

Ravnotežje, glavna komponenta gibanja

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V zadnjem času je veliko pozornosti raziskovalcev in terapevtov namenjene mehanizmom uravnavanja drže in ravnotežja. Največja motivacija za preučevanje ravnotežja so bili nenadni padci, ki so zlasti pogosti pri starejših osebah. Šele pred nedavnim pa je bilo več raziskovalnega dela posvečenega tudi osebam s kroničnimi nevrološkimi stanji, kot so na primer možganska kap, multipla skleroza in parkinsonova bolezen v povezavi z njihovo ogroženostjo za padce, povečuje pa se tudi raziskovanje ravnotežja pri visoko zmogljivih rekreativnih in vrhunskih športnikih. Kot fizioterapevte nas zanima predvsem, kako lahko te mehanizme najučinkoviteje uporabimo pri obravnavi oseb z motnjami ravnotežja.

Zakaj sta ravnotežje in drža tako pomembni komponenti spretnega gibanja? Pokončna drža in ravnotežje sta podlaga za sproščeno in učinkovito izvajanje zavestnega gibanja ter opravljanje vsakodnevnih dejavnosti, kot so na primer pripravljanje hrane, oblačenje, osebna higiena, nakupovanje, rekreativne dejavnosti itn. Ker na ravnotežje vplivata tudi vrsta gibalne naloge in okolje, v katerem se oseba giblje, razdelimo dejavnike, ki vplivajo na držo in ravnotežje, na intrinzične, za posameznika specifične dejavnike, kot so čutilni priliv, mišična zmogljivost, gibljivost ter kognitivni in čustveni dejavniki, ter ekstrinzične dejavnike oziroma dejavnike okolja, v katerem poteka gibanje. Za nemoteno usklajevanje ravnotežja so potrebne informacije, pridobljene iz vidnega, vestibularnega in somatosenzoričnega sistema, ki se obdelujejo in usklajujejo v osrednjem živčevju ter oblikujejo ustrezen odziv pri pripravi na gibanje, med gibanjem ali ob nenadni motnji. Pri tem je treba poudariti, da ravnotežje ni le kompleksna gibalna spretnost, temveč so pri uravnavanju drže in ravnotežja udeležene tudi spoznavne funkcije.

Za ocenjevanje ravnotežja obstaja veliko standardiziranih ocenjevalnih protokolov. Do leta 2015 jih je bilo opisanih kar 66. Večina teh ocenjevalnih protokolov oziroma testov oceni od tri do pet komponent ravnotežja izmed naslednjih devetih: stabilizacija položaja (telesa in udov), dinamična stabilizacija med izvajanjem gibanja, funkcijske meje stabilnosti, zmogljivost in koordinacija mišic, potrebna za držo in ravnotežje, procesi senzorične interakcije, zaznavanje vertikale, vnaprejšnje prilagoditve drže, ustrezen ravnotežni odziv na motnjo in vplivi spoznavnih procesov. Terapevtova izbira enega ali več testov je zato odvisna od namena vrednotenja ravnotežja in značilnosti preiskovancev.

Obravnava drže in/ali ravnotežja je posredno ali neposredno sestavni del vsake fizioterapevtske obravnave, saj so oslabitev in motnje ravnotežja posledica različnih poškodb, bolezni in stanj. Zaradi poškodb je ravnotežje oslabiljeno tudi pri vrhunskih športnikih, pri osebah, ki so utpele različne poškodbe in bolezni gibalnega aparata, bolezni osrednjega ali perifernega živčevja, ter pri starejših odraslih, pri katerih zaradi staranja upada delovanje sistemov, ki uravnavajo držo in ravnotežje. Lahko pa je izboljšanje ravnotežja tudi temeljni cilj obravnave. V tem primeru uporabimo v ravnotežje usmerjeno vadbo. Ta naj bo sestavljena tako, da naslovi čim več komponent ravnotežja. Pri tem je treba upoštevati, da ravnotežje ni samostojna funkcija, temveč je povezana z različnimi gibalnimi in kognitivnimi nalogami, ki potencialno tekmujejo za človekovo pozornost, zato mora biti v ravnotežje usmerjena vadba načrtovana tako, da je funkcijska in čim bolj specifična. Iz teorije motoričnega učenja je namreč znano, da je s tako vadbo pridobivanje funkcijskih sposobnosti najhitrejša in je njihov prenos v vsakodnevno uporabo najučinkovitejši.

Balance, the key component of movement

Recently researchers and therapists have devoted more and more resources to study the mechanisms of posture and balance. An important motivation for this increase of research are unexpected falls, that are particularly frequent in older adults. However, an increased amount of research has also been recently devoted to the balance of persons with chronic neurological conditions such as stroke, multiple sclerosis and Parkinson's disease, mostly related to the increased incidence of falls. Additionally, the topic of balance in high-performance recreational and top athletes has also been addressed. As physiotherapists, we are primarily interested in how these mechanisms can be best used for the treatment of balance of persons with various disabilities.

Why are posture and balance so important components of voluntary movement? An upright posture and balance are the basis for efficient movement and thus for most of everyday activities such as preparing food, dressing, personal hygiene, shopping, recreational activities and other activities of daily life. Since balance is also influenced by the type of movement task and the environment in which a person moves, factors that influence posture and balance are divided into intrinsic, i.e., the individual specific factors of the body, such as sensory flow, muscle performance, range of movement, cognitive and emotional factors; and extrinsic factors, i.e., the factors of the environment in which the movement takes place. For the coordination of balance, the information obtained from the visual, vestibular and somatosensory systems are processed and coordinated in the central nervous system, and serve as the basis for the appropriate reaction whether in preparation for movement, during the movement or in the event of a sudden destabilization. Additionally, it should be emphasized that balance is not only a complex motor skill, but has also a cognitive component that can interfere with posture and balance.

As of year 2015, at least 66 standardized protocols for the evaluation of posture and balance were described. Most of these tests evaluate three to five balance components from the following nine ones: static stability (body and limbs), dynamic stability, functional stability limits, underlying motor systems, sensory integration processes, verticality, anticipatory and reactive postural control and the effects of cognitive processes. The therapist's choice of one or more of the particular tests depends on the purpose of the evaluation and on the characteristics of the evaluated subjects.

The treatment of posture and/or balance is directly or indirectly an integral part of any physiotherapeutic treatment. Impairment of balance is the result of various injuries, diseases and conditions. Due to injuries, the balance may be also impaired in top athletes, in people who have suffered various injuries and diseases of the motor apparatus, diseases of the central and peripheral nervous system and, of course, in older adults, due to aging of the systems that regulate posture and balance. However, balance can also be the primary goal of treatment. There are the so-called balance-specific exercises. They are designed to take into account as many balance components as possible. Here it is important to bear in mind that balance is not an independent function – it is associated with various motor and cognitive tasks, which potentially compete for person's attention. Therefore, the balance-specific exercises should be designed to be functional and as specific as possible. From the theory of motor learning it is known that with such training the acquisition of functional abilities is the fastest and their transfer to daily life the most efficient.