Environmental influences on muscular activation

In the following series of papers the influence of the environment on human movement will be presented from different perspectives.

In the first two papers a discussion of the impact of too early an exposure to gravitational forces will draw upon observations on the quality of movement in preterm and term babies. \(^1\) \(^2\) In addition, the developmental course of children that are born prematurely will be discussed. \(^2\)

Thereafter, we will describe the consequences of exposure to a microgravity environment, as occurs in space and bed rest. \(^3\) What is the impact of an environment of microgravity on muscular activation and conduction velocity in cosmonauts and individuals subjected to bed rest?

In the last part of this collection of papers the effects of muscle disuse resulting from spinal cord injury (SCI) will be reviewed from a wider perspective. Therapeutic methods to counteract spasticity will be presented. \(^4\) \(^5\)

Despite SCI subjects not being exposed to a different environment \textit{per se}, they are no longer able to load the bones in their lower extremities anymore due to paralysis of the muscles of the lower limbs. Apart from the muscular atrophy that takes place in individuals who are sedentary, there are other more debilitating side-effects. Too little activity may have a deleterious effect on general health in subjects with SCI. For this reason high-volume muscular activation by means of functional electrical stimulation (FES) was investigated for its potential to improve fitness and bone density in complete SCI. Indeed, this may be a means of increasing fitness in SCI. \(^6\) \(^7\)

For SCI subjects who can still use some of the musculature in the lower extremities but not all of it, new training devices are introduced. With these new devices it is possible to stress the cardiopulmonary system by incorporating some of the large muscle groups in the lower extremities. \(^8\) \(^9\) Whether or not these devices can be used to relearn lost motor skills is questioned in two clinical commentaries. \(^10\) \(^11\)

In our last paper \(^12\) we comment on the theories on coordination training in the healthy individual.
Literature