involves performing therapeutic exercises in water. This modality leverages the unique properties of water—such as buoyancy, viscosity, and hydrostatic pressure—to facilitate rehabilitation and enhance physical function. One of the primary advantages of aquatic therapy is its capacity to alleviate pain. The buoyancy of water reduces gravitational forces on the body, decreasing joint stress and allowing for pain-free movement. Warm water further aids in relaxing muscles and reducing spasms. For instance, a systematic review and meta-analysis by Baena-Beato et al. (2014) demonstrated that aquatic therapy significantly reduced pain intensity in patients with chronic low back pain. Aquatic therapy has been shown to improve mobility and balance, particularly in older adults. The viscosity of water provides resistance that enhances muscle strength, while buoyancy supports movement, reducing the risk of falls. A systematic review by Shariat et al. (2022) found that aquatic therapy positively impacted dynamic balance in older adults, suggesting its efficacy in fall prevention programs. Engaging in aquatic therapy can lead to significant improvements in quality of life. The supportive environment of water enables individuals to perform exercises that might be challenging on land, fostering a sense of achievement and well-being. A study by Cuesta-Vargas et al. (2011) reported that participants undergoing aquatic therapy experienced enhanced physical function and overall life satisfaction.

Aquatic therapy has been effective in reducing disability associated with various conditions. The combination of reduced pain, improved strength, and enhanced mobility contributes to greater functional independence. Dundar et al. (2009) conducted a randomized controlled trial indicating that aquatic

[1] Assoc. Prof. Dr., Çanakkale Onsekiz Mart University, Faculty of Sport Science, ozhanbavli@comu.edu.tr, ORCID iD: 0000-0002-6850-9925

those recovering from surgeries. The ability to perform weight-bearing exercises without exacerbating pain or swelling accelerates recovery, allowing athletes to return to their sport faster. Aquatic therapy is also effective in preventing long-term overuse injuries, as it allows athletes to train intensively without placing additional strain on the body. This is especially beneficial for endurance athletes who may experience repetitive stress injuries from land-based training.

Aquatic exercise offers a variety of benefits for athletes aiming to enhance their sport performance. From improving muscular strength and cardiovascular endurance to increasing flexibility and preventing injuries, aquatic exercise is a valuable training modality. By utilizing the properties of water, athletes can engage in high-intensity workouts that minimize the risk of injury and promote recovery. As research continues to support the effectiveness of aquatic exercise in sport performance, more athletes are incorporating water-based training into their routines for its unique advantages.

REFERENCES

Alkatan, M., Baker, J. R., Machin, D. R., Park, W., Akkari, A. S., & Tanaka, H. (2016). Improved function and reduced pain after swimming and cycling training in patients with osteoarthritis. Journal of Rheumatology, 43(3), 666–672. https://doi.org/10.3899/jrheum.151110

Asimenia, G., Paraskevi, M., Polina, S., Anastasia, B., Kyriakos, T., & George, K. (2013). Aquatic training for ankle instability. Foot & Ankle Specialist, 6(5), 346-351. https://doi.org/10.xxxx

Baena-Beato, P. A., Arroyo-Morales, M., Delgado-Fernández, M., Gatto-Cardia, M. C., & Artero, E. G. (2014). Effects of different frequencies (2–3 days/week) of aquatic therapy program in adults with chronic low back pain: A non-randomized comparison trial. Pain Medicine, 15(4), 577-588. https://doi.org/10.1111/pme.12374

Baena-Beato, P. Á., Artero, E. G., Arroyo-Morales, M., Robles-Fuentes, A., Gatto-Cardia, M. C., & Delgado-Fernández, M. (2014). Aquatic therapy improves pain, disability, quality of life, body composition and fitness in sedentary adults with chronic low back pain: A controlled clinical trial. Clinical Rehabilitation, 28(4), 350–360. https://doi.org/10.1177/0269215513504943

Bavli, O. (2012). Comparison the effect of water plyometrics and land plyometrics on body mass index and biomotorical variables of adolescent basketball players. *International Journal of Sport and Exercise Science*, *4*(1), 11-14.

Becker, B. E. (2009). Aquatic therapy: Scientific foundations and clinical rehabilitation applications. PM&R, 1(9), 859-872. https://doi.org/10.1016/j.pmrj.2009.05.017

Buckthorpe, M., La Rosa, G., & Della Villa, F. (2019). Restoring knee-extensor strength after anterior cruciate ligament reconstruction: A clinical commentary. International Journal of Sports Physical Therapy, 14(1), 159–172. https://doi.org/10.26603/ijspt20190159

Colado, J. C., Tella, V., Triplett, N. T., & Gonzalez, L. M. (2010). A method for monitoring intensity during aquatic resistance exercises: Practical applications for exercise prescription. Journal of Strength and Conditioning Research, 24(5), 1360-1366. https://doi.org/10.1519/JSC.0b013e3181d82d8b

Cuesta-Vargas, A. I., García-Romero, J. C., & Arroyo-Morales, M. (2011). Exercise, manual therapy, and education with or without high-intensity deep-water running for nonspecific chronic low back pain: A pragmatic randomized controlled trial. American Journal of Physical Medicine & Rehabilitation, 90(7), 526-534. https://doi.org/10.1097/PHM.0b013e31821f6c63

Dufournet, A., Chong, X. L., Schwitzguébel, A., Bernimoulin, C., Carvalho, M., Bothorel, H., & Lädermann, A. (2022). Aquatic therapy versus standard rehabilitation after surgical rotator cuff repair: a randomized prospective study. *Biology*, *11*(4), 610.

Dundar, U., Solak, O., Yigit, I., Evcik, D., & Kavuncu, V. (2009). Clinical effectiveness of aquatic exercise to treat chronic low back pain: A randomized controlled trial. Spine, 34(14), 1436-1440. https://doi.org/10.1097/BRS.0b013e3181a4e533

Gibson, A., & Shields, N. (2015). Effects of aquatic therapy and land-based therapy versus land-based therapy alone on range of motion, edema, and function after hip or knee replacement: A systematic review and meta-analysis. Archives of Physical Medicine and Rehabilitation, 96(3), 367-380. https://doi.org/10.xxxx

Gökmen, M. Y Çepikkurt, F, Belibağlı, M. C., Uluöz, M, Özyol, F. Ç., Bavlı, Ö, ...& Türkmen, M. (2004). Do we need a guideline for all: a qualitative study on the experiences of male athletes following anterior cruciate ligament reconstruction. BMC Sports Science, Medicine and Rehabilitation, 16(1), 225.

Kim, E., Kim, T., Kang, H., Lee, J., & Childers, M. K. (2010). Aquatic versus land-based exercises as early functional rehabilitation for elite athletes with acute lower extremity ligament injury: a pilot study. *PM&R*, *2*(8), 703-712.

Moffatt, F. (2017). The individual physical health benefits of swimming: a literature review. *The health & wellbeing benefits of swimming*, 8-25.

Nagle, E. F., Robertson, R. J., Jakicic, J. J., & Otto, A. D. (2007). Effects of a combined aquatic exercise and walking in sedentary obese females undergoing a behavioral weight-loss intervention. International Journal of Aquatic Research and Education, 7(3), 208-220. https://doi.org/10.25035/ijare.07.03.03

Pereira Neiva, H., Brandão Faíl, L., Izquierdo, M., Marques, M. C., & Marinho, D. A. (2018). The effect of 12 weeks of water-aerobics on health status and physical fitness: An ecological approach. *PloS one*, *13*(5), e0198319.

Prins, J., & Cutner, D. (1999). Aquatic therapy in the rehabilitation of athletic injuries. *Clinics in sports medicine*, *18*(2), 447-461.

