



How to address physical activity and exercise during treatment from eating disorders: a scoping review

Therese Fostervold Mathisen^a, Phillipa Hay^{b,c} and Solfrid Bratland-Sanda^d

Purpose of review

This scoping review aimed to provide a recent update on how to address dysfunctional physical activity and exercise (DEx), and on effects and experiences from including supervised and adapted physical activity or exercise (PAE), during treatment of eating disorders.

Recent findings

A systematic search for peer-reviewed publications in the period 2021–2023 generated 10 original studies and 6 reviews, including one meta-analysis (reporting according to PRISMA and SWiM). Findings showed that DEx was effectively managed by use of psychoeducation and/or PAE. Inclusion of PAE as part of treatment showed low-to-moderate impact on health and positive or neutral effects on eating disorder psychopathology. There were no reports of adverse events. For individuals with anorexia nervosa, PAE improved physical fitness with no influence on body weight or body composition unless progressive resistance training was conducted. For individuals with bulimia nervosa, DEx was reduced simultaneously with increased functional exercise and successful implementation of physical activity recommendations during treatment. Experiences by individuals with eating disorders and clinicians, including accredited exercise physiologists, pointed to positive benefits by including PAE in treatment.

Summary

Lack of consensus about DEx and of recommendations for PAE in official treatment guidelines hinder adequate approaches to these issues in eating disorder treatment.

Keywords

dysfunctional exercise, exercise, exercise therapy, physical activity, psychoeducation

INTRODUCTION

Dysfunctional physical activity and exercise (DEx) implies a pathological relationship with activity and exercise resulting in physical and psychological health impairment, and serves as an overarching term for compulsive exercise, exercise addiction, obligatory exercise, and exercise dependence [1]. DEx is a problematic behaviour for many persons with an eating disorder (ED), and has in particular been acknowledged as a core symptom in anorexia nervosa for more than 150 years [2]. The leading paradigm was to manage DEx with bed rest, similar to the early and mid-20th century paradigm for recovery after severe somatic disorders, such as ischemic stroke [3,4]. The rationale behind the use of bed rest is understandable given the poor medical status and high mortality rates in persons with anorexia nervosa [5,6]. However, a recent review showed that this had no evidence in existing literature and most likely was not only ineffective but

potentially counterproductive [4,7]. DEx is also prevalent in individuals with other EDs such as bulimia nervosa and binge-eating disorder (BED)

^aFaculty of Health, Welfare, and Organization, Østfold University College, Fredrikstad, Norway, ^bTranslational Health Research Institute (THRI), School of Medicine, Western Sydney University, ^cMental Health Services, SWSLHD, Campbelltown, Sydney, Australia and ^dDepartment of Outdoor Studies, Sports and Physical Education, University of South-Eastern Norway, Bø, Norway

Correspondence to Therese Fostervold Mathisen, Faculty of Health, Welfare and Organization, Østfold University College, Kobbleragerstredet 5, 1671 Fredrikstad, Norway.
E-mail: Therese.F.Mathisen@hiof.no

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KEY POINTS

- Few official or national treatment guidelines mention or recommend integration of physical activity and/or exercise (PAE) during treatment of eating disorders, which contrasts with the current evidence on safety and effect, and the extant helpful medical screening guidelines.
- Patients and therapists share the opinion that supervised PAE should be integrated with eating disorder treatment, rather than proscribed.
- In order to guide patients to reduce DEX and rather engage in functional PAE, psychoeducation and PAE should both be included during eating disorder therapy.
- Progressive resistance exercise is likely a preferable type of physical activity, as it may bring favourable effects both mentally and physically, is documented not to interfere with weight increase in the underweight patients, may be preferable by persons with high body weight, and has shown beneficial effects on psychopathology.

[8–11], yet the management of this symptom has been insufficiently addressed in research concerning all EDs. Notable as well are the many definitions and understandings of DEX [12–16], leading to a variety of methods to evaluate symptom severity [17,18].

