

Učinkovitost serijskega mavčenja pri otrocih s cerebralno paralizo

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Uvod: Serijsko mavčenje je konservativen postopek za izboljšanje gibljivosti sklepa (1, 2), hkrati pa lahko tudi za zmanjšanje mišičnega tonusa (3). Namen: V prospektivni raziskavi smo želeli ugotoviti, ali lahko s serijskim mavčenjem pri otrocih s cerebralno paralizo (CP) in z omejeno gibljivostjo v gležnju ali hojo po prstih izboljšamo gibljivost v gležnju in dosežemo vsaj srednji položaj med dorzalno in plantarno fleksijo gležnja oziroma od 5° do 10° dorzalne fleksije pri iztegnjenem kolenu. Preučevali smo vpliv izboljšane gibljivosti gležnja na kakovost vzorca hoje pri samostojno hodečih otrocih in časovni okvir, v katerem otroci obdržijo izboljšano gibljivost v gležnjih. **Metode:** V raziskavo je bilo vključenih 14 otrok s spastično obliko CP: devet s hemiparetično in pet z asimetrično diparetično obliko CP, ki so lahko hodili brez pripomočkov in so imeli zmanjšano gibljivost v gležnju v smeri dorzalne fleksije. Vsi otroci s CP so opravili klinični pregled, oceno gibanja in meritve gibljivosti sklepov. Pri devetih otrocih smo ocenili spastičnosti z modificirano Ashworthovo lestvico. V primeru pomembno zvišanega tonusa (ocena po modificirani Ashworthovi lestvici 2 in več) so otroci pred namestitvijo mavcev prejeli botulinski toksin v mišice gastrocnemius in soleus. Mavci so bili nameščeni od dva do šest tednov (povprečno 2,7 tedna), pri 13 otrocih na eni strani, pri enem pa na obeh straneh. Kriterij za zaključek programa mavčenja je bila izboljšana gibljivost v gležnju (do 10° dorzalne fleksije). Otroci so bili med programom mavčenja vključeni v intenzivni program nevrofizioterapije. Po odstranitvi mavcev in po šestih mesecih smo ponovno ocenili vzorec hoje in ponovili meritve gibljivosti in oceno spastičnosti. **Rezultati:** Klinična analiza hoje je pri večini otrok (povprečna starost 8,1 leta) pokazala, da stopajo na prste vsaj deloma, le en otrok je stopal na celo stopalo. Po odstranitvi mavca je deset otrok še dostopalo na sprednji del stopala. Glede na to smo otroke opremili z ortoza za gleženj in stopalo. Po končanem terapevtskem programu je na sprednji del stopala stopal deloma le en otrok, preostalih 13 otrok pa je v srednji fazi opore obremenjevalo celo stopalo. Klinična analiza hoje po šestih mesecih je pokazala, da pet otrok v fazi opore obremenjuje celo stopalo, šest otrok pa obremenjuje sprednji del stopala, vendar v manjšem obsegu kot pred mavčenjem. Le pri enem otroku se je ponovno pojavila izrazita hoja po prstih. Po končanem programu je prišlo do statistično značilnega izboljšanja rezultatov meritev gibljivosti gležnja pri iztegnjenem kolenu ($p < 0,0001$) s povprečno razliko 15,5°. Rezultati so bili statistično značilno boljši tudi še po šestih mesecih sledenja ($p < 0,0002$) s povprečno razliko 6,9°. **Zaključki:** Rezultati raziskave serijskega mavčenja so pokazali, da so otroci tudi po šestih mesecih precej zadržali izboljšani vzorec hoje in boljšo gibljivost v gležnju.

Ključne besede: otroci s cerebralno paralizo, serijsko mavčenje, klinična analiza hoje, gibljivost, prospektivna študija, kontraktura.

Efficiency of serial casting in children with cerebral palsy

Background: Serial casting is a conservative procedure for improving the joint range of motion (1, 2), at the same time it may also serve to reduce spasticity in muscles (3). The aim of this prospective research was to analyse whether we can improve the ankle range of motion with serial casting in a group children with cerebral palsy (CP) that have a limited range of motion in ankles or they walk on their toes. Our goal was to improve the ankle range of motion to the extent that we achieve at least neutral position between dorsiflexion and plantarflexion of the ankle or from 5° to 10° of dorsiflexion while the knee is extended. We were also interested in how the improved range of motion affects walking patterns in ambulatory children and how long the children can keep the improved range of motion. **Methods:** We included 14 children: nine with hemiparesis and five with diparesis, who were able to walk without assistive devices and had decreased range of dorsiflexion in ankle. All children underwent initial examination, movement analyses, measurements of range of motion and nine children underwent spasticity assessment with Modified Ashworth scale. In cases where spasticity was substantially increased (2 or more at Modified Ashworth Scale), the children received botulinum toxin into the gastrocnemius and soleus muscles prior to the casting. Serial casts were placed from two to six weeks (mean 2.7 weeks) whereby 13 children had a cast on one leg and one child had both legs casted. The criterion for concluding the casting program was improvement in ankle dorsiflexion (up to 10°). During treatment the children were included in intensive neurophysical therapy. Assessment was repeated after the removal of castings and again after six months. **Results:** In most children (mean age 8.1 years) clinical gait analysis showed that they walked on their toes, either severely or mildly, and only one child was capable of full foot-floor contact. After the cast removal ten children still walked with initial toe contact, therefore they received ankle foot orthosis. After the therapeutic program was concluded only one child mildly walked on toes, while the other 13 children had full floor contact in middle stance phase. After six months five children had full floor contact in stance phase and six children had toe-walking but in minor degree as before the casting. In one child severe toe-walking reoccurred. Measurement results of ankle range of motion with the knee extended were significantly improved ($p < 0.0001$) after the program was concluded with mean difference 15.5°. When measuring after six months, the values remained significantly better than at the start of the program ($p < 0.0002$) with mean difference 6.9°. **Conclusions:** Results showed that children mostly maintained the improved gait patterns and ankle range of motion even after six months of follow-up.

Keywords: children with cerebral palsy, serial casting, clinical gait analysis, range of motion, prospective study, contracture.

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