Rahmann, A. E., Brauer, S. G., & Nitz, J. C. (2009). A specific inpatient aquatic physiotherapy program improves strength after total hip or knee replacement surgery: A randomized controlled trial. Archives of Physical Medicine and Rehabilitation, 90(5), 745-755. https://doi.org/10.xxxx

Sadaak, M. M., AbdElMageed, S. F., & Ibrahim, M. M. (2024). Effect of aquatic versus conventional physical therapy program on ankle sprain grade III in elite athletes. Journal of Orthopaedic Surgery and Research, 19, 245–259. https://doi.org/10.1186/s13018-024-04855-0

Shariat, A., Ghayour Najafabadi, M., Ghannadi, S., Hakakzadeh, A., Shaw, B. S., Ingle, L., & Cleland, J. A. (2022). Effects of aquatic therapy on balance in older adults: A systematic review and meta-analysis. European Geriatric Medicine, 13(2), 381-393. https://doi.org/10.1007/s41999-021-00577-2

Tang, Z., Wang, Y., Liu, J., & Liu, Y. (2022). Effects of aquatic exercise on mood and anxiety symptoms: A systematic review and meta-analysis. *Frontiers in Psychiatry*, *13*, 1051551.

Tidhar, D., & Katz-Leurer, M. (2010). Aqua lymphatic therapy in women who suffer from breast cancer treatment-related lymphedema: a randomized controlled study. *Supportive Care in Cancer*, *18*, 383-392.

Uluöz, E. (2016). *Voleybolda fileye temas kuralında yapılan değişikliklerin oyun ve oyuncular üzerindeki etkileri* (No. 48). Nobel Akademik Yayıncılık Eğitim Danışmanlık Tic. Ltd. Şti.

Wang, T., Wang, J., Chen, Y., Ruan, Y., & Dai, S. (2023). Efficacy of aquatic exercise in chronic musculoskeletal disorders: a systematic review and meta-analysis of randomized controlled trials. *Journal of Orthopaedic Surgery and Research*, *18*(1), 942.. https://doi.org/10.1186/s13018-023-04417-w

Chapter 3

INJURIES IN COMBAT SPORTS: CHALLENGES, STRATEGIES, AND EMERGING SOLUTIONS

Mehmet Yiğit GÖKMEN[1]

INTRODUCTION

Combat sports, a category of athletics that includes boxing, wrestling, mixed martial arts (MMA), judo, taekwondo, and similar disciplines, hold a unique place in the global sports landscape. These sports, deeply rooted in cultural traditions and modern competitive arenas, test the limits of human strength, agility, endurance, and strategy. They attract millions of participants and spectators worldwide, contributing to their undeniable popularity and significance [1,2].

The appeal of combat sports lies in their raw physicality and strategic complexity, but these very attributes also bring inherent risks. Unlike non-contact sports, combat sports involve deliberate physical confrontation, often leading to high-impact collisions and repetitive stress on the body. The result is a wide spectrum of injuries, ranging from superficial bruises and lacerations to severe conditions like traumatic brain injuries (TBIs), spinal cord damage, and long-term musculoskeletal disorders [3].

The prevalence and severity of injuries in combat sports make them a critical area of study for both healthcare professionals and sports scientists. For orthopedists, these injuries pose unique challenges in diagnosis, treatment, and long-term management. For sports scientists and coaches, understanding the mechanisms behind these injuries is essential to developing effective prevention strategies and optimizing athlete performance while minimizing risk [4,5].

Injury risk in combat sports is influenced by various factors, including the sport's specific rules and techniques, the athlete's skill level and conditioning, and external elements such as protective equipment and training environments. For instance, a boxer is more likely to sustain hand fractures and concussions,

[1] MD, Department of Orthopaedics and Traumatology, University of Health Sciences, Adana City Training and Research Hospital, mehmet_yigit_gokmen@hotmail.com, ORCID iD: 0000-0003-1243-2057

Advancements in sports medicine, including wearable technology, biomechanical analysis, and personalized approaches, offer promising avenues for reducing injury risks and optimizing athlete care. These innovations, combined with improved diagnostic and rehabilitation techniques, have the potential to revolutionize the way injuries are managed in combat sports. However, the integration of these advancements into practice requires collaboration among medical professionals, sports scientists, coaches, and governing bodies.

The ethical responsibility to protect athletes while preserving the competitive essence of combat sports underscores the importance of ongoing research and education. By fostering a culture of safety and evidence-based practices, the combat sports community can ensure that athletes continue to perform at their best while minimizing long-term health risks.

In conclusion, injuries in combat sports represent a complex interplay of physical, technical, and environmental factors. Addressing these challenges requires a multidisciplinary approach that combines cutting-edge technology, rigorous research, and a commitment to athlete well-being. With continued efforts and innovation, the future of combat sports can be one of greater safety and sustainability, allowing athletes to compete and excel while safeguarding their health.

REFERENCES

1. Barley OR, Harms CA. Profiling Combat Sports Athletes: Competitive History and Outcomes According to Sports Type and Current Level of Competition. *Sports Med - Open*. 2021;7(1):63. doi:10.1186/s40798-021-00345-3
2. Ambroży T, Wąsacz W, Koteja A, et al. Special fitness level of combat sports athletes: mixed martial arts (MMA) and thai boxing (muay thai) in the aspect of training experience. *Journal of Kinesiology and Exercise Sciences*. 2021;31(95):25-37. doi:10.5604/01.3001.0015.7582
3. Limani N, Bulica B. INTO CONTEMPORARY DYNAMICS OF COMBAT SPORTS: A HOLISTIC ANALYSIS. *sport*. 2024;11(23-24):61-71. doi:10.62792/ut.sport.v11.i23-24.p2541
4. Sobieraj T, Kaczmarczyk K, Wit A. Epidemiology of musculoskeletal injuries in combat sports practitioners. *Biomedical Human Kinetics*. 2023;15(1):27-34. doi:10.2478/bhk-2023-0004
5. Lystad RP, Alevras A, Rudy I, Soligard T, Engebretsen L. Injury incidence, severity and profile in Olympic combat sports: a comparative analysis of 7712 athlete exposures from three consecutive Olympic Games. *Br J Sports Med*. 2021;55(19):1077-1083. doi:10.1136/bjsports-2020-102958
6. Hammami N, Hattabi S, Salhi A, Rezgui T, Oueslati M, Bouassida A. Combat sport injuries profile: A review. *Science & Sports*. 2018;33(2):73-79. doi:10.1016/j.scispo.2017.04.014

7. Štyriak R, Hadža R, Arriaza R, Augustovičová D, Zemková E. Effectiveness of Protective Measures and Rules in Reducing the Incidence of Injuries in Combat Sports: A Scoping Review. *J Funct Morphol Kinesiol*. 2023;8(4):150. doi:10.3390/jfmk8040150
8. Mr. Amit Chauhan. Sports Medicine: Advances in Injury Prevention, Treatment, and Rehabilitation. *Inn Sports Sci*. 2024;1(1):5-9. doi:10.36676/iss.v1.i1.02
9. Rainey CE. Determining the prevalence and assessing the severity of injuries in mixed martial arts athletes. *N Am J Sports Phys Ther*. 2009;4(4):190-199.
10. Thomas RE, Thomas BC. Systematic review of injuries in mixed martial arts. *The Physician and Sportsmedicine*. 2018;46(2):155-167. doi:10.1080/00913847.2018.1430451
11. Noh JW, Park BS, Kim MY, et al. Analysis of combat sports players' injuries according to playing style for sports physiotherapy research. *J Phys Ther Sci*. 2015;27(8):2425-2430. doi:10.1589/jpts.27.2425
12. Patenteu I, Predoiu R, Makarowski R, et al. A-trait and risk-taking behavior in predicting injury severity among martial arts athletes. *Front Psychol*. 2023;14:1134829. doi:10.3389/fpsyg.2023.1134829
13. Jensen AR, Maciel RC, Petrigliano FA, Rodriguez JP, Brooks AG. Injuries Sustained by the Mixed Martial Arts Athlete. *Sports Health: A Multidisciplinary Approach*. 2017;9(1):64-69. doi:10.1177/1941738116664860
14. Lin CY, Casey E, Herman DC, Katz N, Tenforde AS. Sex Differences in Common Sports Injuries. *PM R*. 2018;10(10):1073-1082. doi:10.1016/j.pmrj.2018.03.008
15. Ristolainen L, Heinonen A, Waller B, Kujala UM, Kettunen JA. Gender differences in sport injury risk and types of inju-ries: a retrospective twelve-month study on cross-country skiers, swimmers, long-distance runners and soccer players. *J Sports Sci Med*. 2009;8(3):443-451.
16. Meyers MC. Enhancing Sport Performance: Merging Sports Science with Coaching. *International Journal of Sports Science & Coaching*. 2006;1(1):89-100. doi:10.1260/174795406776338454
17. Romero-Morales C, López-López D, Almazán-Polo J, et al. Prevalence, diagnosis and management of musculoskeletal disorders in elite athletes: A mini-review. *Disease-a-Month*. 2024;70(1):101629. doi:10.1016/j.disamonth.2023.101629
18. Hinz M, Kleim BD, Berthold DP, et al. Injury Patterns, Risk Factors, and Return to Sport in Brazilian Jiu Jitsu: A Cross-sectional Survey of 1140 Athletes. *Orthop J Sports Med*. 2021;9(12):23259671211062568. doi:10.1177/23259671211062568
19. Aicale R, Tarantino D, Maffulli N. Overuse injuries in sport: a comprehensive overview. *J Orthop Surg Res*. 2018;13(1):309. doi:10.1186/s13018-018-1017-5
20. Mortazavi J, Zebardast J, Mirzashahi B. Low Back Pain in Athletes. *Asian J Sports Med*. 2015;6(2):e24718. doi:10.5812/asjsm.6(2)2015.24718
21. Ball JR, Harris CB, Lee J, Vives MJ. Lumbar Spine Injuries in Sports: Review of the Literature and Current Treatment Recommendations. *Sports Med Open*. 2019;5(1):26. doi:10.1186/s40798-019-0199-7
22. Hoskins W. Low Back Pain and Injury in Athletes. In: Sakai Y, ed. *Low Back Pain Pathogenesis and Treatment*. InTech; 2012. doi:10.5772/35775
23. Boden BP, Lin W, Young M, Mueller FO. Catastrophic Injuries in Wrestlers. *Am J Sports Med*. 2002;30(6):791-795. doi:10.1177/03635465020300060601
24. Mańka-Malara K, Mierzwińska-Nastalska E. Head Trauma Exposure in Mixed Martial Arts. *Int J Environ Res Public Health*. 2022;19(20):13050. doi:10.3390/ijerph192013050

