



Eurythmy therapy in the aftercare of pediatric posterior fossa tumour survivors—A pilot study

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Available online 23 March 2012

KEYWORDS

Eurythmy therapy;
Posterior fossa
tumour;
Mind-body therapy

Summary

Background: Pediatric posterior fossa brain tumour survivors are burdened with extensive neurologic, emotional, behavioral and mental impairments. Even long-term common remediation therapies such as conventional physical therapy and occupational therapy do not warrant full recovery. Innovative complementary therapy strategies offer a new option that needs evaluation. EYT is a movement therapy that belongs to the field of mind-body therapies (MBTs). This holistic approach aims to promote self-regulation and self-healing powers e.g. in cancer patients. This pilot study is a first attempt to assess the feasibility, treatment adherence and impact of eurythmy therapy (EYT) in pediatric neurooncology.

Methods: Seven posterior fossa tumour survivors who each participated in 25 EYT interventions over 6 months were followed for an additional 6 months. The outcome parameters cognitive functioning, neuromotor functioning and visuomotor integration were assessed at baseline as well as six and 12 months afterwards.

Results: We found good adherence and improvements in cognitive and neuromotor functioning in all children and better visuomotor integration in 5/7 children after 6 months. After 12 months, neuromotor functioning and visuomotor integration diminished again to some extent.

Conclusion: EYT in pediatric cerebellar tumour survivors is feasible and patients may profit from this new approach.

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Introduction

Tumours of the posterior fossa account for almost half of all brain tumours that rank second in the pediatric age group accounting for about 21% of malignancies^{1,2}. The tumour and its treatment, i.e. surgery and in case of a high-grade tumour adjuvant therapy such as irradiation (craniospinal irradiation and/or local irradiation) and chemotherapy often results in serious and ongoing sequelae³. Adverse effects have been reported for attention, concentration and memory, visuomotor integration, fine and gross motor function, processing speed, perceptual functioning and mental and verbal skills⁴ and can result in deterioration of a variety of fields in daily life^{5,6}.

Therapeutic approaches that aim to reduce adverse effects after anti-tumour therapy and to promote the children's own resources are of great value for these patients. One promising approach is mind-body therapies (MBTs) designed to promote self-regulation and self-healing powers according to the salutogenetic perspective⁷. They can be conceived as a holistic approach to health and healing that seeks to strengthen physical, psychological, social and spiritual resources. With increasing popularity, MBTs have become a promising part of adjunctive treatment in pediatric oncology in Western countries⁸ but only half of the families report their MBT use to the practitioner⁹. Main reasons for additionally using MBTs are an improvement in quality of life, relaxation and comfort¹⁰ and diminishing pain. Although 99% of pediatric oncologists think that it is important to know which therapies their patients' use¹¹, only half of them collected this information because of a lack of time or knowledge. Myers et al¹² recommended better communication between practitioners and parents to inform the parents about potentially helpful complementary therapies that may be added safely to their child's care. Therefore, additional studies about the wide range of MBTs in pediatric oncology are warranted.

One interesting MBT approach from Europe is eurythmy therapy (EYT, Greek: eurythmy = 'harmonious rhythm') which belongs to the setting of Anthroposophic Medicine (AM) and has been practiced since 80 years¹³. EYT can be described as a holistic MBT consisting of a broad range of exercises that arise from human speech (e.g. vowels, consonants, rhythm). According to the principles of AM^{13,14}, illness can occur when the state of harmony between the physical, emotional and spiritual-individual levels becomes unbalanced. Therefore, the central idea of EYT is to rebalance health by means of specific EYT movements and exercises in conjunction with meditative aspects^{13–14}. Clinical results from one cohort study indicate that EYT can improve symptoms and health-related quality of life in patients suffering from chronic illness¹⁵. One pilot study¹⁶ with children suffering from attention deficit hyperactivity disorder (ADHD) reported positive improvements in working speed and social behavior problems. In a previous study¹⁷ we found that compared to conventional ergometer training, EYT stimulated heart rate variability (HRV) in healthy subjects. In a subsequent trial with healthy adults receiving ten interventions of EYT, stressed subjects showed an improvement of autonomic regulation reflected in heart rate variability¹⁸. In association with these physiological changes, a significant improvement of health-related quality of life (short form health survey

36; SF-36) and a reduction of stress symptoms (work-related behavior and experience patterns; AVEM) were observed¹⁹.

The current pilot study is a first step towards evaluating EYT in pediatric neurooncology. The goal was to detect the feasibility and acceptance of EYT in seven pediatric posterior fossa tumour survivors. Furthermore, the long-term effects of EYT on neuromotor skills (Zurich Neuromotor Assessment, ZNA), visuomotor integration (developmental test of visual-motor integration, VMI) and cognitive functioning (Hamburg-Wechsler intelligence test for children, HAWIK-IV (German version of WISC-IV); Wechsler intelligence test for adults, WIE (German version of WAIS-III)) were assessed.

Methods

Two independent psychologists obtained measurements at baseline, after 6 month (first assessment point) and after 12 month (second assessment point) (Fig. 1). Neuromotor and visuomotor skills (ZNA²⁰ and VMI^{21,22}) were assessed at baseline, first and second assessment point. Cognitive functioning (HAWIK-IV²³/WIE²⁴) was measured at baseline and second assessment point. Anticipated effects and satisfaction with EYT were documented through semi-standardized questionnaires at baseline and at first assessment point. None of the patients dropped out during the course of the study.

The study was approved by the ethics committee of the Charité – Universitätsmedizin Berlin. Written informed consent was obtained from parents and participants in accordance with the Declaration of Helsinki.

Measurements

The HAWIK-IV is a psychometric measure of intelligence in children aged 6.00 to 16.11 years. The test comprises 10 core subtests, which form four index scores: The *Verbal Comprehension Index* (VCI) includes the vocabulary, similarities, and comprehension subtests. The *Perceptual Reasoning Index* (PRI) comprehends the block design, picture concepts and matrix reasoning subtests. The *Working Memory Index* (WMI) includes the digit span and letter-number sequencing subtests. The *Processing Speed Index* (PSI) includes the Coding and symbol search subtests. The Zürcher Neuromotor Assessment (ZNM) is a test procedure assessing the neuromotor competence of children aged 5–18 years. The assessment battery permits the evaluation of the neuromotor developmental status, identification of "clumsiness" in children and the differential examination of children with neurological disturbances. The examination contains *Pure Motor Tasks* (PMT) including repetitive movements of finger, hand and foot, alternating movements of hand and foot and sequential finger movements. The *Adaptive Task* (AT) includes the pegboard and dynamic balance. The *Equilibrium* (E) includes static balance. The *Posture* (P) includes stress gaits. Additionally, the movement quality can be examined through the standardised assessment of contra lateral *associated movements* (AsM). The Beery-Buktenica developmental test of visual-motor integration (VMI) is a standardised copy forms-type test to assess the extent to which children and adolescents can integrate their visual and motor abilities.

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