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## • Systematic Review

# A systematic literature review on the effectiveness of eurythmy therapy

Désirée Lötzke<sup>1</sup>, Peter Heusser<sup>2</sup>, Arndt Büssing<sup>1</sup>

1. Quality of Life, Spirituality and Coping, Institute of Integrative Medicine, University of Witten/Herdecke, 58313 Herdecke, Germany
2. Theory of Medicine, Integrative and Anthroposophic Medicine, Institute of Integrative Medicine, University of Witten/Herdecke, 58313 Herdecke, Germany

### ABSTRACT

**BACKGROUND:** Eurythmy therapy is a movement therapy of anthroposophic medicine that can have effects on a person's physical body, spirit, and soul.

**OBJECTIVE:** The aim of this publication was to update and summarize the relevant literature on the effectiveness of eurythmy in a therapeutic context since 2008.

**SEARCH STRATEGY:** Different databases like PubMed, MEDPILOT, Research Gate, The Cochrane Library, DIMDI, Arthe and also the journal databases *Der Merkurstab* and the *European Journal of Integrative Medicine* were searched for prospective and retrospective clinical trials in German or English language.

**INCLUSION CRITERIA:** There were no limitations for indication, considered outcome or age of participants.

**DATA EXTRACTION AND ANALYSIS:** Studies were evaluated with regard to their description of the assembly process and treatment, adequate reporting of follow-ups, and equality of comparison groups in controlled trials.

**RESULTS:** Eleven studies met the inclusion criteria. These included two single-arm, non-controlled pilot studies, two publications on the same non-randomized controlled trial and one case study; six further studies refer red to a prospective cohort study, the Anthroposophic Medicine Outcome Study. Most of these studies described positives treatment effects with varying effect sizes. The studies were heterogynous according to the indications, age groups, study design and measured outcome. The methodological quality of the studies varied considerably. There were no clear improvements since 2008, when the recommendations were published in the first review.

**CONCLUSION:** Eurythmy seems to be a beneficial add-on in a therapeutic context that can improve the health conditions of affected persons. More methodologically sound studies are needed to substantiate this positive impression.

**Keywords:** eurythmy therapy; mind-body and relaxation techniques; anthroposophy; review

**Citation:** Lötzke D, Heusser P, Büssing A. A systematic literature review on the effectiveness of eurythmy therapy. *J Integr Med.* 2015 March; Epub ahead of print.

[http://dx.doi.org/10.1016/S2095-4964\(15\)60163-7](http://dx.doi.org/10.1016/S2095-4964(15)60163-7)

Received November 14, 2014; **accepted** December 19, 2014.

**Correspondence:** Désirée Lötzke, MSc; E-mail: [desiree.loetzke@uni-wh.de](mailto:desiree.loetzke@uni-wh.de)



## 1 Introduction

Clinical studies and meta-analyses have provided sound evidence that the field of mind-body medicine offers effective interventions. Two of the most widely-practiced interventions include yoga<sup>[1-3]</sup> and mindfulness meditation<sup>[4-6]</sup>. Basic research on these interventions addresses psychophysiological effects and clinical effects in randomized controlled studies. However, many other mind-body interventions have only a limited number of studies. One of these interventions is “therapeutic eurythmy”, a specific movement therapy used in anthroposophic medicine<sup>[7]</sup>.

Anthroposophic medicine (established by the Austria-Hungarian philosopher Rudolf Steiner and the physician Ita Wegman) is characterized as “an integrative medical system”<sup>[8]</sup>. Kienle *et al*<sup>[8]</sup> summarized that “anthroposophic medicine is an example of a multimodal treatment system — based on a holistic paradigm of the organism, disease, and treatment — that can be fully integrated with conventional medicine in medical practices and hospitals”. A fundamental approach in anthroposophic medicine is the stimulation of the self-healing power and the usage of patients’ salutogenetic resources<sup>[9]</sup>.

The treatment system of anthroposophic medicine integrates various medications based on botanical, zoological or mineral substances, and specific forms of non-pharmacological treatments like art therapy, rhythmical massage, or therapeutic eurythmy<sup>[7,10]</sup>.

This systematic review focuses on eurythmy therapy (EYT), a specific movement therapy introduced by Rudolf Steiner in 1912<sup>[11]</sup>. In EYT, health and disease conditions cannot be understood solely in terms of a person’s physical body, but more comprehensively with respect to the relationship between the processes of the physical body, life forces, spirit, and soul<sup>[7,12]</sup>. Speech and music as the underlying basic elements of eurythmy are actively transformed into motion during the exercises<sup>[11,13,14]</sup>. This goes along with meditative aspects with regard to “guided imagery”<sup>[7]</sup>. These actively performed (external) movements are transformed into “inner movements” which should improve somatic healing processes and the awareness of body, soul and spirit<sup>[14,15]</sup>.

Indications for use of EYT can be acute or chronic diseases of the cardiovascular system, the musculoskeletal system or of the respiratory organs, disability, or psychosomatic diseases, *etc.* EYT is mostly performed in individual therapy sessions<sup>[13-15]</sup>, or only rarely in group sessions.

Eurythmy as a non-pharmacological treatment of anthroposophic medicine is currently used for several indications, which underlines the importance to examine its effectiveness more closely. Previous research activities summarized in a review by Büssing *et al*<sup>[7]</sup> indicated that eurythmy is a potentially relevant treatment in a therapeutic

context. Based on the previous review, the aim of this publication was to update and summarize the relevant literature on the effectiveness of EYT since 2008.

## 2 Methods

Where possible, the PRISMA guidelines for systematic reviews were followed<sup>[16]</sup>.

### 2.1 Literature research

To find all the relevant literature, a systematic literature research was conducted between April and May 2014. *Google Scholar* was used for a first overview; afterwards the following electronic databases were screened: PubMed, MEDPILOT, ResearchGate, The Cochrane Library, DIMDI and Arthe. Also the journal databases of *Der Merkurstab* and the *European Journal of Integrative Medicine* were searched for relevant publications. Concurrently, experts in the field of anthroposophic medicine and/or EYT were contacted for other publications that were not found in the public databases, in particular the grey/unpublished literature. Additionally, reference lists of relevant publications were screened for further hits, and also the website of the international forum of eurythmy was checked for unrecognized publications.