25. Bakirtzis D, Gkiafi Z, Sioutis S, et al. A Narrative Review of Combat Sports Injuries With a Particular Focus on Cervical Spine Injuries. *Cureus*. 2024;16(12):e74980. doi:10.7759/cureus.74980
26. Schlegel P, Novotny M, Valis M, Klimova B. Head injury in mixed martial arts: a review of epidemiology, affected brain structures and risks of cognitive decline. *The Physician and Sportsmedicine*. 2021;49(4):371-380. doi:10.1080/00913847.2021.1885966
27. Fares MY, Baydoun H, Elhassan B, Abboud JA. Upper limb injuries in mixed martial arts. *The Physician and Sportsmedicine*. 2023;51(5):434-441. doi:10.1080/00913847.2022.2123257
28. Pomerantz ML. Hand and Wrist Injuries in Mixed Martial Arts. In: Luchetti R, Pegoli L, Bain GI, eds. *Hand and Wrist Injuries In Combat Sports*. Springer International Publishing; 2018:63-76. doi:10.1007/978-3-319-52902-8_7
29. Ryu S, Lee TK. Biomechanical Parameters that May Influence Lower Limb Injury during Landing in Taekwondo. *Medicina (Kaunas)*. 2021;57(4):373. doi:10.3390/medicina57040373
30. Huang KC, Hsu WH, Wang TC. Acute injury of anterior cruciate ligament during karate training. *The Knee*. 2007;14(3):245-248. doi:10.1016/j.knee.2006.12.002
31. SantAnna JPC, Pedrinelli A, Hernandez AJ, Fernandes TL. Muscle Injury: Pathophysiology, Diagnosis, and Treatment. *Rev Bras Ortop (Sao Paulo)*. 2022;57(1):1-13. doi:10.1055/s-0041-1731417
32. Farley JB, Barrett LM, Keogh JWL, Woods CT, Milne N. The relationship between physical fitness attributes and sports injury in female, team ball sport players: a systematic review. *Sports Med Open*. 2020;6(1):45. doi:10.1186/s40798-020-00264-9
33. Müller S, Gabbett T, McNeil D. Reducing Injury Risk and Improving Skill: How a Psycho-Perceptual-Motor Approach Can Benefit High-Performance Sport. *Sports Health*. 2023;15(3):315-317. doi:10.1177/19417381231156437
34. Lenetsky S, Uthoff A, Coyne J, Cronin J. A Review of Striking Force in Full-Contact Combat Sport Athletes: Methods of Assessment. *Strength & Conditioning Journal*. 2022;44(1):71-83. doi:10.1519/SSC.0000000000000643
35. Kellmann M. Preventing overtraining in athletes in high-intensity sports and stress/recovery monitoring. *Scandinavian Med Sci Sports*. 2010;20(s2):95-102. doi:10.1111/j.1600-0838.2010.01192.x
36. Jones CM, Griffiths PC, Mellalieu SD. Training Load and Fatigue Marker Associations with Injury and Illness: A Systematic Review of Longitudinal Studies. *Sports Med*. 2017;47(5):943-974. doi:10.1007/s40279-016-0619-5
37. Benson BW, Hamilton GM, Meeuwisse WH, McCrory P, Dvorak J. Is protective equipment useful in preventing concussion? A systematic review of the literature. *Br J Sports Med*. 2009;43(Suppl 1):i56-i67. doi:10.1136/bjsm.2009.058271
38. Gabbett T, Minbashian A, Finch C. Influence of environmental and ground conditions on injury risk in rugby league. *Journal of Science and Medicine in Sport*. 2007;10(4):211-218. doi:10.1016/j.jsams.2006.11.003
39. Drury BT, Lehman TP, Rayan G. Hand and Wrist Injuries in Boxing and the Martial Arts. *Hand Clinics*. 2017;33(1):97-106. doi:10.1016/j.hcl.2016.08.004
40. Fleck SJ, Falkel JE. Value of Resistance Training for the Reduction of Sports Injuries: *Sports Medicine*. 1986;3(1):61-68. doi:10.2165/00007256-198603010-00006

41. Faigenbaum AD, Myer GD. Resistance training among young athletes: safety, efficacy and injury prevention effects. *Br J Sports Med*. 2010;44(1):56-63. doi:10.1136/bjsm.2009.068098
42. Talpey SW, Siesmaa EJ. Sports Injury Prevention: The Role of the Strength and Conditioning Coach. *Strength & Conditioning Journal*. 2017;39(3):14-19. doi:10.1519/SSC.0000000000000301
43. Pal S. Preventive Methods for Karate Injuries- A Review. *JCDR*. Published online 2020. doi:10.7860/JCDR/2020/45510.14154
44. Seshadri DR, Thom ML, Harlow ER, et al. Wearable Technology and Analytics as a Complementary Toolkit to Optimize Workload and to Reduce Injury Burden. *Front Sports Act Living*. 2021;2:630576. doi:10.3389/fspor.2020.630576
45. Seçkin AÇ, Ateş B, Seçkin M. Review on Wearable Technology in Sports: Concepts, Challenges and Opportunities. *Applied Sciences*. 2023;13(18):10399. doi:10.3390/app131810399
46. Johannsen F, Langberg H. The treatment of acute soft tissue trauma in Danish emergency rooms. *Scandinavian Med Sci Sports*. 1997;7(3):178-181. doi:10.1111/j.1600-0838.1997.tb00136.x
47. Edwards P, Ebert J, Joss B, Bhabra G, Ackland T, Wang A. EXERCISE REHABILITATION IN THE NON-OPERATIVE MANAGEMENT OF ROTATOR CUFF TEARS: A REVIEW OF THE LITERATURE. *Int J Sports Phys Ther*. 2016;11(2):279-301.
48. Kraemer W, Denegar C, Flanagan S. Recovery from injury in sport: considerations in the transition from medical care to performance care. *Sports Health*. 2009;1(5):392-395. doi:10.1177/1941738109343156
49. Hsu CJ, Meierbachtol A, George SZ, Chmielewski TL. Fear of Reinjury in Athletes. *Sports Health*. 2017;9(2):162-167. doi:10.1177/1941738116666813
50. Weiß M, Büttner M, Richlan F. The Role of Sport Psychology in Injury Prevention and Rehabilitation in Junior Athletes. *Behav Sci (Basel)*. 2024;14(3):254. doi:10.3390/bs14030254
51. Creighton DW, Shrier I, Shultz R, Meeuwisse WH, Matheson GO. Return-to-Play in Sport: A Decision-based Model. *Clinical Journal of Sport Medicine*. 2010;20(5):379-385. doi:10.1097/JSM.0b013e3181f3c0fe
52. Shrier I, Safai P, Charland L. Return to play following injury: whose decision should it be? *Br J Sports Med*. 2014;48(5):394-401. doi:10.1136/bjsports-2013-092492
53. Wang M, Pei Z. Injury prevention and rehabilitation strategies in physical education: A machine learning-based approach using biomechanical characteristics. *mcb*. 2024;21(2):412. doi:10.62617/mcb.v21i2.412
54. Li RT, Kling SR, Salata MJ, Cupp SA, Sheehan J, Voos JE. Wearable Performance Devices in Sports Medicine. *Sports Health: A Multidisciplinary Approach*. 2016;8(1):74-78. doi:10.1177/1941738115616917
55. Alzahrani A, Ullah A. Advanced biomechanical analytics: Wearable technologies for precision health monitoring in sports performance. *Digit Health*. 2024;10:20552076241256745. doi:10.1177/20552076241256745
56. Kauser MS, Kishore KC. Using motion capture technology to assess gait patterns in runners and investigate injury risks: A short review. *IJASHNB*. 2024;10(3):59-64. doi:10.18231/j.ijashnb.2024.014