Globally, physical inactivity is a leading cause of morbidity and mortality [19–21], and large initiatives exist to increase physical activity in all age groups [21,22]. Physical activity is defined as ‘any bodily movement produced by skeletal muscles that requires energy expenditure’ [23], and consists of a subset, exercise, which refers to planned, structured and repetitive physical activity aiming to improve or maintain fitness [23]. The latter points to exercise as being functional, and contrasts to the dysfunctional exercise as a symptom in EDs. Both physical activity and exercise (PAE) have shown to be effective in both prevention and treatment of a range of mental and physical illnesses [24–27]. There are several hypotheses about the mechanisms of these effects, including both biological such as the dopamine hypothesis and psychological such as the self-efficacy hypothesis [28,29]. Recent advances in the research field of exercise genomics show that these effects among others are generated by myokines, signal substances produced by active muscle mass and that causes tissue growth and remodelling in various bodily organs including the brain [30,31].

Despite several reviews finding it is safe to include supervised and adapted PAE during treatment of different EDs [32–34], guidelines on medical screening and use of physical activity during

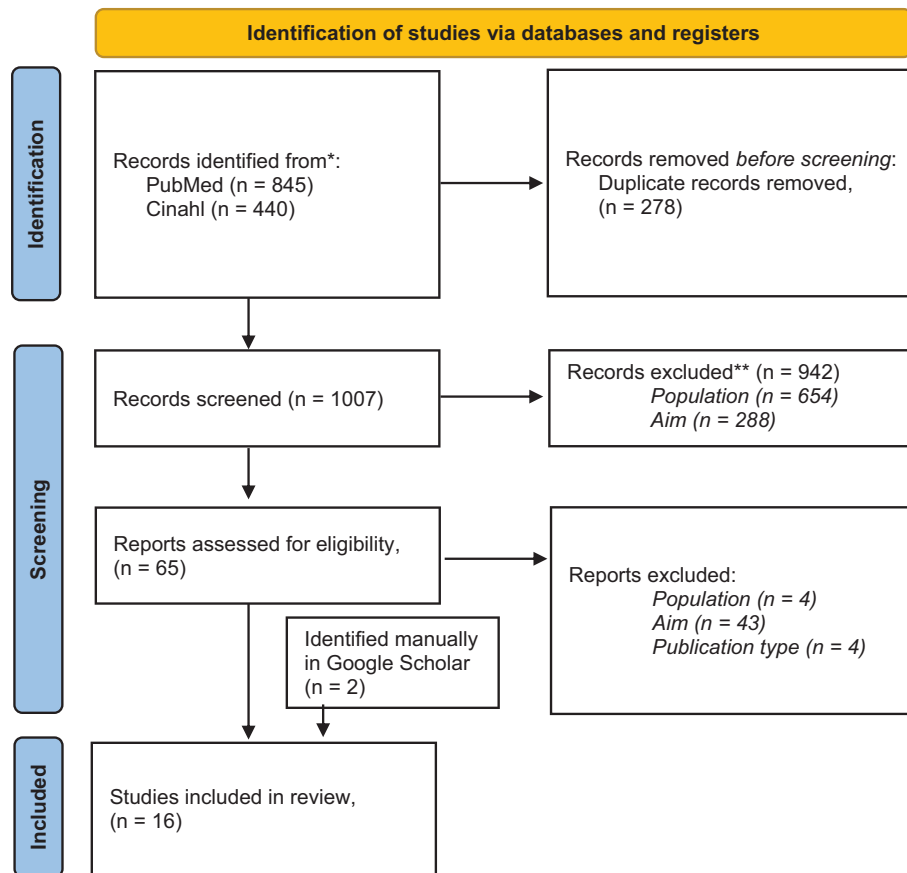
treatment [1,35,36], and increased request from patients and clinicians for use of guided PAE during treatment [37–39], most official guidelines for ED treatment do not address PAE as part of therapy. The lack of focus on how to deal with the complexity of physical activity behaviour during treatment, that is, how to manage the DEX and at the same time introduce functional and health-related physical activity, may deprive patients of important mental and physical health benefits [40]. With this background, the aim of this review was to provide a recent update in the knowledgebase of addressing PAE during ED treatment. This literature review specifically aims to address to the following questions:

- (1) How do we best address and reduce DEX during eating disorder treatment.
- (2) What are the effects from including PAE as part of eating disorder treatment.

METHOD

Five databases: PubMed, Cinahl, Premier, Embase, ProQuest and Google Scholar were searched with combined [MeSH Terms] and [Title/Abstract]/keyword. Whilst systematic searches were performed in PubMed and Cinahl with a complete search string (see Supplementary File, <http://links.lww.com/YCO/A76>), other databases were inspected manually using different combinations of the search terms and keywords to randomly inspect if any additional publications were identified. Polyglot Search Translator was used in some of the databases. All searches were limited to the period 2021–2023, only peer reviewed literature was included, and publications with athletes were excluded. The review is not registered, but protocol is available on request.