In each database, the search started with the global English search terms ‘eurythmy’, ‘therapeutic eurythmy’ and ‘eurythmy therapy’, and the search terms ‘Eurythmie’, ‘Heileurythmie’ and ‘Eurythmietherapie’ in German. Where possible, each search request was limited for publications between 2008 and 2014. In the electronic databases the search request was refined and then structurally combined with further search terms.

### 2.2 Inclusion criteria

The literature research was focused on both prospective and retrospective clinical trials (with or without a control group) which aimed to analyze the clinical effectiveness of EYT, and which were published since 2008 in scientific journals in English or German language. In order to comprehensively identify as many studies as possible, there were no limitations for indication, considered outcome or age of participants. Controlled trials were included when the control group received any other interventions as the intervention group, or when the control group did not receive any intervention.

### 2.3 Exclusion criteria

Master or bachelor theses, theoretical considerations, comments or documentations, and single-case studies without a clear focus on clinically relevant outcomes were excluded. We further excluded studies that were already included in the review by Büssing *et al*<sup>[7]</sup>, and studies that reported the effectiveness of multimodal therapy concepts without separately reported results for EYT. Additionally, abstracts without a related publication were not considered.

## 2.4 Data extraction and further approach

The retrieved articles were fully read and checked for compliance with the inclusion criteria. Each study was classified with respect to year of publication, research design, number of patients and proportion of gender, indication, assessment points, treatment, considered outcomes (including research instruments) and results. Values for statistical significance, effect sizes and/or mean differences were reported where possible. Unclear points were discussed by the authors.

A meta-analysis was not considered as useful because of the heterogeneity of the indications and the considered outcomes of identified studies.

To assess the methodological quality of the respective studies, the Jadad score which is generally seen as a basic instrument to “assess the quality of reports of randomized clinical trials (RCTs)”<sup>[17]</sup> was deliberately not used, because we did not find any RCT. This review used the following evaluation criteria from the review by Büsing *et al*<sup>[7]</sup>, which may allow a comparison of results from the two reviews, *i.e.*, “adequate description of the subject assembly process ([for example] methods for patient selection described, eligible but not enrolled subjects and reason for exclusion), equality of comparison groups in the case of controlled studies”, “adequate reported follow-up (dropout-rate, dropout survey presented)”, “adequate description of treatment” (for example exercises, intervention period, number of sessions, group or individual sessions), “unbiased surveillance for adverse outcomes”<sup>[7]</sup>. Risks of bias were discussed by the authors.

## 3 Results

### 3.1 Selection process

Based on the described search strategy, 92 potentially relevant hits were found according to their titles. Forty-seven of these were found in the screened electronic databases; most of them in the first global search in *Google Scholar*. Nine hits were found in the database of the *European Journal of Integrative Medicine*, and 11 from the database of *Der Merkurstab*. The request of experts in the field of anthroposophic medicine/EYT revealed 25 hits. Most of these were found in a collection of publications since 2005 concerning eurythmy<sup>[18,19]</sup>. After eliminating duplicates, 62 publications were deemed suitable. The abstracts of the remaining publications were screened according to relevance for the review and the inclusion criteria outlined above. In this step, 33 publications were excluded; the remaining 29 publications were read and again proved.

Eleven of the identified studies analyzed the effectiveness of eurythmy in a therapeutic context. Two publications of the same study, which focus on stress reduction in a

sample of primary healthy individuals, were included<sup>[20,21]</sup>. The respective authors argued that the fatigue scores at the baseline assessment in the intervention group and in the control group were considerably higher than the norm values of the general German population<sup>[22]</sup>. One publication<sup>[23]</sup> could not be easily classified in the therapeutic context as it had a preventive aim, but will be discussed separately because of its relevance. The study by Kröz *et al*<sup>[24]</sup> examined the effects of a multimodal therapy concept (including eurythmy) for breast cancer patients with cancer-related fatigue. That publication was not used for this review because the contribution of EYT was unclear, according to the measured effects<sup>[24]</sup>. Also the publication of Ecker *et al*<sup>[25]</sup> was not included because EYT was considered as one integral part of a complex anthroposophic therapy concept for asthma. Further, there was an article documenting three case reports of breast cancer patients using EYT<sup>[26]</sup>; a casuistry of a woman with an ovarian carcinoma using EYT<sup>[27]</sup>, and a publication regarding a 28-year-old woman using EYT as one part of her individualized therapy for congenital lymphoedema<sup>[28]</sup>. Because of the missing report of results for clinically relevant outcomes or a missing accordance with the inclusion criteria, these publications were excluded. The literature research process is shown in Figure 1.

### 3.2 Eurythmy in a therapeutic context

In the following, the main relevant findings were summarized concerning study design, characteristics of participants, follow-up and intervention characteristics, outcome measures, therapeutic effects, limitations and methodological quality.

#### 3.2.1 Study design

Five publications<sup>[20,21,29-31]</sup> were identified which correspond the aim of this review-update to collect new studies, since the first review in 2008 on the effectiveness of eurythmy as monotherapy. Two publications described single-arm, non-controlled pilot studies<sup>[30-32]</sup>, two publications referred to the same non-RCT<sup>[20,21]</sup>, and one case study was found<sup>[29]</sup>. All studies had a prospective design. Six studies<sup>[33-38]</sup> referred to the prospective cohort study, Anthroposophic Medicine Outcome Study (AMOS).

#### 3.2.2 Characteristics of participants

The included studies focused on persons with different health afflictions or indications (Table 1). Two publications of the AMOS described effects after usage of anthroposophic treatments for individuals with different indications, summarized as “chronic diseases”<sup>[33,37]</sup>. The other studies focused on more specific indications such as chronic low back pain<sup>[34]</sup>, anxiety disorders<sup>[29,38]</sup>, asthma bronchiale<sup>[36]</sup>, or attention deficit hyperactivity<sup>[35]</sup>. Individuals with essential arterial hypertension<sup>[31]</sup>, brain tumor survivors<sup>[30]</sup> and moderately stressed (primarily healthy) individuals<sup>[20,21]</sup> were also target groups.