57. Hussain S, Mubeen I, Ullah N, et al. Modern Diagnostic Imaging Technique Applications and Risk Factors in the Medical Field: A Review. *Biomed Res Int*. 2022;2022:5164970. doi:10.1155/2022/5164970
58. Youn BY, Ko SG, Kim JY. Genetic basis of elite combat sports athletes: a systematic review. *Biol Sport*. 2021;38(4):667-675. doi:10.5114/biolsport.2022.102864
59. Shahim P, Tegner Y, Marklund N, Blennow K, Zetterberg H. Neurofilament light and tau as blood biomarkers for sports-related concussion. *Neurology*. 2018;90(20):e1780-e1788. doi:10.1212/WNL.0000000000005518
60. Saternos H, Trautman CW, Gilmore A, Davidson BS, Gorgens KA, Ledreux A. Fluid Biomarkers in Sports-Related Mild Traumatic Brain Injuries: Current Status and Novel Trends. In: Rajendram R, Preedy VR, Patel VB, eds. *Biomarkers in Trauma, Injury and Critical Care*. Biomarkers in Disease: Methods, Discoveries and Applications. Springer International Publishing; 2022:1-26. doi:10.1007/978-3-030-87302-8_25-1
61. Testoni D, Hornik CP, Smith PB, Benjamin DK, McKinney RE. Sports medicine and ethics. *Am J Bioeth*. 2013;13(10):4-12. doi:10.1080/15265161.2013.828114
62. Ulrich G, Breitbach A. Interprofessional collaboration among sport science and sports medicine professionals: an international cross-sectional survey. *Journal of Interprofessional Care*. 2022;36(1):4-14. doi:10.1080/13561820.2021.1874318
63. Demir Benli M, Benli C, Akova B, Ergün M. Sports medicine awareness among healthcare professionals. *Turk J Sports Med*. 2024;59(2):51-55. doi:10.47447/tjsm.0808
64. Erskine NR, Hendricks S, Jones B, Salie F. Innovation in sport medicine and science: a global social network analysis of stakeholder collaboration in rugby union. *BMJ Open Sport Exerc Med*. 2024;10(1):e001559. doi:10.1136/bmjsem-2023-001559

Chapter 4

WINTER SPORTS IN TURKEY OVERVIEW OF THE OLYMPIC DISCIPLINES

Serkan VAROL[1]
Eren ULUÖZ[2]

INTRODUCTION

The term winter sports encompasses individual or team sports activities performed on snow or ice. The origins of these sports have been shaped as part of a historical process extending from ancient times to the present day, and over time they have evolved not only as a means of transportation but also as a competitive sports branch (Ülker, 2006).

The origin of winter sports dates back to the search for solutions to meet the transportation needs of people in cold climates in areas covered with snow or ice. It is thought that the first communities to use skis in these sports were the Sami and Scandinavians (Lund, 1996). Among the archaeological findings supporting this theory, rock paintings found in the Arctic regions stand out. These paintings provide striking examples depicting two skiers hunting deer (Hudson, 2003, p. 89). It was in Norway in the 19th century that winter sports gained a modern structure and acquired a sporting identity. Norwegian Sondre Nordheim developed a special binding system in this period, which gave skiers more control and mobility. Nordheim's innovative techniques brought skiing to the forefront as both a recreational and competitive sport and made significant contributions to the popularization of this sport (Lund, 1996).

The maturation of skiing in Norway and its acquisition of a national identity were part of the Norwegians' support for their independence movement against Sweden. In this context, winter sports spread to Europe and North America

[1] Dr., Bingöl Provincial Directorate of Youthand Sports, varolserkan1274@gmail.com, ORCID iD: 0000-0002-0013-5736

[2] Prof. Dr., Çukurova University Faculty of SportSciences, proferde@gmail.com, ORCID iD: 0000-0002-4037-0634

REFERENCES

Aykın, A. G., & Bilir, f. P. (2017). Evaluatıon of the relatıon between physıcal actıvıty and qualıty of lıfe ın terms of the sustaınable development: sample of antalya and osmanıye publıc educatıon centers. Nigde university journal of physical education & sport sciences/nigde üniversitesi beden egitimi ve spor bilimleri dergisi, 11(3).

Aykın, A. G., & Bilir, F. P. (2013). Hükümet Programları ve Spor Politikaları. ÇukurovaÜniversitesi Sosyal Bilimler Enstitüsü Dergisi, 22(2), 239-254.

Clifford, H. (2002). Downhill slide: Why the corporate ski industry is bad for skiing, ski towns, and the environment. (No Title).

Eski, T. (2010). Ortaöğretim öğrencilerinin kış sporlarına yönelik farkındalık düzeylerinin değerlendirilmesi. Yayınlanmamış Doktora Tezi. Gazi Üniversitesi. EBE.

Fédération Internationale de Ski (2012a). 618. History of Skiing.

Hudson, S. (2003). Sport and adventure tourism (pp. xxi+-324). New York: Haworth Hospitality Press.

İncekara, A. (1998). Doğu Anadolu›da kış turizmi ve gelişme olanakları. İstanbul Ticaret Odası.

Larsen, N. (2009). A009-10 the big snow year – altay city. Https://Altaiskis.wordpress.com/2011/06/20/2009-10-The-Big-Snow-Year-AltayCity/. 28.08.2023 Lerner, B.W. & Lerner, K. L. (Ed.2008). Climate change in context, Gale; (1 th ed.), pp.1103.

Lund, M. (1996). A short history of alpine skiing. Skiing Heritage, 8(1), 7-11.

http://www.olympic.org/en/content/Sports adresinden 10 Aralık 2024 tarihinde alınmıştır.

Olimpiyat Dünyası Dergisi. (2006). Torino 2006 Kış Olimpiyatları Eki. E. Arıpınar. (Ed). Sayı. 32. Türkiye Milli Olimpiyat Komitesi Yayınları.

Plueddeman, C. (1994). The mechanics of speed skiing. Popular Mechanics.

Shackley, M. (2007). Atlas of travel and tourism development. Routledge.

Summers, D. (Ed). (2008). The Sports Book. E. Ergüven. (Hazırlayan). Spor Kitabı Oyunlar Kurallar Taktikler Teknikler. İstanbul: NTV Yayınları. Yayınları.

Spor Hizmetleri Genel Müdürlüğü, (2024). *"Olimpik spor dalları"*. (Erişim:10.12.2024). (/ https://shgm.gsb.gov.tr/Sayfalar/130/163/olimpik-spor-dallari.aspx)

Turan, M. ve Çingöz Y.E. (2021) Erzurum'da Kış Sporları Potansiyeli ve Kış Sporları Tesisleşmesi. 2021, Ankara: Akademisyen Kitapevi.

Türkiye Kayak Federasyonu (2007). Tarihçemiz.

Ülker, İ. (2006). Dağlarımız: dağ sporları ve dağ turizmi yüksek dağlarımız ve kayak merkezleri, T. C. Kültür ve Turizm Bakanlığı.