The final and complete review was performed on 30 March 2023. One author (T.F.M.) imported all articles to the online review administration tool Rayyan [41], and performed the total screening. One co-author (S.B.S.) supported the review process by checking the screening of articles and finally evaluating and confirming the included articles. Details of the screening process and selection of the final articles are illustrated in Fig. 1. In total, 16 relevant articles were identified from the period of 2021 to 2023 addressing either of the two aims for this review. The articles evaluating effects from interventions designed to reduce DEX are presented in Table 1, while the articles studying effects from supervised PAE during ED therapy are presented in Table 2 (reviews and meta-analysis) and Table 3 (original articles). No meta-analysis was performed because statistical pooling of the results was difficult



*Additionally manual searches with different combinations of the relevant search terms and keywords were performed in Google Scholar, Embase, and ProQuest. Two unique publications were identified by searches in Google Scholar (see figure).

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FIGURE 1. Flow diagram for literature review.

as there was large heterogeneity across studies, but we adhered to SWiM and PRISMA (see Supplementary Data, <http://links.lww.com/YCO/A77>) [42].

HOW DO WE BEST ADDRESS AND REDUCE DYSFUNCTIONAL PHYSICAL ACTIVITY AND EXERCISE DURING EATING DISORDER TREATMENT?

The two reviews that summarized different methodologies to treat DEx identified psychoeducation, preferably through principles applied by CBT, and/or allowing patients to participate in professionally supervised and adapted physical activity, as frequently demonstrating positive findings (Table 1) [43,44]. Most studies combined both methodologies and found comparable improvements in DEx and ED pathology, despite different definitions and measurement of DEx. The single original study included in the current review evaluated the feasibility, effect from – and acceptability of an

psychoeducational program aimed at reducing DEx in adolescents (Table 1) [45[■]]. In this study, participants reported high levels of acceptance and interest in the program, and the psychoeducation addressing ‘facts and myths’ was reported as especially helpful. This is consistent with research presented in one of the included reviews; that is, the therapeutic value of psychoeducation to enable persons to recognize DEx, and to improve their ability to recognize and tolerate emotions [43[■]].

WHAT ARE THE EFFECTS FROM INCLUDING PHYSICAL ACTIVITY OR EXERCISE AS PART OF EATING DISORDER TREATMENT?

The three reviews (all of only anorexia nervosa) and one meta-analysis (all EDs) that summarized findings on including supervised exercise to treatment, were similar in characterizing exercise programs as low-to-moderate in impact; that exercise gave no effect

Table 1. Studies presenting interventions targeting dysfunctional exercise during treatment of eating disorders, including review studies

Author and year; aim	Type of study (quality check tools)	Design quality	Number ^a	Diagnoses	Age	BMI	Results	Conclusion
Hallward et al., 2022 [44] Examine interventions that address CE and their impact on treating CE in EDs	Systematic Review (PRISMA, SWiM, GATQS)	2 RCT 2 Cntrl-s 5 non-Cntrl 2 Cases-s	n = 11 studies / n = 780 patients	EDs	n.a.	n.a.	The studies focused on Ex psychoeducation and often incorporated Ex sessions (9 of 11 studies); improvements in CE and ED psychopathology were observed across all studies	Finding positive impact from addressing CE, but treatments need to be compared, and CE needs consistent conceptualization. Still, despite the different conceptualizations, similar treatment approaches were used, with positive outcomes.
Mang et al., 2021 [45] Explore the efficacy and acceptability of a new 7-week JuniorLEAP group therapy programme for AN to address CE	Intervention (n.a.)	Noncontrolled	n = 32 patients	AN	15.0 ± 1.7	n.r.	The LEAP psychoeducational 7-weeks' program, added to usual care, result in reductions in symptoms of ED and CE, and participants report high acceptability. Most helpful were learning facts and disproving some of the misconceptions about Ex.	A promising result from this noncontrolled implementation in adolescents with AN speaks of a need for a RCT, to better understand the program effects.
Ouellet et al., 2022 [43] Present the current state of knowledge regarding therapies targeting the management of DEx in EDs	Systematic review (n.r.)	2 RCT 2 Cntrl-s 4 non-Cntrl 3 Cases-s	n = 11 studies / n = 599 patients	EDs	15-28	11-62	Identifies four main classes of DEx treatment: adapted Ex, CBT, thermoregulation, and pharmacotherapy. Ex and CBT seem efficient for improved psychopathology.	Treatments aimed at reducing DEx should include adapted Ex combined with CBT principles. Recommendations are; include group Ex, include rest intervals, include psychoeducation on DEx, and address emotions.