There was a wide range of patient numbers in the different

studies. While the number of participants in the AMOS and the studies that focused on moderately stressed adults ranged from 61 to 1 510 participants, the two studies with pilot character assessed the outcome parameters for 7 to 9 participants<sup>[30,31]</sup>. The number of evaluated patients receiving EYT (subgroup analysis was possible) of the AMOS was smaller than the total number of patients and ranged from 21 to 791. The case report focused on just one person.

The aforementioned studies referred to children and/or adolescents<sup>[30,35,37]</sup> or adults<sup>[20,21,31,34]</sup> as target groups. Some studies assessed outcome parameters for a wider age group including children, adolescents and adults<sup>[33,36,38]</sup> and therefore included a heterogeneous cohort of patients. The age of included participants ranged from 1 to 75 years across all the studies. The average age across all studies ranged from 8 to 64 years.

### 3.2.3 Follow-up

The pilot studies<sup>[30,31]</sup> assessed outcome parameters once after intervention, while the studies referring to the AMOS described five follow-ups after the baseline assessment. The longest period to measure long-term effects was found in the study which focused on different indications in chronic diseases<sup>[33]</sup>, with an assessment after four years; the case report<sup>[29]</sup> included information about the patient after a period of 6 years.

### 3.2.4 Intervention characteristics

EYT in the included studies was conducted as group

sessions<sup>[20,21,31]</sup> or individual sessions<sup>[29,30]</sup>. The sessions were conducted one to three times per week over a period of 6 to 10 weeks. The longest intervention period was six months<sup>[30]</sup>. The sessions lasted between 30 and 60 min. Part of the intervention in a few studies was a rest phase after the therapy session.

In a few studies participants were instructed on how to conduct an additional home-based EYT program<sup>[20,21,29-31]</sup>. The AMOS lacked detailed information concerning the EYTs (*i.e.*, duration of the sessions and the whole treatment period). The median duration over all included therapies lasted between 98 and 120 d in the respective studies<sup>[33-38]</sup>.

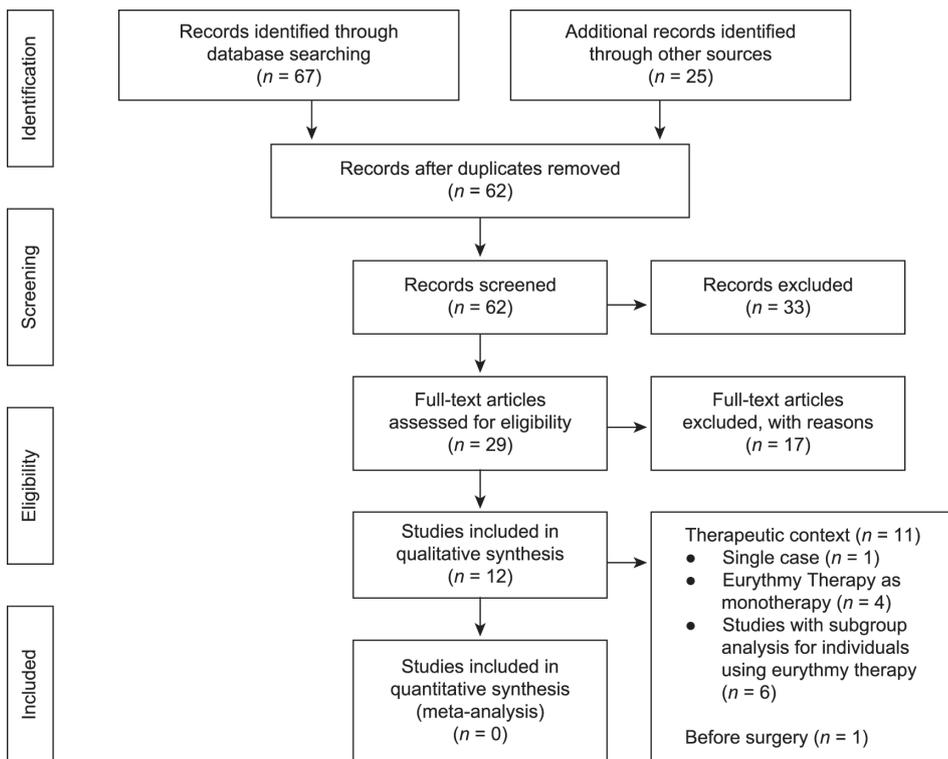
### 3.2.5 Outcome measures

The assessed outcome parameters differed according to the respective indications. A few studies also assessed qualitative data, *e.g.*, effectiveness of intervention, therapy outcome rating or satisfaction with therapy<sup>[20,21,31,33,35-38]</sup>. More detailed information on outcomes, instruments and results are presented in Table 1.

### 3.2.6 Therapeutic effects

#### 3.2.6.1 Non-controlled studies with pilot character

The results of the study by Zerm *et al*<sup>[31]</sup> do not indicate a significant impact on blood pressure in patients (50–75 years of age) with essential arterial hypertension after EYT, neither directly nor six months later. However, this study reported a significant improvement over the whole intervention period as compared to the baseline assessment of state-autonomic regulation ( $P=0.036$ ), and of self-