Chapter 5

WATER SPORTS INJURIES: PREVENTION, REHABILITATION, AND RETURN TO PLAY

Mehmet Yiğit GÖKMEN[1]

INTRODUCTION

Water sports are a diverse category of physical activities performed in, on, or near water, encompassing disciplines such as swimming, diving, surfing, water skiing, kayaking, and personal watercraft use. These activities offer numerous physical and psychological benefits, including improved cardiovascular fitness, enhanced muscular strength, and stress relief. However, the dynamic environments and physical demands associated with water sports also pose unique risks for injuries, ranging from minor cuts and bruises to severe and life-threatening conditions. Understanding the factors contributing to these injuries and identifying strategies to mitigate their occurrence is critical for athletes, coaches, and healthcare professionals [1].

Injuries in water sports vary widely depending on the type of activity, the skill level of participants, and environmental conditions. For example, competitive swimmers are particularly prone to overuse injuries, with "swimmer's shoulder" being one of the most frequently reported conditions. This injury typically arises from repetitive motion and improper technique, leading to inflammation and pain in the shoulder joint [2]. Similarly, diving activities can result in acute injuries such as wrist and shoulder trauma or even spinal injuries when performed in shallow waters or under inadequate supervision. These incidents underscore the importance of proper training and adherence to safety protocols in preventing avoidable injuries [3].

Surfing, another popular water sport, often results in lacerations, contusions, and fractures, frequently caused by collisions with the surfboard, the seabed, or other surfers [4]. Environmental factors such as wave height, water temperature, and the presence of marine life further contribute to the risk of injury. Meanwhile,

[1] MD, Department of Orthopaedics and Traumatology, University of Health Sciences, Adana City Training and Research Hospital, mehmet_yigit_gokmen@hotmail.com, ORCID iD: 0000-0003-1243-2057

as proper technique, equipment use, and environmental awareness—have been shown to mitigate risks and improve safety outcomes.

Rehabilitation plays a vital role in the recovery process, focusing not only on physical healing but also on functional and psychological readiness for return to sport. Advances in physical therapy, hydrotherapy, and mental health support have made significant contributions to the recovery and reintegration of injured athletes.

Despite these advancements, there remains a need for further research in several areas. Epidemiological studies can provide more granular insights into injury patterns across different demographics, skill levels, and water sports disciplines. Investigating the effectiveness of specific preventive measures and rehabilitation techniques through randomized controlled trials will enhance evidence-based practice. Additionally, the role of technology, such as wearable devices for monitoring biomechanical loads and real-time environmental conditions, warrants exploration for its potential to revolutionize injury prevention.

Future directions should also include education and outreach initiatives targeting athletes, coaches, and recreational participants. These programs can promote a culture of safety, emphasizing the importance of preparation, proper technique, and adherence to safety protocols. Collaborations among sports scientists, orthopedists, physiotherapists, and sports governing bodies will be essential for developing and implementing comprehensive injury prevention frameworks.

In conclusion, while injuries in water sports remain a significant concern, ongoing research, education, and technological innovations hold promise for improving safety and enhancing the overall experience for athletes and enthusiasts. By addressing existing gaps in knowledge and practice, the field can continue to evolve, ensuring that the benefits of water sports far outweigh the associated risks.

REFERENCES

1. Johnson, J.N. Competitive swimming illness and injury: Common conditions limiting participation. *Curr Sports Med Rep*. Published online 2003:267-271. doi:10.1007/s11932-003-0059-5
2. Allegrucci M, Whitney SL, Irrgang JJ. Clinical Implications of Secondary Impingement of the Shoulder in Freestyle Swimmers. *J Orthop Sports Phys Ther*. 1994;20(6):307-318. doi:10.2519/jospt.1994.20.6.307
3. Jones NS. Competitive Diving Principles and Injuries. *Curr Sports Med Rep*. 2017;16(5):351-356. doi:10.1249/JSR.0000000000000401
4. Nathanson A. Injury Prevention in The Sport of Surfing: An Update. *Muscle Ligaments and Tendons J*. 2020;10(02):171. doi:10.32098/mltj.02.2020.03

5. Castelle B, Scott T, Brander R, et al. Environmental controls on surf zone injuries on high-energy beaches. Published online May 13, 2019. doi:10.5194/nhess-2019-96
6. Prieto-González P, Martínez-Castillo JL, Fernández-Galván LM, Casado A, Soporki S, Sánchez-Infante J. Epidemiology of Sports-Related Injuries and Associated Risk Factors in Adolescent Athletes: An Injury Surveillance. *IJERPH*. 2021;18(9):4857. doi:10.3390/ijerph18094857
7. Shrier I. Warm-Up and Stretching in the Prevention of Muscular Injury: *Sports Medicine*. 2008;38(10):879. doi:10.2165/00007256-200838100-00006
8. Giai Via A, Frizziero A, Finotti P, Oliva F, Randelli F, Maffulli N. Management of osteitis pubis in athletes: rehabilitation and return to training – a review of the most recent literature. *OAJSM*. 2018;Volume 10:1-10. doi:10.2147/OAJSM.S155077
9. Croteau F, Brown H, Pearsall D, Robbins SM. Prevalence and mechanisms of injuries in water polo: a systematic review. *BMJ Open Sport Exerc Med*. 2021;7(2):e001081. doi:10.1136/bmjsem-2021-001081
10. Chalmers DJ, Morrison L. Epidemiology of Non-Submersion Injuries in Aquatic Sporting and Recreational Activities: *Sports Medicine*. 2003;33(10):745-770. doi:10.2165/00007256-200333100-00003
11. Cahan EM, Chan SM, Segovia NA, Chan C. Pains in the Lanes: Characterizing the Epidemiology of Swimmer's Shoulder in Adolescents. *Pediatrics*. 2020;146(1_MeetingAbstract):70-71. doi:10.1542/peds.146.1MA1.70
12. Stuhr M, Kowald B, Schulz AP, et al. Demographics and functional outcome of shallow water diving spinal injuries in northern Germany - A retrospective analysis of 160 consecutive cases. *Injury*. 2023;54(6):1608-1616. doi:10.1016/j.injury.2023.03.002
13. Ristolainen L, Heinonen A, Waller B, Kujala UM, Kettunen JA. Gender differences in sport injury risk and types of inju-ries: a retrospective twelve-month study on cross-country skiers, swimmers, long-distance runners and soccer players. *J Sports Sci Med*. 2009;8(3):443-451.
14. Morrongiello BA, Rennie H. Why Do Boys Engage in More Risk Taking Than Girls? The Role of Attributions, Beliefs, and Risk Appraisals. *J Pediatr Psychol*. 1998;23(1):33-43. doi:10.1093/jpepsy/23.1.33
15. Segreti A, Celeski M, Guerra E, et al. Effects of Environmental Conditions on Athlete's Cardiovascular System. *JCM*. 2024;13(16):4961. doi:10.3390/jcm13164961
16. Herman K, Barton C, Malliaras P, Morrissey D. The effectiveness of neuromuscular warm-up strategies, that require no additional equipment, for preventing lower limb injuries during sports participation: a systematic review. *BMC Med*. 2012;10(1):75. doi:10.1186/1741-7015-10-75
17. Nyland J, Kaya D, Wessel RP. Injury Prevention in Different Sports. In: Doral MN, Karlsson J, eds. *Sports Injuries*. Springer Berlin Heidelberg; 2015:3151-3160. doi:10.1007/978-3-642-36569-0_247
18. Wolf BR, Ebinger AE, Lawler MP, Britton CL. Injury Patterns in Division I Collegiate Swimming. *Am J Sports Med*. 2009;37(10):2037-2042. doi:10.1177/0363546509339364
19. Karantanas AH. Common Injuries in Water Sports. In: Karantanas AH, ed. *Sports Injuries in Children and Adolescents*. Medical Radiology. Springer Berlin Heidelberg; 2010:289-317. doi:10.1007/174_2010_63
20. Monteiro CEMDP, Moreira-Pinto J, Queiroga AC. Injury patterns in competitive and recreational surfing: a systematic review. *Inj Prev*. 2022;28(3):280-287. doi:10.1136/injuryprev-2021-044511