Presented by alphabetical order of first author. AN, anorexia nervosa; case-s, case study; CE, compulsive exercise; Cntrl, control group; Cntrl-s, controlled study; DEx, dysfunctional exercise; Ex, exercise; ED, eating disorder; non-Cntrl, noncontrolled study; n.a., not applicable; n.r., not reported; PA, physical activity; PRISMA, preferred reporting items for systematic reviews and meta-analyses; RCT, randomized controlled study; SWiM, synthesis without meta-analyses; GATQS, quality assessment tool for quantitative studies.
^aCounting patients in intervention groups only.

on body weight or –composition compared with a control condition; and, that exercise had either positive or neutral effects on psychopathology (Table 2) [46–49]. Importantly, no adverse outcomes were reported.

Four recent original studies on effects from motivating for or giving physical activity to patients with EDs are somewhat different in aims, yet have complementary findings (Table 3) [50[■],51,52,53[■]]. One study found success in reducing DEx while aiming to increase healthy exercise through a psychoeducational and motivational program in persons with bulimia nervosa; however, the study's main goal to increase exercise volume to recommended level was not accomplished [52]. Two studies found improved functionality, that is, balance, muscular strength, respiratory capacity, and walking speed, from supervised physical activity in participants with anorexia nervosa [50[■],51]. Further, they found that progressive resistance exercise was needed to achieve favourable effects on body composition, and that quality of life was associated with improved body composition [50[■]]. Finally, one study evaluated the feasibility and effects from integrating research-derived recommendations for physical activity in clinical settings and found successful translation [53[■]].

Perspective of people with lived experience of an eating disorder

In total, three studies explored the experiences and attitudes by patients on integration of physical activity and/or exercise into treatment [54,55[■],56[■]]. The patients spoke of a need to learn healthy ways to be physically active, and to re-learn healthy motives and healthy volumes and intensity of physical activity. They also spoke of the important physical, psychological and psychosocial effects from physical activity. The patients themselves said that integration of physical activity should be accompanied by psychoeducation on healthy and unhealthy practices, and that full restriction of physical activity will rather lead to conduct of secret physical activity and exercising. The lack of sufficient focus on DEx and psychoeducation or integration of supervised physical activity during treatment were reported to be frustrating [55[■]].

Contrasting with the low impact and low intensity movement with focus on bodily sensations that has been applied in many of the physical activity interventions, some patients spoke of the empowering experiences from lifting weights [56[■]]. They reported that such high impact activity stimulates mindfulness, attention, and body awareness, and

contributes with stress coping. The goal-oriented type of exercise, such as getting stronger, brings measurable achievements that are experienced as a mindset change towards exercise associated with improved self-acceptance and confidence. Interestingly, the patients mention that standardized exercise routines, that is, following routines like having given days for exercise or rest, and following a predefined exercise program, helped them cope with the compulsiveness that otherwise may arise. Although this may reach 'clinical' levels in standardized measurements of compulsiveness (i.e., rigidity), it was argued that such healthy routines create safety and distance from DEx behaviour such as wanting to exercise for longer or harder, including more exercises in one session and/or not allowing rest days [56[■]].

Therapist perspectives

Two studies explored the opinions of therapists on PAE during treatment of EDs [57,58[■]]. One Delphi study on therapists' opinion on the effect of yoga as an adjunctive therapy on comorbid disorders in ED did not reach consensus, as there is limited documentation and controlled studies on this aspect [57]. However, interviews with accredited exercise physiologists (AEP) on their experiences working in clinics with EDs, showed that AEPs had similar perspectives to that of patients [58[■]]. AEPs highlighted the person's need to relearn healthy PAE. They also shared an experienced need to educate other clinicians on how AEPs work and how professionally supervised PAE may help patients in their recovery. But while expert AEPs have positive experiences in supervising PAE during treatment of EDs, they also spoke of the need to increase educational focus on these disorders during their own professional studies.

