

BÖLÜM 19

SPORDA REHABİLTASYON VE EGZERSİZ

Betül ÇİFTÇİ¹

Giriş

Kas, ligaman ve kemik hasarına neden olan spor yaralanmaları tedavisinde cerrahi ile birlikte gelişmiş rehabilitasyon protokolleri uygulanmaktadır. Rehabilitasyon süreci, yaralanma sonrası tanı konulması ile birlikte başlar. Spor rehabilitasyonunda esas amaç hasar öncesi fiziksel ve duygusal seviyeye geri dönüşü sağlamaktır.

Modern rehabilitasyon protokolleri takım çalışmasını gerektirir. Spor hekimi, spor fizyoterapisti rehabilitasyon ekibinin en önemli üyeleridir. Bazı durumlarda psikolog ve diyetisyen de bu ekibe katılmaktadır (1). Spor rehabilitasyonu sürecinde yapılan spor aktivitesinin detaylarını bilmek sporcudaki biyomekanik ve psikolojik etkilerini anlamak açısından önemlidir. Bu nedenle biyolojik, psikolojik ve sosyal faktörlerin bir bütün olarak değerlendirildiği biyopsikolojik yaklaşım son zamanlarda önem kazanmıştır. Uyku, bireyin özgüveni, kendi kendine algılanan stres gibi atletik performansı etkileyen psikososyal sağlık değişkenleri spor performansını da etkileyen faktörlerdir ancak biyolojik ve psikososyal değişkenlerin birbirile olan etkileşimi ve yaralanma riskini arttırması ile ilgili bilinmeyenler çok fazladır. Bu konuya ilgili çalışmalarla ihtiyaç vardır (2).

Sporcuların yaralanma öncesi sağlık ve fiziksel performans verilerinin bilinmesi yaralanma sonrası rehabilitasyon hedeflerini oluşturmak açısından önemlidir. Tüm sporculara spor sezonu öncesinde bireysel sağlık değerlendirmeleri yapılmalı verileri kayıt altında tutulmalıdır. Böylece yaralanma durumunda rehabilitasyon planlaması daha kolay olacaktır (3).

¹ Dr. Öğr. Üyesi, Kırklareli Üniversitesi, Sağlık Bilimleri Fakültesi, Fizyoterapi ve Rehabilitasyon AD., btlcftc@hotmail.com