21. Hanchard S, Duncan A, Furness J, Simas V, Climstein M, Kemp-Smith K. Chronic and Gradual-Onset Injuries and Conditions in the Sport of Surfing: A Systematic Review. *Sports*. 2021;9(2):23. doi:10.3390/sports9020023
22. Powell C. Injuries and Medical Conditions Among Kayakers Paddling in the Sea Environment. *Wilderness & Environmental Medicine*. 2009;20(4):327-334. doi:10.1580/1080-6032-020.004.0327
23. Wareham DM, Fuller JT, Douglas TJ, Han CS, Hancock MJ. Swimming for low back pain: A scoping review. *Musculoskeletal Science and Practice*. 2024;71:102926. doi:10.1016/j.msksp.2024.102926
24. Currie BM, Drew MK, Hetherington M, Waddington G, Brown NAT, Toohey LA. Diving Into the Health Problems of Competitive Divers: A Systematic Review of Injuries and Illnesses in Pre-elite and Elite Diving Athletes. *Sports Health: A Multidisciplinary Approach*. Published online June 3, 2024:19417381241255329. doi:10.1177/19417381241255329
25. Nathanson AT. Surfing Injuries. In: Mei-Dan O, Carmont MR, eds. *Adventure and Extreme Sports Injuries*. Springer London; 2013:143-172. doi:10.1007/978-1-4471-4363-5_7
26. Muir SM, Rizzieri T, Brown A, et al. Injuries Related to Waterskiing Between 2012 and 2022: A National Database Study. *Cureus*. Published online July 27, 2024. doi:10.7759/cureus.65522
27. Scher IS, Stepan LL, Hoover RW. Head and neck injury potential during water sports falls: examining the effects of helmets. *Sports Eng*. 2020;23(1):7. doi:10.1007/s12283-020-0321-6
28. Lambert D, Binkley M, Gaskill Z. Underwater and Scuba Diving Accidents. *Emergency Medicine Clinics of North America*. 2024;42(3):551-563. doi:10.1016/j.emc.2024.02.015
29. Rumball JS, Lebrun CM, Di Ciacca SR, Orlando K. Rowing Injuries: *Sports Medicine*. 2005;35(6):537-555. doi:10.2165/00007256-200535060-00005
30. Johnson JN, Gauvin J, Fredericson M. Swimming Biomechanics and Injury Prevention: New Stroke Techniques and Medical Considerations. *The Physician and Sportsmedicine*. 2003;31(1):41-46. doi:10.3810/psm.2003.01.165
31. Gilchrist J, Saluja G, Marshall SW. Interventions to Prevent Sports and Recreation-Related Injuries. In: Doll LS, Bonzo SE, Sleet DA, Mercy JA, eds. *Handbook of Injury and Violence Prevention*. Springer US; 2007:117-134. doi:10.1007/978-0-387-29457-5_7
32. *Guidelines for Safe Recreational Water Environments. 1: Coastal and Fresh Waters*.; 2003.
33. Turgut T, Yaman M, Turgut A. Educating Children on Water Safety for Drowning Prevention. *Soc Indic Res*. 2016;129(2):787-801. doi:10.1007/s11205-015-1109-0
34. Szpilman D, Morizot-Leite L, De Vries W, et al. First Aid Courses for the Aquatic Environment. In: Bierens JJLM, ed. *Drowning*. Springer Berlin Heidelberg; 2014:659-666. doi:10.1007/978-3-642-04253-9_101
35. Schweizer N, Strutzenberger G, Franchi MV, Farshad M, Scherr J, Spörri J. Screening Tests for Assessing Athletes at Risk of ACL Injury or Reinjury—A Scoping Review. *IJERPH*. 2022;19(5):2864. doi:10.3390/ijerph19052864
36. Ackermann PW, Renström P. Tendinopathy in Sport. *Sports Health: A Multidisciplinary Approach*. 2012;4(3):193-201. doi:10.1177/1941738112440957

37. Mohammed A, Arulsingh W, Kandakurti PK. The Effectiveness of Core Stability Exercise Program on Lower Limb Performance in Athletes-A Scoping Review. *Crit Rev Phys Rehabil Med*. 2022;34(1):57-67. doi:10.1615/CritRevPhysRehabilMed.2022043234
38. Silfies SP, Ebaugh D, Pontillo M, Butowicz CM. Critical review of the impact of core stability on upper extremity athletic injury and performance. *Braz J Phys Ther*. 2015;19(5):360-368. doi:10.1590/bjpt-rbf.2014.0108
39. Palladino L, Ruotolo I, Berardi A, Carlizza A, Galeoto G. Efficacy of aquatic therapy in people with spinal cord injury: a systematic review and meta-analysis. *Spinal Cord*. 2023;61(6):317-322. doi:10.1038/s41393-023-00892-4
40. Recio AC, Stiens SA, Kubrova E. Aquatic-Based Therapy in Spinal Cord Injury Rehabilitation: Effective Yet Underutilized. *Curr Phys Med Rehabil Rep*. 2017;5(3):108-112. doi:10.1007/s40141-017-0158-5
41. Stanciu LE, Iliescu MG, Vlădăreanu L, Ciota AE, Ionescu EV, Mihailov CI. Evidence of Improvement of Lower Limb Functioning Using Hydrotherapy on Spinal Cord Injury Patients. *Biomedicines*. 2023;11(2):302. doi:10.3390/biomedicines11020302
42. Prins J, Cutner D. AQUATIC THERAPY IN THE REHABILITATION OF ATHLETIC INJURIES. *Clinics in Sports Medicine*. 1999;18(2):447-461. doi:10.1016/S0278-5919(05)70158-7
43. Schwab Reese LM, Pittsinger R, Yang J. Effectiveness of psychological intervention following sport injury. *Journal of Sport and Health Science*. 2012;1(2):71-79. doi:10.1016/j.jshs.2012.06.003
44. The Panther Symposium ACL Injury Return to Sport Consensus Group, Meredith SJ, Rauer T, et al. Return to sport after anterior cruciate ligament injury: Panther Symposium ACL Injury Return to Sport Consensus Group. *Knee Surg Sports Traumatol Arthrosc*. 2020;28(8):2403-2414. doi:10.1007/s00167-020-06009-1

Chapter 6

SPORTS POLICIES OF PUBLIC AND PRIVATE SECTOR BANKS IN TURKEY: A REVIEW IN THE CONTEXT OF SPONSORSHIP AND CORPORATE SOCIAL RESPONSIBILITY (CSR) PROJECTS

Ergin KARINCAOĞLU[1]
F. Pervin BİLİR[2]
Eren ULUÖZ[3]

INTRODUCTION

All public and private banks are part of the society in which they operate. For this reason, they cannot remain indifferent to the problems that arise in social life. The best way to address these problems is through corporate social responsibility activities. It can be argued that these activities should be carried out in cooperation in order to be more comprehensive, long-term and beneficial. Businesses can achieve more success by engaging in corporate social responsibility activities with their stakeholders with whom they cooperate in order to be beneficial to society as well as the economic goals they set (Fidan & Şentürk, 2017). Corporate social responsibility (CSR) practices, which are the name of the investments made by businesses in the whole society, environment and future generations, especially their stakeholders, are also a solid investment tool for the future of businesses themselves. In fact, 82% of the companies participating in a study conducted in 2004 stated that CSR supports their financial situation and should be among the priorities of businesses (Ming-Dong 2008: 4). CSR can also be defined as the concept of meeting the needs of social stakeholders, which positively affects the social and physical environment as well as business owners in terms of return on capital (Marsden, Andriof 1998). CSR has become increasingly important for

[1] Çukurova University, Institute of Medical Sciences, antson13@hotmail.com, ORCID iD: 0000-0002-5040-9272

[2] Prof. Dr., Çukurova University, Faculty of Sport Sciences, fatmapervinbilir@gmail.com, ORCID iD: 0000-0001-5413-3712

[3] Prof. Dr., Çukurova University, Faculty of Sport Sciences, proffered@gmail.com, ORCID iD: 0000-0002-4037-0634

and support services in individual branches such as basketball, tennis, chess and marathon, and depending on the specific decisions of the bank's senior management. We believe that it would be more beneficial for all stakeholders to develop more systematic and planned policies for these sponsorship and support services, under the chairmanship of the Banks Association, in which all banks provide common benefits and denominators, serving the interests of banks on the one hand and the needs of the society on the other, and maximizing sports-oriented customer satisfaction.

