The effect of upper extremity myofascial surgery on muscle tone and functional outcome in persons with spastic cerebral palsy

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Background and Purpose: The upper extremity of persons with spastic cerebral palsy (CP) is characterized by spasticity and an impaired range of motion that affects the positioning of the upper extremity. This often leads to contractures that further limit functioning of the upper extremity. Orthopaedic Selective Spasticity Surgery (OSSCS) was developed by Dr Takashi Matsuo for reduction of spasticity. This study was performed to evaluate the effect of upper extremity OSSCS on muscle tone and functional outcome in persons with spastic CP.

Methods: A retrospective analysis was conducted among 145 persons with spastic quadriplegia and hemiplegia, aged 5 to 20 years, who underwent OSSCS of elbow flexors, forearm flexors, pronators and hand intrinsic muscles. OSSCS involves the techniques of intramuscular tendon lengthening and controlled sliding tendon lengthening. Additional surgical techniques, e.g., release of deep fascia, myofascia and inter-tendinous fascia were added to OSSCS by Dr. Deepak Sharan, who has trained with Dr. Matsuo. The surgery was followed by protocol-based rehabilitation post the removal of plaster after 2 weeks. The rehabilitation involved Occupational Therapy, Myofascial Release, Constraint Induced Movement Therapy, Mirror Therapy, EMG Biofeedback, Functional Electrical Stimulation and Aquatic Therapy. The rehabilitation was provided for 6 days per week for 6 months. Manual Ability Classification System (MACS) was used to characterize the upper extremity function. The outcome measures were modified Ashworth Scale (mAS) and Melbourne Assessment of Unilateral Upper Limb Function (MAUULF). Data were collected at baseline and at 5 months’ post-surgery. Follow up data was collected 2-year post surgery.

Results: Among the study group, females (55%) were predominant and 52% of the participants were aged 10 to 15 years. The commonest muscles released were the forearm flexors and pronators (93%). Persons who underwent OSSCS followed by rehabilitation showed a significant improvement of MACS (p<0.001), mAS (p<0.001) and MAUULF (p<0.001) compared to the baseline. The follow up data were obtained for 66% of the participants, in which the progress was maintained in 97% of the participants.

Conclusion: Upper extremity OSSCS involving the myofascia, followed by intensive protocol-based rehabilitation, was effective in reducing muscle tone and improving function among persons with CP.

References:
OSSCS- Before Release

OSSCS- After Release