ASSESSMENT OF DAILY PHYSICAL ACTIVITY IN PEDIATRIC PATIENTS TREATED FOR MALIGNANT TUMORS (SARCOMAS) AND ACUTE LEUKAEMIA

Müller Carsten¹, Winter Corinna, Brinkmann Anja, Brandes Mirko, Boos Joachim, Völker Klaus, Rosenbaum Dieter
(Movement Analysis Lab, University Hospital Muenster¹, Germany)

Introduction: Ewing’s sarcoma and Osteosarcoma have a peak incidence during the second decade of life [1], whereas leukaemia is the most common of all cancer diagnoses in children and adolescents. The diseases lead to a loss of physical fitness that often forces patients to rest in bed. Chemotherapy requirements and restrictions to the ward during in-patient treatment generate a further immobilisation. Since daily physical activities play an important role for children and adolescents, these side effects of cancer therapy may impair the motor development as well as the peak bone mass of patients in pediatric oncology.

Methods: We investigated the outcome of cancer therapy on physical activity in two patient groups (bone tumor and soft tissue sarcoma, n=21, 15.1 +/- 3.4 yrs and acute lymphoblastic/myeloid leukaemia, n=17, 11.2 +/- 3.8 yrs). The results were compared with healthy children matched by gender and age.

To assess daily physical activity the StepWatch Activity Monitor (Cyma, USA) was used. This uniaxial accelerometer is an ankle-worn monitor for recording gait cycles (GC) and intensities minute by minute with a storage capacity for several weeks. A high measurement precision of about 99% [2,3] can be achieved by adjusting individual gait parameters.

Results:
Leukaemia Patients: Mean values for GC were 2717.1 per day (34.1% compared to the healthy control group) during in-patient treatment and 3737.2 (46.9%) at home during therapy breaks (as compared to the controls with 7970.8 GC). Only 6.8% of all activities during in-patient treatment and 4.8% at home was performed with high intensity (>40 GC per minute). The control group achieved 13.4% of daily activities at high intensity.

Bone tumor and soft tissue sarcoma: These patients achieved 1364.7 GC per day (16.8%) during in-patient treatment and 2419 GC (29.4%) at home (as compared to the controls with 8224 GC). Only 3.6% and 4.7% was the high intensity part for children during in-patient treatment or at home whereas 15% of the control group’s everyday activities was performed with high intensity.

Discussion: Both control groups accomplished the recommendations for children and adolescents of about 6000 to 8000 GC per day [4]. For both patient groups we found a drastically reduced amount and intensity of daily physical activity due to cancer therapy (side effects) and the disease itself (fatigue), which may contribute to a higher fracture risk in later life [5].

In our present longitudinal studies we investigate the effects of additional exercise in patients with bone tumors and soft tissue sarcomas during their in-patient stay on physical activity, bone mass and quality of life.

Literature:
Correspondence: c.mueller@uni-muenster.de
Keywords: Children Physical Activity, Immobilisation, Cancer