**Figure 1** PRISMA flow diagram of study selection process

**Table 1 (to be continued)** Overview of identified studies

| Reference                                   | Research design                          | Assessment   | Indication   | Number/gender/age of participants  | Considered outcome/measuring instrument  | Treatment   | Results   |
|---|--|--|--|--|--|---|---|
| <b>Effects of eurythmy as a monotherapy</b> |  |  |  |  |  |   |   |
| Zerm <i>et al</i> <sup>[31]</sup>           | Single-armed, non-controlled pilot study | t <sub>0</sub> , t <sub>1</sub> , t <sub>2</sub><br>-Baseline<br>-Directly after intervention<br>- 6 months after intervention | Essential arterial hypertension  | 9 (6 w, 3 m); mean age: 64 years   | -Total median blood pressure (24 h) (+ state-autonomic regulation (S-aR); self-regulation (SR); internal coherence (ICS) & quality of life (HQL); trait autonomic regulation (T-aR)) | Group therapy weekly (60 min + 20 min rest phase) for 10 weeks<br><br>Exercise home program daily (30 min) during intervention period and for 6 months after intervention | -Median blood pressure (24 h) directly after and 6 months after intervention: moderate improvement (n.s.)<br>-Improvements (s.) after intervention compared to baseline according to S-aR ( $P=0.036$ ); SR ( $P=0.044$ )<br>-Improvements (s.) 6 months after intervention compared to baseline according to S-aR ( $P=0.024$ ); SR ( $P=0.050$ ); HLQ sum score ( $P=0.013$ ) |
| Kanitz <i>et al</i> <sup>[30]</sup>         | Single-arm pilot study                   | t <sub>0</sub> , t <sub>1</sub> , t <sub>2</sub><br>-Baseline<br>-Directly after intervention<br>- 6 months after intervention | Posterior fossa tumor  | 7 (3 w, 4 m); mean age: 11 years   | -Feasibility and acceptance<br>-Cognitive functioning (HAWIK-IV/WIE; VCI; PRI; WMI; PSI)<br>-Neuromotor functioning (ZNM; PMT; AT; E; P)<br>-Visuomotor integration (VMI)            | 25 h eurythmy therapy (individual) within 6 months (35 min + 15 min rest phase)   | -Summary of the authors according to the 2 assessment point compared to baseline: ↑ in every measured outcome (n.s.)  |
| Kanitz <i>et al</i> <sup>[21]</sup>         | Non-randomized controlled trial          | t <sub>0</sub> , t <sub>1</sub><br>-Before and after intervention  | Recruited as healthy but baseline assessment showed that participants were moderately stressed | Treatment group: 68 (59 w, 7 m); mean age: 42 years<br><br>Control group: 22 (18 w, 4 m); mean age: 43.6 years | -SCS (AVEM)<br>-HRQoL (SF-36)  | Eurythmy therapy (group) over 6 weeks (1 to 3 times a week; 45 min + 15 min rest phase)<br>-Handout for practice alone<br>-No intervention for control group              | -24 % of the participants: healthier SCS after intervention<br>-Intervention group: greater improvement than control group over time (all 7 scales) ( $F(1/74)=4.59$ ; $P=0.04$ ) → effect sizes between 0.05 and 0.48<br>HRQoL<br>-Improvement over 6 weeks in the intervention group compared to the control group (n.s.)<br>-Significant changes according to BP, GH, RE     |

**Table 1 (continuation)** Overview of identified studies

| Reference   | Research design   | Assessment  | Indication  | Number/gender/age of participants   | Considered outcome/measuring instrument   | Treatment  | Results  |
|---|---|---|---|---|---|--|--|
| Kanitz <i>et al</i> <sup>[20]</sup>   | Non-randomized controlled trial                             | t <sub>0</sub> , t <sub>1</sub><br>-Before and after intervention   | Recruited as healthy but baseline assessment showed that participants showed high scores of fatigue | Treatment group: 68 (59 w, 7 m); mean age: 42 years (ECG: only 23 w)<br><br>Control group: 22 (18 w, 4 m); mean age: 44 years | -Fatigue (MFI) (GF, PF, RA, RM, MF)<br>-Heart rate variability (24 h)<br>-Effectiveness and usefulness of the eurythmy therapy (qualitative survey)<br>-Also assessed, but published in another paper: HRQol, SCS | 8 to 10 h of eurythmy therapy (group) over 6 weeks (1 to 3 times a week; 45 min + 15 min rest phase)<br>-Handout for practice alone<br>-No intervention for control group                | -Positive changes in fatigue symptoms in the intervention group (Cohen's <i>d</i> between 0.57–1.15)<br>-Group × time interaction for all 5 dimensions (s.)<br>-The authors stated a correlation of fatigue symptoms with a proportional enhancement of the higher frequency and a decrease in the ultra and very low frequency components after eurythmy therapy  |
| <b>Case report</b>  |   |   |   |   |   |  |  |
| Schwab <i>et al</i> <sup>[29]</sup>   | Case report   | Documentation after each session by the therapist<br>-After 2.5 years<br>-After 6 years   | Stress-induced anxiety  | 1 w; 21 years of age  |   | One session per week (over 8 weeks, 30 min) + practice alone   | -After intervention compared to baseline: happier mood; ↓ anxiety symptoms; ↓ bodily symptoms; ↑ social activity; ↑ mobility (neck, back, breast region); movements more relaxed<br>-After 2.5 years: stress increased because of life conditions; again start of eurythmy therapy<br>-After 6 years patients own impression: anxiety not ameliorated but she learned to cope  |
| <b>Studies with subgroup analysis for patients using eurythmy therapy as a main therapy</b> |   |   |   |   |   |  |  |
| Hamre <i>et al</i> <sup>[34]</sup>  | Prospective observational cohort study (follow-up analysis) | t <sub>0</sub> , t <sub>1</sub> , t <sub>2</sub> , t <sub>3</sub> , t <sub>4</sub> , t <sub>5</sub><br>-Baseline<br>-After 3, 6, 12, 18 and 24 months | Chronic low back pain   | 75 (64 w, 11 m); mean age: 49 years<br><br>45 participated in eurythmy therapy  | -Back specific functional disability (HFAQ)<br>-Back pain and leg pain (LBPRS)<br>Secondary clinical outcomes: symptom score, quality of life (SF-36), depressive symptoms (CES-D)                                | -No standardized protocol for eurythmy therapy and the other included therapies;<br>-Median therapy duration over all included therapies: 98 d<br>-Median number of therapy sessions: 12 | -Results for all participants of the study for the main outcomes (mean 0 to 6 months difference): ↑ (s.) in all measured main outcomes HFAQ ( <i>P</i> <0.001, SRM=0.59); LBPRS ( <i>P</i> <0.001, SRM=0.59)<br>-HFAQ, LBPRS: ↑ in all follow-up assessments<br>-Result for patients using eurythmy therapy (mean 0 to 6 months difference): HFAQ: ↑ (s.) ( <i>P</i> =0.004, SRM=0.55); LBPRS: ↑ (s.) ( <i>P</i> =0.001, SRM=0.66) |

