

BÖLÜM 21

KAS KUVVETİNİ ARTTIRAN EGZERSİZLER

Şahide Eda ARTUÇ¹

Giriş

Kas kuvvetinin artırılması, sportif performansı arttırmada, lökomotor sistem yaralanmalarının önlenmesinde ve rehabilitasyonunda, kas ve yumuşak dokularda katabolizmanın arttığı fizyolojik (yaşlılık) veya patolojik (yaralanmalar, sistemik hastalıklar vs) durumlarda fonksiyonel kapasitenin sağlanması adına önem taşır (1).

Kas performansı, bir kasın iş yapabilme kapasitesini ifade eder. Tanım basit görünmesine rağmen, kas performansı fonksiyonel hareketin karmaşık bir bileşenidir ve vücut sistemlerinin tamamından etkilenir. Kas performansını etkileyen faktörler arasında kasın morfolojik özellikleri, nörolojik, biyokimyasal ve biyomekanik etkiler ile kardiyovasküler, metabolik, bilişsel ve duygusal işlevler yer alır (1-2).

Kas performansının temel unsurları kuvvet, güç ve enduranstır. Kas performansının bu unsurlarından herhangi birindeki bozulma sonucunda aktivite sınırlamaları (fonksiyonel sınırlamalar) ve katılım kısıtlaması (sakatlık) veya artan işlev bozukluğu riski ortaya çıkabilir. Hareketsizlik, kullanmama, yaralanmalar ve hastalıklar gibi birçok faktör kas performansında bozulmaya neden olarak güçsüzlük ve kas atrofisine yol açabilir (3).

Kuvvet: Direncin üstesinden gelmek için bir kas veya kas grubu tarafından tek bir maksimum çaba sırasında ortaya çıkan en büyük ölçülebilir kuvvettir.

Güç: Kas performansının bir başka yönü olan kas gücü, bir kas tarafından birim zamanda üretilen iş (kuvvet x mesafe) olarak tanımlanır (kuvvet x mesafe/zaman).

1 Uzm. Dr., SBÜ Ankara Gaziler Fizik Tedavi ve Rehabilitasyon Eğitim ve Araştırma Hastanesi, edartuc@gmail.com

Kaynaklar

1. Eker Büyüksireci D, Meray J. Kas performans egzersizleri. Durmaz B, editör. Tedavi Edici Egzersizler. 1. Baskı. Ankara: Türkiye Klinikleri; 2019. p.15-20.
2. Reibe D. Benefits and risks associated with physical activity. American College of Sports Medicine: ACSM's Guidelines for Exercise Testing and Prescription. 10th ed. Philadelphia: Lippincott Williams & Wilkins; 2018. p.1-9.
3. Kurtaiş Aytür Y. Terapötik Egzersizler. Beyazova M, Gökçe-Kutsal Y, editörler. Fiziksel Tıp ve Rehabilitasyon. 3. Baskı, Ankara: Güneş Tıp Kitapevi; 2016. s. 745-759.
4. American College of Sports Medicine: Position stand: progression models in resistance training for healthy adults. *Med Sci Sports Exerc* 41:687–708, 2009.
5. American Physical Therapy Association: Guide to Physical Therapist Practice, ed. 2. *Phys Ther* 81:9–744, 2001.
6. Gabriel, DA, Kamen, G, and Frost, G: Neural adaptations to resistive exercise: mechanisms and recommendations for training practices. *Sports Med* 36:133–149, 2006.
7. Kraemer, WJ, and Ratamess, NA: Physiology of resistance training: current issues. *Orthop Phys Ther Clin North Am* 9: 467–513, 2000.
8. Weiss, LW, Coney, HD, and Clark, FC: Gross measures of exercise-induced muscular hypertrophy. *J Orthop Sports Phys Ther* 30 (3):143–148, 2000.
9. McArdle, WD, Katch, FL, and Katch, VL: *Exercise Physiology: Nutrition, Energy, and Human Performance*, ed. 7. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins, 2009.
10. Mueller, MJ, and Maluf, KS: Tissue adaptation to physical stress: a proposed “physical stress theory” to guide physical therapist practice, education, and research. *Phys Ther* 82 (4): 383–403, 2002.
11. Maria Grazia Benedett, Giulia Furlini, Alessandro Zati, Giulia Letizia Mauro: The Effectiveness of Physical Exercise on Bone Density in Osteoporotic Patients. *BioMed Research International* Volume 2018, Article ID 4840531.
12. Kris Beattie, Ian C. Kenny, Mark Lyons, Brian P. Carson: The Effect of Strength Training on Performance in Endurance Athletes. *Sports Med*. 2014 Jun;44 (6):845-65.
13. Neumann, DA: *Kinesiology of the Musculoskeletal System— Foundations for Rehabilitation*, ed 2. St. Louis: Mosby/Elsevier, 2010.
14. Levangie, PK, and Norkin, CC: *Joint Structure and Function: A Comprehensive Analysis*, ed. 7. Philadelphia: FA Davis, 2011.
15. Carolyn Kisner, Lynn Allen Colby: *Therapeutic Exercise: Foundations and Techniques*, 6th Edition 2012. Chapter 6 Resistance Exercise for Impaired Muscle Performance, p:157-241.
16. Dustin J. Oranchuk, Adam G. Storey, André R. Nelson, John B. Cronin: Isometric training and long-term adaptations: Effects of muscle length, intensity, and intent: A systematic review. *Scand J Med Sci Sports*. 2019 Apr;29 (4):484-503.
17. Anthony J Blazeovich, Cody J Wilson, Pedro E Alcaraz, Jacobo A Rubio-Arias: Effects of Resistance Training Movement Pattern and Velocity on Isometric Muscular Rate of Force Development: A Systematic Review with Meta-analysis and Meta-regression. *Sports Med*. 2020 May;50 (5):943-963.
18. Danny Lum, Tiago M Barbosa: Brief Review: Effects of Isometric Strength Training on Strength and Dynamic Performance. *Int J Sports Med*. 2019 May;40 (6):363-375.
19. Andersen LL, Andersen JL, Zebis MK, Aagaard P. Early and late rate of force development: differential adaptive responses to resistance training? *Scand J Med Sci Sports*. 2010;20 (1):162–9.