DISCUSSION

The current literature review supports previous positive findings from studies on effects from psychoeducation and supervised PAE during treatment of different EDs. However, because the existing studies on safety and effects from use of PAE in treatment of EDs is limited in number, the same articles are cited and evaluated in reviews published the past decade [32–34,43[■],44,46,47[■],48[■]]. Hence, the more recent original studies [45[■],50[■],51,52,53[■]] bring important nuances and findings to the field, and the feasibility and safety of education and practical experience from PAE during treatment that they demonstrate are underlined by the positive experiences from those with lived experiences [54,55[■],56[■]].

Most trials evaluating effects from PAE during treatment of EDs have shown limited or no effects on body composition (muscle mass and bone mass). Such desirable outcomes may be limited by the low-to-moderate intensity applied in most of the tested programs. Other explanations are that there may be an inability to refuel after exercise or to re-nourish according to increased needs with training, or there is insufficient sensitivity of measurement methods. Nevertheless, as such physical effects are desirable, and have previously been demonstrated in randomized controlled trials with progressive resistance training programs covering individuals with anorexia nervosa, bulimia nervosa and BED [50[■],59], the beneficial effects on fitness and on psychopathology support continued advocacy for supervised PAE during treatment of different EDs.

The lack of recommendations on PAE in national treatment guidelines is reflected by the scepticism that accredited exercise physiologists (AEP) report that they meet in the clinical settings [58[■]]. This is in contrast to the expressed needs of persons with lived experiences [54,55[■],56[■]], and to both AEP and user perspectives when psychoeducation on DEX and supervised PAE is implemented in treatment of EDs [58[■]]. While psychoeducation should address exercise literacy and how to recognize DEX, optimal exercise programs are repeatedly argued to be resistance exercise training. The latter implies a somewhat more intense exercise than those applied in previous studies (yoga, stretching, rubber band strength exercise), and carries important learnings from experiences of being empowered, and reaching increasing body awareness and self-confidence [54,55[■],56[■]].

Most of the conducted studies within this specific subject are challenged by high risk of bias due to lack of controls, and even where there is a control condition there is still a risk of bias as blinding of personnel and participants in exercise trials is difficult. Whereas about half of the included studies in this and the included reviews lacked a control condition, they point to similar findings identified in the randomized controlled studies. Nevertheless, the interpretation of findings is limited because of the heterogeneity of interventions, and some studies' lack of details about the PAE program or on other treatments offered to the participants. Further, most of the existing research has focused on adolescent or young adult females of Caucasian ethnicity with anorexia nervosa, leaving a need for more research on the understudied groups of individuals with bulimia nervosa or BED, males and transgendered individuals, and ethnic minorities. Further, the issue of DEX and supervised PAE during treatment should

be explored throughout the lifespan. However, the existing body of research is consistent and points to positive psychological effects (mood, psychopathology, ED intensity) of supervised exercise in the treatment of EDs.

CONCLUSION

This review, aiming to evaluate recent findings on how we best approach DEX during treatment of EDs, and what the effects are from integrating PAE during treatment, point to a need to consider supervised PAE as an important, obligatory part of ED treatment.

Although many of the studies included in this review rely on different definitions and measurements of DEX, they were similarly successful in reducing DEX and psychopathology using the same interventions, that is, psychoeducation and integration of practical experience with PAE during treatment. We argue that clinics adapt the existing physical activity guidelines and suggested medical screening procedures [1,35,36], and implement supervised PAE and adherent psychoeducation. Importantly, this implies engaging AEDs in the multidisciplinary treatment teams. Continued exploration of activity programs may help us identify the optimal interventions to achieve combined beneficial somatic, physical, mental, and cognitive outcomes. Such research should apply high-quality designs (e.g. randomized controlled trials), and evaluate any differences between ED diagnoses, intensity and complexity of psychopathology (particularly highly restrictive or not), and physical status.

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Conflicts of interest

There are no conflicts of interest.

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- of outstanding interest

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Deserves attention for including a large number of participants, mixed diagnoses, blinded outcome measurement, building on existing knowledge, and taking important steps forward by studying translation/implementation.

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This explorative study contributes with increased understanding of patients' expectations, experiences and demands for physical activity during treatment. The study includes a decent number of participants, gives a thorough understanding of the patient-perspective, and provides detailed recommendation for physical activity programs.

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