**Table 1 (continuation)** Overview of identified studies

| Reference                          | Research design                                      | Assessment  | Indication                               | Number/gender/age of participants  | Considered outcome/measuring instrument  | Treatment  | Results   |
|------------------------------------|--|---|--|--|--|--|---|
| Hamre <i>et al</i> <sup>[37]</sup> | Prospective observational cohort study               | t <sub>0</sub> , t <sub>1</sub> , t <sub>2</sub> , t <sub>3</sub> , t <sub>4</sub> , t <sub>5</sub><br>-Baseline<br>-After 3, 6, 12, 18 and 24 months | Chronic diseases (different indications) | 435 (179 w, 256 m); mean age: 8 years<br><br>55% (n=238) participated in eurythmy therapy        | -Disease severity (disease score)<br>-Caregivers' assessment of severity (symptom score)<br>-Quality of life (KINDL; KITA)<br>-Therapy outcome rating<br>-Satisfaction with therapy<br>-Therapy effectiveness rating | -No standardized protocol for eurythmy therapy and the other included therapies<br>-Median therapy duration over all included therapies: 118 d<br>-Median number of therapy sessions: 12 | -Results for all participants of the study (mean 0 – 6 months difference) (significant results): ↑ disease score ( $P < 0.001$ , SRM=1.30); ↑ symptom score ( $P < 0.001$ , SRM=0.97); ↑ quality of life; ↑ symptom and disease scores (s.) between baseline and all follow-ups; ↑ (all but two s.) quality of life scores between baseline and all follow-ups<br>-Result for patients using eurythmy therapy (mean 0 to 6 months difference): ↑(s.) symptom score ( $P < 0.001$ , SRM=0.95)  |
| Hamre <i>et al</i> <sup>[36]</sup> | Prospective observational cohort study (multicenter) | t <sub>0</sub> , t <sub>1</sub> , t <sub>2</sub> , t <sub>3</sub> , t <sub>4</sub> , t <sub>5</sub><br>-Baseline<br>-After 3, 6, 12, 18 and 24 months | Asthma bronchiale                        | 90 (36 children (13 w, 23 m); 54 adults (38 w, 16 m))<br><br>21 participated in eurythmy therapy | -Average asthma severity (VAS)<br>-Asthma symptoms<br>-Symptom score<br>-Quality of life (AQLQ, SF-36, KINDL)  | -No standardized protocol for eurythmy therapy and the other included therapies<br>-Median therapy duration over all included therapies: 120 d<br>-Median number of therapy sessions: 12 | -Results for all participants of the study (baseline compared to assessment after 12 months): ↑ (s.) in all measured outcomes<br>-Results (s.) for all participants of the study (baseline compared to assessment after 24 months): ↑ average asthma severity ( $P < 0.001$ , SRM=0.98); ↑ symptom score ( $P < 0.001$ , SRM=1.06); ↑ in all asthma symptoms (all $P < 0.001$ ; (one exception); SRM= between 0.38–0.74); quality of life <i>e.g.</i> , KINDL asthma module ( $P = 0.019$ , SRM=0.68)<br>-Results for patients using eurythmy therapy (average 0 to 12 months difference): ↑ (s.) average asthma severity ( $P = 0.009$ ) |

**Table 1 (continuation)** Overview of identified studies

| Reference                          | Research design                        | Assessment  | Indication                               | Number/gender/age of participants  | Considered outcome/measuring instrument   | Treatment  | Results  |
|------------------------------------|--|---|--|--|---|--|--|
| Hamre <i>et al</i> <sup>[38]</sup> | Prospective observational cohort study | t <sub>0</sub> , t <sub>1</sub> , t <sub>2</sub> , t <sub>3</sub> , t <sub>4</sub> , t <sub>5</sub><br>-Baseline<br>-After 3, 6, 12, 18 and 24 months | Anxiety disorders                        | 64 (55 w, 9 m);<br>mean age: 42 years<br><br>41% (n=26) participated in eurythmy therapy | -Anxiety severity<br>-SAS<br>-CES-D<br>-SF-36's Mental Component Summary<br>-Therapy outcome rating<br>-Satisfaction with therapy<br>-Therapy effectiveness rating                                      | -No standardized protocol for eurythmy therapy and the other included therapies<br>-Median therapy duration over all included therapies: 120 d<br>-Median number of therapy sessions: 12 | -Results for all participants of the study (mean 0 to 6 months difference) (significant results): ↑ anxiety severity (physician/patient) (P<0.001, SRM=1.52/1.71); ↑ symptom score (SRM=1.52); ↑ SAS (SRM=1.15); ↑ CES-D (SRM=0.87); ↑ SF-36's mental component (SRM=0.76, all P<0.001); ↑ (s. at all follow-ups) according to anxiety severity, SAS, CES-D, symptom score and 7 SF-36 scales<br>-Result for patients using eurythmy therapy (0–6 months difference): ↑ (s.) anxiety severity (physician/patient) (P<0.001; SRM=1.51/1.56) |
| Hamre <i>et al</i> <sup>[35]</sup> | Prospective observational cohort study | t <sub>0</sub> , t <sub>1</sub> , t <sub>2</sub> , t <sub>3</sub> , t <sub>4</sub> , t <sub>5</sub><br>-Baseline<br>-After 3, 6, 12, 18 and 24 months | Attention deficit hyperactivity disorder | 61 (10 w, 51 m);<br>mean age: 9 years<br><br>34 participated in eurythmy therapy         | -ADHD core symptoms (FBB-HKS)<br>-Disease severity (disease score; symptom score)<br>-Quality of life (KINDL)<br>-Therapy outcome rating<br>-Satisfaction with therapy<br>-Therapy effectiveness rating | -No standardized protocol for eurythmy therapy and the other included therapies<br>-Median therapy duration over all included therapies: 102 d<br>-Median number of therapy sessions: 13 | -Results for all participants of the study: ↑ (s.) for all measured clinical outcomes between baseline and 6-month follow-up and between baseline and 24-month follow-up (P≤0.001); mean 0–24 months difference (SRM): FBB-HKS total=0.84; symptom score=1.02; KINDL total quality of life=0.55<br>-Results for patients using eurythmy therapy: 7% less improvement compared to all study participants; mean 0–6 months difference: ↑ (s.) FBB-HKS total score (P=0.001)  |