20. McGill, SM, and Cholewicki, J: Biomechanical basis of stability: an explanation to enhance clinical utility. *J Orthop Sports Phys Ther* 31:96–99, 2001.
21. Suetta C, Aagaard P, Rosted A, Jakobsen AK, Duus B, Kjaer M, et al. Training-induced changes in muscle CSA, muscle strength, EMG, and rate of force development in elderly subjects after long-term unilateral disuse. *J Appl Physiol.* 2004;97 (5):1954–61.
22. Bazylar CD, Beckham GK, Sato K. The use of the isometric squat as a measure of strength and explosiveness. *J Strength Cond Res.* 2015;29 (5):1386–92.
23. Gerald F Fletcher, Philip A Ades, Paul Kligfield, Ross Arena, Gary J Balady, Vera A Bittner, Lola A Coke, Jerome L Fleg, Daniel E Forman, Thomas C Gerber, Martha Gulati, Kushal Madan, Jonathan Rhodes, Paul D Thompson, Mark A Williams: Exercise standards for testing and training: a scientific statement from the American Heart Association. *Circulation.* 2013 Aug 20;128 (8):873-934.
24. LaStayo, PC, et al: Eccentric muscle contractions: their contributions to injury, prevention, rehabilitation, and sport. *J Orthop Sports Phys Ther* 33 (10):557–571, 2003.
25. M Roig, K O'Brien, G Kirk, R Murray, P McKinnon, B Shadgan, W D Reid: The effects of eccentric versus concentric resistance training on muscle strength and mass in healthy adults: a systematic review with meta-analysis. *Br J Sports Med.* 2009 Aug;43 (8):556-68.
26. Utku B., Akın Ş. (2017). Eksantrik Egzersizler ve Spor Yaralanmalarından Korunmadaki Yeri, *Türkiye Klinikleri J Sports Med-Special Topics* 2017;3 (3):233-9
27. Niederbracht, Y, et al: Effects of a shoulder injury prevention strength training program on eccentric external rotation muscle strength and glenohumeral joint imbalance in female overhead activity athletes. *J Strength Cond Res* 22:140–145, 2008.
28. Brad J Schoenfeld, Dan I Ogborn, Andrew D Vigotsky, Martino V Franchi, James W Krieger: Hypertrophic Effects of Concentric vs. Eccentric Muscle Actions: A Systematic Review and Meta-analysis. *J Strength Cond Res.* 2017 Sep;31 (9):2599-2608.
29. Ellenbecker, TS: Isokinetics in rehabilitation. In Ellenbecker, TS (ed): *Knee Ligament Rehabilitation.* New York: Churchill Living-stone, 2000, p 277.
30. Hislop, HJ, and Perrine, J: The isokinetic concept of exercise. *Phys Ther* 41:114–117, 1967.
31. Steindler, A: *Kinesiology of the Human Body under Normal and pathological Conditions.* Springfield, IL: Charles C Thomas, 277.1955.
32. Brunnstrom, S: *Clinical Kinesiology.* Philadelphia: FA Davis, 1962.
33. Glass R., Waddell J, Hoogenboom B. The effects of open versus closed kinetic chain exercises on patients with acl deficient or reconstructed knees: a systematic review. *North American Journal of Sports Physical Therapy.* 2010;5 (2):74–84.
34. Mi-Kyoung Kim, Kyung-Tae Yoo: The effects of open and closed kinetic chain exercises on the static and dynamic balance of the ankle joints in young healthy women. *J Phys Ther Sci.* 2017 May;29 (5):845-850.