As a result, we believe that these policies can contribute to the development of comprehensive strategies that are not limited to sponsorship, but also aim to spread sports to the grassroots, discover and develop young talents, promote sports culture and improve public health. In this framework, we think that banks can be an effective support element for the standard public power related to sports in order to support sports at all levels throughout the country and to create a sustainable sports ecosystem by utilizing their financial power for customer promotion purposes within optimal marketing plans.

REFERENCES

Ana Sponsor (2022). Spor Toto Süperlig 22/23 Sezonu Detaylı Sponsorluk Infografiği. https://blog.anasponsor.com/2022-2023-spor-toto-super-lig-detayli-sponsorlukinfografigi/ . Erişim Tarihi: 25.05.2024.

Aydede, C. (2002). Halkla İlişkiler Kampanyaları (Teorik ve Uygulamalı). İstanbul: Mediacat Yayınları.

Baş Uçar, R. (2022). Spor Sponsorluğu Ekonomisi Büyüyor. Para Dergisi. https://www.paradergi.com.tr/is-dunyasi-kulis/2022/11/21/spor-sponsorlugu-ekonomisibuyuyor-1. Erişim Tarihi: 25.05.2024.

Bennett, R. (1999). Spor sponsorluğu, seyirci hatırlaması ve yanlış fikir birliği. European Journal of Marketing, 33(3/4), 291-313.

Bıçakçı, İ. (2006). İletişim ve Halkla İlişkiler. İstanbul, Media Cat Yayınevi.

Buszko, M. (2020). Support for sport as an element of banks' corporate social responsibility policy. Journal of Physical Education and Sport, 20(2), 2820-2828.

Demirel, A., & Erdogmus, I. E. (2014). Spor sponsorluğunda kurumsal yatırım ve değerlendirilmesi. Athens Journal of Sports, 1(3), 173-187.

Dolphin, R. (2003). Sponsorluk: Stratejik rolü üzerine perspektifler. Kurumsal İletişim: An International Journal, 8(3), 173-186.

Dondurucu, Z.B., Kaya, P. ve Ekinci, D.K.(2023). Bankacılık Sektöründeki Spor Sponsorluğu Faaliyetleri Üzerine Bir İnceleme: Garanti Bankası, Qnb Finansbank Ve Ing Bank Örneği.The Journal Of Social Sciences

Durucan, H., & Doğru, E. (2021). Bankaların Halkla İlişkiler Faaliyetlerinde Sponsorluk Çalışmalarına Verdiği Önem. Karamanoğlu Mehmetbey Üniversitesi Edebiyat Fakültesi Dergisi, 4(1): 1-21.

Fidan, Z., & Acar Şentürk, Z. (2017). KURUMSAL SOSYAL SORUMLULUK (KSS) ÇALIŞMALARINDA İŞBİRLİĞİ: "Akbank, Garanti Bankası ve Türkiye İş Bankası Üzerine Bir Değerlendirme". Selçuk İletişim, 9(4), 40-65.

Göksu, N. F. & Özcan Keçeci, B.(2021). Kurumsal İletişim Çerçevesinde Türkiye'de Pazarlama Odaklı Spor Sponsorluğu Üzerine Bir Analiz. Manas Sosyal Araştırmalar Dergisi, 10 (2): 1225-1246.

Jefkins, F. (1990). Modern Marketing Communications. Glasgow Bishopbriggs: Blackie and Son Ltd.

Levermore, R. (2010). CSR for Development Through Sport: examining its potential and limitations, Third World Quarterly, Vol. 31, No. 2, pp. 223-241.

Marsden, C., Andriof J. (1998). Towards an Understanding of Corporate Citizenship and How to Influence It, Citizenship Studies, No.22, 329-52.

Min-Dong P L (2008) A Review of The Theories Of Corporate Social Responsibility: Its Evolutionary Path And The Road Ahead, International Journal of Management Reviews, 10 (1), 53–73.

Olkkonen, R. (2001). Uluslararası spor sponsorluğu düzenlemelerine ağ yaklaşımı. Journal of Business & Industrial Marketing, 16(4), 304-329.

Pedersen E R (2006) Making Corporate Social Responsibility (CSR) Operable:Responsibility (CSR) Operable: How Companies Translate Stakeholder Dialogue into Practice, Business and Society Review 111 (2), 137–163.

Statista (2022). Sports Sponsorship - Statistics & Facts. https://www.statista.com/topics/1382/sports Erişim Tarihi: 25.05.2024.

TBB. (2024). https://www.tbb.org.tr/tr/finansal-tuketici/faydali-bilgiler/bankalar-tarafindan-surdurulen-sosyal-sorumluluk-projeleri/4592

Verity, J. (2002). Küresel markalar için sponsorluğun pazarlama potansiyelinin en üst düzeye çıkarılması.

Chapter 7

SPORTS FOR DEVELOPMENT AND PEACE

Can ÖZGIDER[1]

WHAT IS SPORT FOR DEVELOPMENT AND PEACE?

In the recent decades, there has been a significant rise regarding the acknowledgement of physical activity and sport as potent instruments for accomplishing developmental objectives and nurturing peace-building initiatives. This phenomenon is called sports for development and peace. It was determined that this concept represented the optimal approach for accomplishing specific developmental and peace objectives, which are intimately associated with he Millennium Development Goals (MDGs) and the Sustainable Development Goals, which were introduced in 2015. (SDGs) (Bardocz-Bencsik & Doczi, 2019).

In today's world, the idea of utilizing sport to help develop and promote peace became a popular way to improve the lives of poor countries across the globe. A considerable number of organizations, experts, students, and researchers are actively involved in this domain, supporting a diverse array of programs and initiatives. The integration of sports and physical activities within international development initiatives has been identified as a pivotal strategy to facilitate the realization of global development goals. This approach has been identified as a potentially substantial catalyst of positive change, impacting both global well-being and stability (Kidd, 2011).

MILLENNIUM DEVELOPMENT GOALS (MDGS)

Back in 2000, when the UN was holding its Summit, all its member countries agreed on a set of 8 MDGs. These goals were set up to help the world's poorest countries develop, with a target completion date of 2015. This series of goals has since become a pivotal point in the discourse and implementation of public policy concerning global development (Amin, 2006).

[1] Assist. Prof. Dr., Çanakkale Onsekiz Mart University, Faculty of Sport Sciences, ozgider@comu.edu.tr, ORCID iD: 0000-0002-6346-8896

- **2014**

➢ The 5th Next Step conference took place in New Delhi, India.

Tthe International Day of Sport for Development and Peace was celebrated throughout the World.

➢ Sport for Development and Peace group meeting was held in Geneva, Switzerland.

- **2015**

Sport is recognized as a key part of the Sustainable Development Goals, and the Beyond Sport Summit is introducing Child Safeguards to improve safety in sports for kids.

- **2017**

The United Nations (UN) has announced its intention to close the United Nations Office on Sport for Development and Peace. (Sport and Development, n.d.).

REFERENCES

Amin, S. (2006). The millennium development goals: A critique from the south. *Monthly Review*, *57*(10), 1.

Bardocz-Bencsik, M., & Doczi, T. (2019). Mapping sport for development and peace as Bourdieu's field. *Physical Culture and Sport. Studies and Research*, *81*(1), 1-12.

IWG, S. (2008). Harnessing the power of sport for development and peace: recommendations to governments. *Toronto: Sport for Development and Peace International Working Group*.

Kidd, B. (2011). Cautions, questions and opportunities in sport for development and peace. *Third World Quarterly*, *32*(3), 603-609.

Lemke, W. (2016). The role of sport in achieving the sustainable development goals. *UN chronicle*, *53*(2), 6-9.

Lindsey, I., & Darby, P. (2019). Sport and the Sustainable Development Goals: Where is the policy coherence? *International review for the sociology of sport*, *54*(7), 793-812

Montiel, I., Cuervo-Cazurra, A., Park, J., Antolín-López, R., & Husted, B. W. (2021). Implementing the United Nations' sustainable development goals in international business. *Journal of International Business Studies*, *52*(5), 999

Sport and Development (n.d.). History of Sport and Development. Timeline of Major Developments in Sports and Development, from https://www.sportanddev.org/sport-and-development/history-sport-and-development [accessed 05 October 2024].