**Table 1 (continuation)** Overview of identified studies

| Reference                               | Research design   | Assessment   | Indication  | Number/gender/age of participants   | Considered outcome/measuring instrument  | Treatment  | Results  |
|---|---|--|---|---|--|--|--|
| Hamre <i>et al</i> <sup>[33]</sup>      | Prospective observational study                             | Follow-up analysis of the AMOS -48 months after intervention   | Different indications (depression, asthma, low back pain, anxiety disorders, ADHD symptoms, migraine) | 1 510 (1 054 w, 456 m); mean age: 37 years<br><br>Eurythmy therapy: 791   | -Symptom score<br>-Quality of life (SF-36)<br>-Depressive symptoms (CES-D)<br>-Disease-specific outcomes (check instruments in publications) | -No standardized protocol for eurythmy therapy and the other included therapies<br>-Median therapy duration over all included therapies: 119 d<br>-Median number of therapy sessions: 12 | -Results for all participants of the study (mean 0–48 months difference): ↑ (s.) in symptom score (SRM=1.13); CES-D (SRM=0.56); SF-36's physical/mental component (SRM=0.39/0.60) (all $P<0.001$ ); ↑ (s.) in all diagnosis groups for the disease specific outcomes; ↑ (s.) symptom score in adults, children and in all included main therapies<br>-Results for patients using eurythmy therapy (mean 0–48 months difference): ↑ (s.) in symptom score ( $P<0.001$ ; SRM=1.12) |
| <b>Studies with preventive aim</b>      |   |  |   |   |  |  |  |
| Pedrazzoli <i>et al</i> <sup>[23]</sup> | Prospective, sham-controlled, non-randomized clinical trial | t <sub>0</sub> , t <sub>1</sub> , (t <sub>3</sub> )<br>-before and after intervention (physiological outcomes)<br>-2 d after surgery (questionnaire) | Surgery   | 60<br><br>Intervention group: 30 (29 w, 1 m); mean age: 50 years<br><br>Control group: 30 (25 w, 5 m); mean age: 50 years | Relaxation of patients:<br>-Salivary cortisol<br>-Heart rate<br>-Blood pressure<br>-Self-assessment of the impact of intervention            | -Intervention group: eurythmy therapy immediately before surgery (30 min)<br>-Sham-control group: lying down (presence of eurythmy therapist; 30 min)                                    | -Comparison before and after intervention:<br>Intervention group: no significant positive effects on the measured outcomes using eurythmy therapy before surgery (just ↓ (s.) for diastolic blood pressure); reported highly effectiveness of eurythmy therapy before surgery by patients<br>Control group: ↓ (s.) cortisol content in saliva, ↓ blood pressure, ↓ pulse rate  |

w: women/female; m: male; n.s.: not significant; s.: significant; PSI: Processing Speed Index; ZNM: Züricher Neuromotor Assessment; HQL: Herdecke Quality of Life Questionnaire; VCI: Verbal Comprehension Index; PRI: Perceptual Reasoning Index; ↑: improvement; ↓: deterioration; WMI: Working Memory Index; PMT: Pure Motor Tasks; AT: Adaptive Task; E: Equilibrium; P: Posture; HFAQ: Hannover Functional Ability Questionnaire; LBPRS: Low Back Pain Rating Scale Pain Score; SF-36: Short-Form-36 Question Health Survey; CES-D: Center for Epidemiological Studies Depression Scale; AQLQ: Asthma Quality of Life Questionnaire; KINDL: Questionnaire for Measuring Health Related Quality of Life in Children and Adolescents; VAS: Visual Analogue Scale; AVEM: Work-Related Behaviour and Experience Patterns; BP: bodily pain; GH: general health; RE: role emotional; RP: role physical; V: vitality; MH: mental health; SF: social functioning; HRQoL: health-related quality of life; MFI: multidimensional fatigue inventory; GF: general fatigue; PF: physical fatigue; RA: reduced activity; RM: reduced motivation; MF: mental fatigue; SCS: stress-coping strategies; ECG: electrocardiogram; CFS-D: Cancer Fatigue Scale; AMOS: The Anthroposophic Medicine Outcome Study; SAS: Self-rating Anxiety Scale; ADHD: attention deficit hyperactivity disorders; FBB-HKS: Fremdbeurteilungsbogen für Hyperkinetische Störungen (German).



regulation measures ( $P=0.044$ ). Moreover, this study found a significant improvement of patients' quality of life (sum score) six months after intervention ( $P=0.013$ )<sup>[31]</sup>.

Eurythmy in the treatment of brain tumors in children and adolescents (6 to 17 years of age) showed short-term positive results concerning neuromotor and cognitive functioning and also for visuomotor integration after 25 h of individual EYT. Six months after intervention the positive effects in neuromotor functioning and visuomotor integration declined. Because of the small number of participants, the results could not be verified concerning their statistical significance<sup>[30]</sup>.

### 3.2.6.2 Non-randomized controlled trial

The study by Kanitz *et al*<sup>[21]</sup> analyzed the effectiveness of EYT on moderately stressed adults according to their coping strategies. The results showed a statistically significant improvement in “work-related behaviour and experience patterns” (seven scales) for the intervention group compared to a passive control group over six weeks, with one to three therapy sessions weekly ( $F(1/74)=4.6$ ;  $P=0.04$ ). Effect sizes for the significant improvements for the scales ‘*experience of social support*’, ‘*satisfaction with life*’, ‘*satisfaction with work*’ and ‘*emotional distancing*’ were small (Cohen's  $d$  between 0.31 and 0.48). This study also assessed a positive impact on SF-36's health-related quality of life (Table 1)<sup>[21]</sup>.

In the second publication of Kanitz *et al*<sup>[20]</sup> on the same database, the authors described statistically significant and clinically relevant changes in fatigue symptoms in the intervention group after EYT. While the control group showed an increase in fatigue symptoms, individuals participating in EYT over six weeks showed a decrease. The publication presented moderate to strong effect sizes ( $d$ ) between 0.57 and 1.15 for general fatigue, physical fatigue, mental fatigue, reduced activity and reduced motivation<sup>[20]</sup>.