Kaynaklar

1. Beitzel K, Berthold D, Klose M. Sports Rehabilitation. In: The Sports Medicine Physician. Springer International Publishing; 2019. p. 99–105.
2. von Rosen P, Frohm A, Kottorp A, Fridén C, Heijne A. Multiple factors explain injury risk in adolescent elite athletes: Applying a biopsychosocial perspective. *Scand J Med Sci Sport*. 2017;27(12):2059–69.
3. Dhillon H, Dhillon S, Dhillon MS. Current Concepts in Sports Injury Rehabilitation. 2017; Available from: www.ijoonline.com
4. Hudson Z. Rehabilitation and return to play after foot and ankle injuries in athletes. *Sports Med Arthrosc*. 2009;17(3):203–7.
5. Fournier M. Principles of rehabilitation and return to sports following injury. *Clin Podiatr Med Surg [Internet]*. 2015;32(2):261–8. Available from: <http://dx.doi.org/10.1016/j.cpm.2014.11.009>
6. Ro^me JÉ, Frenette RR, St-Pierre M, Co^té CH, Co^té C, Mylona E, et al. Muscle impairment occurs rapidly and precedes inflammatory cell accumulation after mechanical loading. 2002 [cited 2023 Jan 9]; Available from: www.ajpregu.org
7. Greising SM, Corona BT, Call JA. Musculoskeletal Regeneration, Rehabilitation, and Plasticity following Traumatic Injury. *Int J Sports Med*. 2020;41(8):495–504.
8. Glass GE, Chan JK, Freidin A, Feldmann M, Horwood NJ, Nanchahal J. TNF- α promotes fracture repair by augmenting the recruitment and differentiation of muscle-derived stromal cells. [cited 2023 Jan 9]; Available from: www.pnas.org/cgi/doi/10.1073/pnas.1018501108
9. Järvinen TAH, Järvinen TLN, Kääriäinen M, Äärimaa V, Vaittinen S, Kalimo H, et al. Muscle injuries: optimising recovery. *Best Pract Res Clin Rheumatol*. 2007;21(2):317–31.
10. Bleakley CM, O'Connor S, Tully MA, Rocke LG, MacAuley DC, McDonough SM. The PRICE study (Protection Rest Ice Compression Elevation): Design of a randomised controlled trial comparing standard versus cryokinetic ice applications in the management of acute ankle sprain [ISRCTN13903946]. *BMC Musculoskelet Disord*. 2007;8:1–8.
11. Abrahamson E, Hyland V, Hicks S, Koukoullis C. rehabilitation. 2010.
12. Bleakley CM, McDonough SM. Cryotherapy for acute ankle sprains: a randomised controlled study of two different icing protocols. *Br J Sport Med [Internet]*. 2006;40:700–5. Available from: <http://bjsm.bmjjournals.com/>
13. Hubbard TJ, Denegar CR. by the National Athletic Trainers [Internet]. Vol. 39, Journal of Athletic Training. Association, Inc; 2004. Available from: www.journalofathletictraining.org
14. Mendiguchia J, Brughelli M. A return-to-sport algorithm for acute hamstring injuries. *Phys Ther Sport [Internet]*. 2011;12(1):2–14. Available from: <http://dx.doi.org/10.1016/j.ptsp.2010.07.003>
15. Physiologic_and_Biochemical_Effects_of_4.
16. Bleakley CM, Glasgow P, MacAuley DC. PRICE needs updating, should we call the POLICE? *Br J Sports Med*. 2012;46(4):220–1.
17. Villalta EM, Peiris CL. Early aquatic physical therapy improves function and does not increase risk of wound-related adverse events for adults after orthopedic surgery: A systematic review and meta-analysis. *Arch Phys Med Rehabil [Internet]*. 2013;94(1):138–48. Available from: <http://dx.doi.org/10.1016/j.apmr.2012.07.020>
18. Russell Linda. The importance of patients' nutritional status in wound healing. *Br J Nurs*. 2001;10(6):42–9.
19. Papadopoulou SK. nutrients Rehabilitation Nutrition for Injury Recovery of Athletes: The Role of Macronutrient Intake. [cited 2023 Jan 9]; Available from: www.mdpi.com/journal/nutrients
20. Misra D, Booth SL, Tolstykh I, Felson DT, Nevitt MC, Lewis CE, et al. Vitamin K Deficiency Is Associated with Incident Knee Osteoarthritis. 2013;
21. Zhang FF, Driban JB, Lo GH, Price LL, Booth S, Eaton CB, et al. The Journal of Nutrition Nutritional Epidemiology Vitamin D Deficiency Is Associated with Progression of Knee Osteoarthritis 1,2. [cited 2023 Jan 9]; Available from: <https://academic.oup.com/jn/article/144/12/2002/4615955>
22. Musumeci G, Castrogiovanni P, Loreto C, Castorina S, Pichler K, Weinberg AM. Post-Traumatic

