

# Health & Fitness Journal of Canada

---

Copyright © 2020 The Authors. Journal Compilation Copyright © 2020 Health & Fitness Society of BC

Volume 13

June 30, 2020

Number 2

---

## ORIGINAL ARTICLE

### Guiding principles to inform future exercise protocols for eating disorder treatment.

Danika A. Quesnel<sup>1</sup>, Brian Cook<sup>2</sup>, Cristina M. Caperchione<sup>3</sup>

<sup>1</sup>School of Health and Exercise Sciences· University of British Columbia Okanagan, Kelowna, Canada

<sup>2</sup>Alsana Eating Disorder Treatment & Eating Recovery Centers, USA

<sup>3</sup>School of Sport, Exercise and Rehabilitation, Human Performance Research Centre, University of Technology Sydney, Australia

\*Corresponding Author Email: [danika.quesnel@gmail.com](mailto:danika.quesnel@gmail.com)

---

#### Abstract

**Background:** The management of exercise during the treatment of eating disorders (ED) has garnered much attention in the recent years. Despite interest in adopting exercise as a supplemental component to ED treatment, details are lacking regarding the specific components or guiding principles that should be considered when recommending exercise for individuals with EDs. **Purpose:** The purpose of this study was to identify ED-specific guidelines on the frequency, intensity, time (duration), and type (e.g., FITT principles). **Methods:** To gain insight regarding these details, semi-structured interviews were conducted with an international panel of ED experts (n = 13). Verbatim transcripts were analyzed with the support of NVivo 11.0. Themes were reflective of the FITT principle. **Results:** Specifically, frequency and duration should follow a graded protocol that aligns with each client's unique mental and physical health needs. Intensity of exercise should move from light, to moderate, incorporating higher intensities cautiously, depending on a client's treatment plan and fitness levels. All types of exercise modalities were encouraged; however, flexibility exercises were viewed as safest while resistance training was recognized as most important for regaining function and body composition. Hesitancy surrounded cardiovascular activity due to its tendency to be abused by individuals with ED. **Conclusion:** Therefore, participants advised that social activities precede the engagement of solitary cardiovascular activities. Together, these results provide important new and clinically relevant details regarding the potential inclusion of exercise in ED treatment.

**Health & Fitness Journal of Canada 2019;13(2):3-15.**

<https://doi.org/10.14288/hfjc.v13i2.297>

Keywords: Exercise guidelines, Eating disorders, FITT principle, Mental health, Exercise

---

#### Introduction

Evidence supporting the incorporation of exercise into mental health treatment is mounting. For instance, engaging in exercise for mild to moderate anxiety and depressive disorders has been shown to elicit clinical improvement on par with

medication (Schuch et al., 2016; Stonerock, Hoffman, Smith, & Blumenthal, 2015; Ströhle, 2009). Such successes have lead clinicians and researchers alike to question the possibility of using exercise therapeutically in other mental health disorders. Eating disorders (ED) often are

## Exercise guidelines in eating disorder treatment

---

comorbid with mental health issues that have been shown to respond well to therapeutic exercise, and therefore may benefit from similar exercise protocols (Cook et al., 2016). However, unlike anxiety and depressive disorders, exercise has been posited to play a significantly more complex and interwoven role in the etiology, maintenance and prognosis of EDs (Meyer, Taranis, Goodwin, & Haycraft, 2011). Consequentially, ED guidelines are unique compared to other related areas of mental health in that there is a lack of information regarding the specific considerations for key aspects such as the frequency, intensity, time and type of activity that inform how to use exercise in treatment.

