

Journal of Neurology (2006) 253 [Suppl 2]: II/1–II/170
Sixteenth Meeting of the European Neurological Society
27–31 May 2006, Lausanne, Switzerland
Symposia and Free Communications

P599

Extracorporeal shock waves in the rehabilitation of children with cerebral palsy

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Objectives: Children with cerebral palsy (CP) regularly are suffering from soft contractures due to muscular stiffness. This makes movements laborious and motor learning difficult. The goal of this investigation is to assess the effects of special ESW on these contractures.

Methods: After the informed consent of children and parents the treatments were performed 5 times during 2 weeks with a modified Minilith SL lithotripter (Storz Medical) producing diverging ESW of 0.012mJ/mm² – 0.024 mJ/mm² energy flux density. This is about 10% of what is considered in physical medicine as “low energy extracorporeal shock waves (ESW)”. We performed 2 different investigations. In group A we treated the muscles responsible for soft contractures of the upper limbs and in group B of the lower limbs. Before and after the treatments with ESW we assessed goniometrically the active range of motion (ROM) of the joints. All children received 4x600 ESW per treatment session while following daily the same basic physiotherapeutical program during the 2 weeks. Group A were 63 children with tetraplegia, group B 38 children with diplegia or tetraplegia. The children of both groups were 8.1 years old on average. In group A 20 randomly chosen children served at the beginning as a blinded control group. They received a sham treatment by interposition of a neoprene slide between the coupling cushion of the lithotripter and the patient’s body. These children also were treated after the 2 weeks with real ESW. In group B we compared the results of 20 patients, which had served as a control group in a former investigation with the same design. Results: In group A the 126 limbs showed an improvement of the elbow extension of 21° and of the hand supination of 40°. Obviously as a result of the physiotherapy the control group augmented the extension with 6.7° and the supination with 4.2°. In group B the 76 limbs improved the extension of the hips by 19°, of the knees by 12° and the ankle joints by 9°. The historical control group has augmented the extension of these joints with 5.2°, 4.8° and 2.1° respectively. The treatments were painless. No undesired effects were observed. All results were statistically significant and lasted for at least 6 weeks. Then a lingering deterioration took place, if ever the children did not move the joints actively.

Conclusion: Very low energy ESW enhance the ROM of joints affected by soft contractures in children with CP.