- Caspase-3 Expression in the Adjacent Areas of Growth Plate Injury Site: A Morphological Study. OPEN ACCESS Int J Mol Sci [Internet]. 2013 [cited 2023 Jan 9];14:14. Available from: www.mdpi.com/journal/ijmsArticle
23. J.A R. Management of acute sport injury. In: P C, editor. Sports Rehabilitation and Injury Prevention. West Sussex,UK: Wiley- Blackwell; 2010. p. 163–84.
 24. Bleakley C, McDonough S, MacAuley D. The Use of Ice in the Treatment of Acute Soft-Tissue Injury: A Systematic Review of Randomized Controlled Trials. Am J Sports Med. 2004;32(1):251–61.
 25. Myrer JW, Measom G, Fellingham GW. Temperature changes in the human leg during and after two methods of cryotherapy. J Athl Train. 1998;33(1):25–9.
 26. Hayden CA. Cryokinetics in an early treatment program [Internet]. Available from: <https://academic.oup.com/pjt/article/44/11/990/4628932>
 27. Kwiecien SY, Malachy , Mchugh P. The cold truth: the role of cryotherapy in the treatment of injury and recovery from exercise. Eur J Appl Physiol [Internet]. 2021 [cited 2022 Sep 6];121(3):2125–42. Available from: <https://doi.org/10.1007/s00421-021-04683-8>
 28. Qu C, Wu Z, Xu M, Qin F, Dong Y, Wang Z, et al. Cryotherapy models and timing-sequence recovery of exercise-induced muscle damage in middle- And long-distance runners. J Athl Train. 2020;55(4):329–35.
 29. Kwiecien SY, Mchugh MP, Howatson G. The efficacy of cooling with phase change material for the treatment of exercise-induced muscle damage: pilot study. 2017 [cited 2022 Sep 11]; Available from: <https://www.tandfonline.com/action/journalInformation?journalCode=rjsp20>
 30. D.Wall RM and P. Pain Mechanisms: a new theory. Science (80-). 1965;150(3699):971–9.
 31. Dickenson AH. Gate control theory of pain stands the test of time. Br J Anaesth. 2002;88(6):755–7.
 32. Johnson MI, Paley CA, Jones G, Mulvey MR, Wittkopf PG. Efficacy and safety of transcutaneous electrical nerve stimulation (TENS) for acute and chronic pain in adults: a systematic review and meta-analysis of 381 studies (the meta-TENS study). BMJ Open [Internet]. 2022;12:51073. Available from: <http://bmjopen.bmj.com/>
 33. McCallum MID, Glynn CJ, Moore RA, Lammer P, Phillips AM. Transcutaneous electrical nerve stimulation in the management of acute postoperative pain. Vol. 61, Br. J. Anaesth. 1988.
 34. The eVect of physical therapy on beta-endorphin levels Tamás Bender · György Nagy · István Barna · Ildikó Tefner · Éva Kádas · Pál Géher.
 35. Johnson MI, Tabasam G. An investigation into the analgesic effects of interferential currents and transcutaneous electrical nerve stimulation on experimentally induced ischemic pain in otherwise pain-free volunteers. Phys Ther. 2003;83(3):208–23.
 36. Almeida CC de, Silva VZM da, Júnior GC, Liebano RE, Durigan JLQ. Transcutaneous electrical nerve stimulation and interferential current demonstrate similar effects in relieving acute and chronic pain: a systematic review with meta-analysis. Brazilian J Phys Ther [Internet]. 2018;22(5):347–54. Available from: <https://doi.org/10.1016/j.bjpt.2017.12.005>
 37. English B. Phases of Rehabilitation. Foot Ankle Clin [Internet]. 2013;18(2):357–67. Available from: <http://dx.doi.org/10.1016/j.fcl.2013.02.011>
 38. Javorac D, Stajer V, Ratgeber L, Olah A, Betlehem J, Acs P, et al. Hydrotherapy with hydrogen-rich water compared with RICE protocol following acute ankle sprain in professional athletes: a randomized non-inferiority pilot trial. Res Sport Med. 2021;29(6):517–25.
 39. Cochrane DJ. Alternating hot and cold water immersion for athlete recovery: A review. Phys Ther Sport. 2004;5(1):26–32.
 40. Shadgan B, Pakravan AH, Hoens A, Reid WD. Contrast baths, intramuscular hemodynamics, and oxygenation as monitored by near-infrared spectroscopy. J Athl Train. 2018;53(8):782–7.
 41. Lundberg TR, Howatson G. Analgesic and anti-inflammatory drugs in sports: Implications for exercise performance and training adaptations. Scand J Med Sci Sport. 2018;28(11):2252–62.
 42. Graham GG, Davies MJ, Day RO, Mohamudally A, Scott KF. The modern pharmacology of paracetamol: Therapeutic actions, mechanism of action, metabolism, toxicity and recent pharmacological findings. Inflammopharmacology. 2013;21(3):201–32.