### 3.2.6.3 Case reports

One case report described the results of EYT for a 21-year-old woman with stress-induced anxiety<sup>[29]</sup>. A positive change of patient's mood and self-confidence, positive improvements concerning anxiety, bodily symptoms and upper body mobility were reported after eight weeks of individual therapy. Sleep problems, muscular pains and intensity of headaches decreased. After six years the patient reported that there were some anxiety symptoms left but that she learned to better cope with it<sup>[29]</sup>.

### 3.2.6.4 Publications on the AMOS

The AMOS examined different indications in various publications. For the included studies, just results for subgroup analysis concerning participants who used EYT as main therapy modality will be discussed. Not for all measured outcomes in the study, results for the subgroup analysis were given.

One publication focused on chronic low back pain<sup>[34]</sup> and reported statistically significant improvements, specifically in back functional disability (as measured with the Hannover Functional Ability Questionnaire (HFAQ)) and in back and leg pain (Low Back Pain Rating Scale Pain Score (LBPRS)) for 45 of 74 participants aged between 17 and 75 years using eurythmy as main therapy modality 24 months after intervention. The main improvements were registered six months after baseline (0–6 months mean difference: HFAQ, 9.6 points (95% confidence interval (CI): 3.25–15.98;  $P = 0.004$ ); LBPRS, 8.4 (95% CI: 3.57–13.24)). For standardized response mean effect sizes (SRM) see Table 1<sup>[34]</sup>.

Separately reported results for participants using EYT in the publication focusing on asthma in children/adolescents and adults were just given for the average asthma severity after 12 months. They showed a statistically significant improvement (0–12 months difference: 2.05; 95% CI: 0.6–3.5;  $P = 0.009$ )<sup>[36]</sup>.

In the study focusing on attention deficit hyperactivity in 3- to 16-year-old individuals<sup>[35]</sup>, the authors presented a subgroup analysis for the FBB-HKKS, a parent's questionnaire assessing the core symptoms for attention deficit hyperactivity disorders, in a baseline to 6-month follow-up comparison. The results showed a statistically significant ( $P = 0.001$ ) mean difference (0.28; 95% CI: 0.12–0.44). The subgroup analysis included individuals with eurythmy as main therapy modality with or without medical treatment<sup>[35]</sup>.

The publication by Hamre *et al*<sup>[38]</sup> which focused on patients aged 17–75 reported statistically significant results for the subgroup of patients using eurythmy as the main therapy modality according to anxiety severity for the baseline to 6-month follow-up comparison (mean differences physician rating ( $P < 0.001$ ): 3.66 (95% CI: 2.78–4.53)). The SRM was 1.51. Similar results were also reported for the patient rating (Table 1)<sup>[38]</sup>.

In the publication by Hamre *et al*<sup>[37]</sup> all participants aged 1–16 years were included in the analysis. The indications were summarized as “chronic diseases”. The results show a statistically significant improvement of symptom score ( $P < 0.001$ ; average improvement 0 to 6 months difference = 2.33 (95% CI: 2.02–2.65; SRM=0.95)) for the subgroup of patients using eurythmy (238 individuals) as main therapy modality<sup>[37]</sup>.

Another publication by Hamre *et al*<sup>[33]</sup> focused on the 48-month follow-up concerning different indications summarized as “chronic diseases” in 1 to 75 years old patients. Across all included indications, the symptom scores of the 791 individuals using eurythmy as main therapy modality showed statistically significant ( $P < 0.001$ ) improvements after intervention (average 0–48 months difference: 2.88; 95% CI 2.70–3.06; SRM: 1.12)<sup>[33]</sup>.

### 3.2.7 Limitations and methodological quality

The studies varied in their methodological quality, and in their number and importance of limitations. In all publications, inclusion and exclusion criteria as well as participants' characteristics were reported. Remarkable is the subject assembly process in the two publications by Kanitz *et al*<sup>[20,21]</sup> where participants were recruited in four schools, among them two anthroposophic 'Waldorf schools'. One might expect that the choice of schools may lead to a bias in a positive or negative way (*i.e.*, students are familiar with EYT, or may have strict reservations). Results which describe possible differences according to the schools, in which the participants were recruited, are missing. Additionally, relevant outcomes such as the fatigue scores showed significant differences between the control and the intervention group at the baseline assessment<sup>[20,21]</sup>. The reasons for the differences at baseline assessment are unclear. A study by Watt *et al*<sup>[39]</sup> collected data on fatigue for the Danish general population with the same instrument, and summarized that control groups must be selected with caution for correct interpretations of results in comparisons. The authors described differences in the fatigue scores among others with respect to sociodemographic factors<sup>[40]</sup>. Therefore, one cannot exclude the possibility that the reported differences between the two groups in the study by Kanitz *et al*<sup>[20,21]</sup> might be co-influenced by methodological reasons (*i.e.*, the recruitment process).

Not all publications specifically mentioned whether participants also received conventional treatments or other forms of anthroposophic therapy<sup>[30,31]</sup>. In the study of Kanitz *et al*<sup>[20,21]</sup> individuals were excluded if they used another 'physical' therapy during the intervention period. In the study by Schwab *et al*<sup>[29]</sup> as well as in the studies referring to the AMOS, the participants did receive additional therapies<sup>[33-38]</sup>.

The enrolled publications also varied in their description of the specific exercises. Most studies listed examples<sup>[20,21,29-31]</sup>, while in the publications of the AMOS the description of exercises is missing<sup>[33-38]</sup>.

The small number of participants and the absence of a comparison group in most of the studies are further limitations concerning the interpretation of therapy effects. In the studies with a control group, participants were not randomized to the groups<sup>[20,21]</sup>. A topic worthy of discussion for the design of future studies is the unbalanced gender ratio (predominance of women) as found in two publications by Kanitz *et al*<sup>[20,21]</sup>, and in most of the included studies referring to the AMOS<sup>[33-38]</sup>.