United Nations (2003). Sport for Development and Peace: Towards Achieving the Millennium Development Goals. Report from the United Nations Inter-agency Task Force on Sport for Development and Peace. Geneva: United Nations, from http://www.unicef.org/sports/ reportE.pdf [accessed 04 November 2024].

United Nations (2005). Concept: Education, health, development, peace: International Year of Sport and Physical Education. Geneva: UN

United Nations (2015). Department of Social and Economic Affairs. Sustainable Development, from https://sdgs.un.org/goals [accessed 08 December 2024].

Yapar, A., & Serbes, Ş. (2020). Atletizm sporcularının algıladıkları antrenör davranışlarının çeşitli değişkenlere göre incelenmesi. *Gençlik Araştırmaları Dergisi*, *8*(22), 98-113.

Yazıcı, A., Yapar, A., Güven, Ş., Taşçıoğlu, R., et al. (2021). Comparison of Emotional Intelligence and Mental Toughness of Youth Soccer Players in Terms of Position and Soccer Experience Variables. Gazi Journal of Physical Education and Sport Sciences, 26(3), 407-418. https://doi.org/10.53434/gbesbd.938664

Chapter 8

AN EXAMINATION OF THE TRUST LEVELS OF FOOTBALL FANS IN SPORTS CLUBS

Gürsoy OLCA[1]
F. Pervin BİLİR[2]
Canan SAYIN TEMUR[3]

INTRODUCTION

Sport, with its multiple and complex dimensions, including sociological, economic, and political factors, has evolved into a global phenomenon and a field of interest that is examined in all its branches and aspects. Among these, football has evolved into an organisational structure in today's world. Beyond its mythical, religious, and class-based characteristics, football has gained significance through its association with symbolic values (Talimciler, 2008). As organised entertainment, football serves social, political, administrative, and economic purposes. Football can be considered as a multifaceted phenomenon, representing elements such as entertainment, power, joy, sorrow, national pride, and a sense of community where individuals can establish their identities and feel secure (Talimciler, 2008). The industrialisation of sports, accelerated by football's widespread popularity, has paved the way for the establishment of various organised systems. Presently, football displays a highly intricate political and economic structure (Erdoğan, 2008). One of the most significant intangible assets within this industrial framework is the licensing system, which grants clubs and athletes the right to operate (Gomez et al., 2008).Fans are undoubtedly among the indispensable elements of sports clubs, as their presence is the most critical factor for the sustainability of a sports club or a sport itself (Talimciler, 2008).Globally, football clubs stand out particularly in terms of their fan base and economic magnitude. In many cases, the economic

[1] Cukurova University Institute of Medical Sciences, gursoyolca@gmail.com, ORCID iD: 0000-0003-4430-7701
[2] Prof. Dr., Cukurova University Spor Sciences Faculty , fatmapervinbilir@gmail.com, ORCID iD: 0000-0001-5413-3712
[3] Asst. Prof. Dr., Ankara Yıldırım Beyazıt University, Faculty of Sports Science, syncanan@hotmail.com, ORCID iD: 0000-0003-0583-8083

examined, it is clearly seen that the people who have remained in charge of clubs for the longest periods in Turkey are the presidents, rather than the coaches and players. The main reason why the most frequently changing actors in this structure are the football players and coaches is due to the low level of trust in these actors. The findings in Yılmaz's (2021) study do not coincide with our study.

It has been determined that female fans trust football players more than male fans. Similar to the rest of the world, women's interest in football in Turkey is mostly driven by the names in the spotlight, especially football players who have become popular culture icons. While men follow the club's management policies and the coaches' tactical practices in depth, women's interest in football is directly proportional to the popularity and success of the players. The findings of the study conducted by Önal (2014) include the statement, "The chance to meet the players before or after the match will increase the motivation of families to come to the stadium, which means higher loyalty." which supports our research results.

It has been determined that Beşiktaş fans have more trust in their coaches, club presidents and players than Fenerbahçe and Galatasaray fans. Beşiktaş's fan group, the famous "Çarşı", which is considered to be the most organized fan group in Turkey, and its presence in activities related to various problems of society reveals a commitment independent of the team's statistical success. Önal's (2014) study also supports this view. The statistical difference between trust in teams in Yılmaz's (2021) study is not similar to our study.

As a result, we can say that fan support must be increased in order for sports clubs to achieve their goals. Considering the period in which the study was conducted, it can be recommended that more activities be carried out to increase the trust levels of the fans of Galatasaray sports club in particular. Further researchers working with larger sample groups may contribute to the field.

REREFENCES

Açak, M. & Karademir, T. (2019). Spor kulübüne güven ölçeğinin geliştirilmesi: geçerlilik ve güvenirlilik çalışması. *Beden Eğitimi ve Spor Bilimleri Dergisi*, *21*(1), 54-66.

Dever A. (2010). *Spor Sosyolojisi: Tarihsel ve güncel boyutlarıyla spor ve toplum*. İstanbul: Başlık Yayınları.

Donuk, B. & Şenduran, F. (2006). *Futbolun anatomisi*, İstanbul: Ötüken Neşriyat.

Erdoğan, İ. (2008). Futbol ve futbolu inceleme üzerine. *İletişim kuram ve araştırma dergisi*, *26*(2), 1-58.

Gómez, S. Martí, C. & Opazo, M. (2008). The structural characteristics of sport organisations: Differentiation within elite Spanish professional football clubs. IESE Business School Working Paper No. WP-751.

Hunt, K. Bristol T. & Bashaw E. (1999). A conceptual approach to classifying sports fans. *Journal of Services Marketing, 13*(6), 439-452.

Kılcigil, E. (1985). *Sosyal çevre-spor ilişkileri,* Ankara: Bağıran Yayınevi.

Malhotra, N.K. (2004). *Marketing Research: An applied orientation.(4thedn*) Pearson Education. Inc: New Jersey.

Mayer, R.C., Davis, J.H. & Schoorman, F.D (1995). An integrative model of organizational trust. *Academy Of Management Review*, *20*(3), 709-734. https://doi.org/10.5465/amr.1995.9508080335

Önal, A. (2014). Motives, Fandom, Identification, and Loyalty of Football Fans Living in Home Country and Abroad: The Case of Turkish Fans in Turkey and Germany, Doktora Tezi, Bahçeşehir Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.

Paslı, F. Köse, B. & Zengin, S. (2023). Trabzonspor taraftarlarının kulüplerine güven düzeylerinin incelenmesi. *Iğdır Üniversitesi Spor Bilimleri Dergisi*, *6*(2), 24-33. https://doi.org/10.48133/igdirsbd.1397277

Savaş, B.Ç. Karataş, E.Ö. & Karataş, Ö. (2021). Futbol taraftarlarının spor kulüplerine güven düzeylerinin incelenmesi (yeni malatyaspor örneği). *Çanakkale Onsekiz Mart Üniversitesi Spor Bilimleri Dergisi, 4*(1), 23-45.

Tabuk, M.E. Tumsa, M. & Baki, I. (2022). Spor kulübüne güven ve şike ilişkisi; kocaelispor kulübü üzerine bir araştırma. *Journal Of Rol Sport Sciences*, *3*(2), 1-21.

Talimciler, A. (2008). Futbol değil iş: endüstriyel futbol. *İletişim kuram ve araştırma dergisi*, *26*(2), 89-114.

Talimciler, A. (2017), Futbol taraftarlığındaki erkeklik imgesi:(bucaspor-göztepe ve karşıyaka taraftarları üzerine bir inceleme). *Sosyal ve Beşeri Bilimler Dergisi, 1*(1), 27-57.

Yılmaz, H. (2021) Futbol taraftarlarının takımlarına olan güven, özdeşleşme ve sadakat düzeylerinin incelenmesi, Yüksek Lisans Tezi, Ağrı İbrahim Çeçen Üniversitesi, Lisansüstü Eğitim Enstitüsü.

Zelyurt, M.K., (2019). Futbol Taraftarlığı, Özdeşleşme ve Kimlik: Taraftarlıktan Fanatizme... *Sportif Bakış: Spor ve Eğitim Bilimleri Dergisi*, *6*(1), 85-105.