43. Bindu S, Mazumder S, Bandyopadhyay U. Non-steroidal anti-inflammatory drugs (NSAIDs) and organ damage: A current perspective. *Biochem Pharmacol.* 2020 Oct 1;180.
44. McMahon SB, Dargan P, Lanas A, Wiffen P. The burden of musculoskeletal pain and the role of topical non-steroidal anti-inflammatory drugs (NSAIDs) in its treatment. Ten underpinning statements from a global pain faculty. 2020; Available from: <https://www.tandfonline.com/action/journalInformation?journalCode=icmo20>
45. Wiffen PJ, Xia J. Systematic review of topical diclofenac for the treatment of acute and chronic musculoskeletal pain. *Curr Med Res Opin [Internet].* 2020;36(4):637–50. Available from: <http://dx.doi.org/10.1080/03007995.2020.1716703>
46. Derry S, Moore RA, Gaskell H, McIntyre M, Wiffen PJ. Topical NSAIDs for acute musculoskeletal pain in adults. Vol. 2017, *Cochrane Database of Systematic Reviews*. John Wiley and Sons Ltd; 2015.
47. Moghadam N, Hieda M, Ramey L, Levine BD, Guilliod R. Hyperbaric Oxygen Therapy in Sports Musculoskeletal Injuries. *Med Sci Sports Exerc.* 2020;52(6):1420–6.
48. Oyaizu T, Enomoto M, Yamamoto N, Tsuji K, Horie M, Muneta T, et al. Hyperbaric oxygen reduces inflammation, oxygenates injured muscle, and regenerates skeletal muscle via macrophage and satellite cell activation *OPEN. Sci Rep ORtS [Internet].* 2018 [cited 2023 Jan 9];8:1288. Available from: www.nature.com/scientificreports/
49. Horie M, Enomoto M, Shimoda M, Okawa A, Miyakawa S, Yagishita K. Enhancement of satellite cell differentiation and functional recovery in injured skeletal muscle by hyperbaric oxygen treatment. *J Appl Physiol [Internet].* 2014 Jan 15 [cited 2023 Jan 9];116(2):149–55. Available from: <http://www.jappl.org>
50. Yeh WL, Lin SS, Yuan LJ, Lee KF, Lee MY, Ueng SWN. Effects of hyperbaric oxygen treatment on tendon graft and tendon-bone integration in bone tunnel: Biochemical and histological analysis in rabbits. *J Orthop Res.* 2007 May;25(5):636–45.
51. Hsu RWW, Hsu WH, Tai CL, Lee KF. Effect of hyperbaric oxygen therapy on patellar tendinopathy in a rabbit model. *J Trauma - Inj Infect Crit Care.* 2004;57(5):1060–4.
52. Small K, McNaughton L, Greig M, Lovell R. The effects of multidirectional soccer-specific fatigue on markers of hamstring injury risk. *J Sci Med Sport.* 2010;13(1):120–5.
53. Liebenson C. Functional training for performance enhancement - Part 1: The basics. *J Bodyw Mov Ther.* 2006;10(2):154–8.
54. Pizzari T, Coburn PT, Crow JF. Prevention and management of osteitis pubis in the Australian Football League: A qualitative analysis. *Phys Ther Sport.* 2008;9(3):117–25.
55. Frank R, Bacurau P, De G, Monteiro A, Ugrinowitsch C, Tricoli V, et al. Acute effect of a ballistic and a static stretching exercise bout on flexibility and maximal strength [Internet]. Available from: www.nsca-jscr.org
56. Yuktasir B, Kaya F. Investigation into the long-term effects of static and PNF stretching exercises on range of motion and jump performance. *J Bodyw Mov Ther.* 2009 Jan;13(1):11–21.
57. Olivo SA, Magee DJ. Electromyographic assessment of the activity of the masticatory using the agonist contract-antagonist relax technique (AC) and contract-relax technique (CR). *Man Ther.* 2006 May;11(2):136–45.
58. Earle Abrahamson, Victoria Hyland SH, Koukoullis and C. Progressive systematic functional rehabilitation. In: P C, editor. *Sports Rehabilitation and Injury Prevention.* West Sussex,UK; 2010. p. 199–221.
59. Smith M, Fryer G. A comparison of two muscle energy techniques for increasing flexibility of the hamstring muscle group. *J Bodyw Mov Ther.* 2008;12(4):312–7.
60. Curran PF, Fiore RD, Crisco JJ. A comparison of the pressure exerted on soft tissue by 2 myofascial rollers. *J Sport Rehabil.* 2008;17(4):432–42.
61. Wilke J, Vogt L, Banzer W. Immediate effects of self-myofascial release on latent trigger point sensitivity: a randomized, placebo-controlled trial. *Biol Sport [Internet].* 2018 [cited 2022 Sep 13];35(4):349. Available from: [/pmc/articles/PMC6358529/](https://PMC6358529/)