The results of the case report should be interpreted with caution, because no (standardized) instruments were used<sup>[29]</sup>.

Two AMOS publications had varying numbers of

enrolled individuals in the subgroup analysis for EYT, without a discussion of the reason<sup>[33,34,38]</sup>. Something else worth mentioning is the wide range of participants' age, starting with 1 year in the inclusion criteria of two publications<sup>[33,37]</sup>. For example, the publication focusing on chronic diseases in children reported that 7% (32/435) of the included individuals were 1 to 3 years old. The feasibility of the EYT sessions with children of this age group is at least debatable.

The description of limitations and confounding factors in the publications was differently detailed. Drop-out rates/follow-up rates were reported in all included studies. The publications by Kanitz *et al*<sup>[20,21]</sup> provided explanations for the drop-outs. The publications of Hamre *et al*<sup>[33-38]</sup> reported differences in respondents and non-respondents.

### 3.3 Eurythmy in preparation for surgery

A prospective, sham-controlled, non-RCT by Pedrazzoli *et al*<sup>[23]</sup> analyzed the effects of EYT on pulse, cortisol levels and blood pressure of patients before surgery. The authors aimed to analyze whether eurythmy before surgery may have a positive impact on patients' relaxation. The physiological outcomes in the intervention group did not change significantly (except for the diastolic blood pressure), but the authors nevertheless concluded that "patients perceived EYT in preparation for surgery as being highly effective"<sup>[23]</sup>.

## 4 Discussion

This review aimed to summarize and evaluate the current literature on the effectiveness of eurythmy in the treatment of various diseases since 2008. In total, just a small number of relevant publications (11 out of 62) applied to the inclusion and exclusion criteria. The included publications were quite heterogeneous for study design and outcomes, and did show that EYT is currently used in a wide range of applications and for different target groups (*i.e.*, children, adolescents and adults). According to these studies, EYT is applied for various chronic diseases, *i.e.*, hypertension, asthma bronchiale, attention deficit hyperactivity, anxiety disorders, or cancer. One explanation for the wide use is certainly the aim of eurythmy to influence the human individual in all its aspects, *i.e.*, the processes of the physical body, life, soul and spirit as well as their interactions<sup>[11,14]</sup>.

Besides EYT's potential effectiveness for patients with more physical disorders such as chronic low back pain, study results suggested a beneficial role in the treatment of anxiety disorders as well. The findings of the included studies also showed a statistically significant impact of EYT for autonomic regulation and self-regulation in arterial essential hypertension patients; on work-related behaviour and experience pattern and fatigue symptoms in moderately stressed adults; on attention deficit hyperactivity



disorder core symptoms; on asthma severity; and on symptom scores in general for patients with different chronic diseases. However, the clinical relevance of some of these outcome variables is not yet fully clarified.

One relevant outcome parameter in studies dealing with the effectiveness of mind-body therapies seems to be health-related quality of life. A number of included studies reported improvements in quality of life measures after EYT, although different instruments were used.

While the publications of the AMOS reported (when given) large effect sizes (SRM) for the measured outcomes for patients with eurythmy as main therapy modality, the values for SRM in the other included publications varied between small and large effect sizes.

This review primarily focused on statistically assessed effects of EYT. A few studies also conducted qualitative surveys, which underline the suggestion that EYT can be helpful in the care of patients with chronic diseases. For example, participants reported a higher quality of life, improved stress management, a positive impact on relaxation<sup>[21]</sup>, greater vitality and improvements concerning resilience and their attitude toward life<sup>[31]</sup>. The results concerning the therapy outcome ratings (0–10, 10 being “helped very well”) and patients’ satisfaction with therapy (0–10, 10 being “very satisfied”) reported in the AMOS studies, support the evidence for positive effects of EYT on individuals’ health status.

It is worthy to take into consideration that not all the included studies have the same relevance for the evaluation of the research question. The methodological quality of the studies ranges considerably. The lack of RCTs was the most obvious issue, but understandable in light of the reservation of anthroposophic medicine physicians to randomize their patients<sup>[40]</sup>. In fact, anthroposophic medicine sees each person as an individual, who requires individual treatment strategies. Also important is an intact personal practitioner-patient relationship, rather than standardized protocols and randomly generated practitioner-patient assignments. Other limitations such as small sample size, or simultaneous participation in other treatments (*i.e.*, physiotherapy, other anthroposophic medicine therapies), reduced the validity of study results.

In light of the summarized study results and obvious limitations, one may conclude that EYT may in fact have beneficial effects under specific conditions. Yet, the low methodological quality of several studies makes it difficult to assess its relevance for specific indications and populations. In future studies with a focus on a wide range of age groups and/or with several different indications subgroup analysis should be performed as well, because EYT might not be similarly effective in all individuals. One publication showed that across all included participants with different main therapy modalities, there were larger improvements

for children than for adults<sup>[36]</sup>. This indicates that future research should possibly focus on target groups such as age, or other patient characteristics to obtain more differentiated results. Additionally, most of the included studies had a predominance of women. The results are in line with other studies and publications in the context of complementary and alternative medicine<sup>[41–43]</sup>. This fact is probably transferable on therapies in anthroposophic medicine. Hamre *et al*<sup>[38]</sup> expressed the presumption that women are possibly more open to creative therapies like eurythmy. The findings of this review also imply that future research should continue to focus on long-term effects, because the study by Kanitz *et al*<sup>[30]</sup> showed that two measured main outcomes in brain tumor survivors declined six month after intervention.

## 5 Conclusion

As a whole, eurythmy seems to be a beneficial technique that improves the health of affected persons. There are statistically significant impacts on different clinically relevant outcomes, and the findings suggest that eurythmy is effective in a therapeutic context. Nevertheless, more rigid and methodologically sound studies are needed to substantiate this positive impression. Only a small number of studies have been published after the first overview of the current literature in 2008. This review did not find clear improvements in methodological quality since the publication of the first review’s recommendations<sup>[7]</sup>.

## 6 Competing interests

The study was not financed by any organization; the authors did not receive financial support by organizations, companies etc., which could have influenced the interpretation of data. The authors are employees of a university and therefore financed through university.

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## Submission Guide

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