The consternation about the etiological role of exercise in EDs has resulted in two diametrically opposing contentions regarding if exercise in ED treatment and recovery is possible. The first contention suggests that including exercise in ED treatment should be avoided entirely. This recommendation has emerged as a result of the established detrimental relationships of unsupervised exercise performed as part of the active phase of an ED. Specifically, compared to individuals with ED who do not exercise dysfunctionally, individuals engaging in dysfunctional exercise display higher levels of psychological distress and ED psychopathology (Dalle Grave et al., 2008; Meyer, Taranis, & Touyz, 2008), illness chronicity, higher rates of relapse (Hausenblas, Cook, & Chittester, 2008; Meyer et al., 2008), longer inpatient hospitalizations, and higher direct and indirect treatment costs (Crow & Nyman, 2004; Stuhldreher et al., 2012). Dysfunctional exercise in this context is a term used to encompass a variety of other terms used for unhealthful relationships

with exercise such as exercise addiction, compulsive exercise, obligatory exercise, excessive exercise etc. (American Psychiatric Association, 2013; Hausenblas & Downs, 2002; Mond, Hay, Rodgers, & Owen, 2006). However, the research purported to support this contention is severely limited by poor methodology and assessments, bias observations and an overgeneralization of results from case studies of homogenous samples of individuals with severe and enduring anorexia nervosa (AN) (Cook & Leininger, 2017).

Alternatively, the second contention is based on empirical evidence that offered an alternative view of exercise in EDs. This view suggests that interventions incorporating closely monitored, nutritionally supported exercise may be healthful for individuals with EDs. Several reviews of the literature have documented positive results for appropriate inclusion of exercise in treatment for all variants of EDs (Cook et al., 2016; Ng, Ng, & Wong, 2013; Moola, Gairdner & Amara, 2013; Vancampfort et al., 2014; Zunker, Mitchell, & Wonderlich, 2011). To date, exercise interventions have shown improved quality of life, physical fitness, body composition, and reductions in drive for thinness, weight and shape concerns, eating restraint scores, anxiety, depression, sleep disturbances and perceived stress in athletic and non-athletic ED populations (Hausenblas et al., 2008; Fewell, Nickols, Tierney, & Levinson, 2018; Moola, et al., 2013; Ng et al., 2013; Vancampfort et al., 2014). These initial successes are encouraging and provide evidence for the need to further refine and specify how to incorporate exercise into treatment. Providing clinically derived recommendations may then maximize improvement in treatment outcomes by

standardizing the delivery of exercise in ED treatment. Thus, further research and clinical evidence is needed to reconcile these two divergent contentions regarding the role exercise in ED treatment.

Incorporating exercise during ED treatment without guidelines has become increasingly common. In a multinational study, 65.3% of treatment units surveyed included exercise as part of their program; however only 22.5% included exercise plans created by exercise specialists (Bratland-Sanda et al., 2009). Similarly, a recent qualitative study found that approximately 50% of health professionals throughout North America and Europe incorporated some type of exercise into ED treatment, without the guidance of an exercise professional (Quesnel et al., 2017). Despite these advances, clinicians continue to indicate that there is a lack of guiding information for managing and incorporating exercise into ED treatment (Quesnel et al., 2017). Extant guidelines are preliminary recommendations that focus on goal oriented, individually tailored, graded programs for supervised exercise that include flexibility (FLX), resistance training (RT) and cardiovascular activity (CV) (Calogero & Pedrotty 2004; Cook et al., 2016; Quesnel et al., 2017; Schlegel, Hartmann, Fuchs, & Zeeck, 2015). However, these guidelines have stopped short of recommending specific amounts, including the frequency, intensities, timing, and type of exercise (e.g., FITT principles) that are specific to ED treatment. Thus, ED-specific FITT guidelines are needed to improve applicability and uptake of exercise protocols into clinical settings. Further, providing the ED-specific guidelines could serve as a first step in scientific inquiries regarding this topic.

While recent expert-driven recommendations for the appropriate use

of exercise in treatment have been described (Quesnel et al., 2017), there remains a need for comprehensive guidelines to inform clinicians about the specific exercise principles (e.g., frequency, intensity, time, type) for exercise management in ED treatment (American College of Sports Medicine, Riebe, Ehrman, Liguori, & Magal, 2018). Thus, elaboration on preliminary recommendations (Quesnel et al., 2017) is needed. Therefore, the primary purpose of this study was to identify ED-specific guidelines on the frequency, intensity, time (duration), and type (American College of Sports Medicine et al., 2018) of exercise in ED treatment. (American College of Sports Medicine et al., 2018). In the introduction, the author(s) must introduce the topic and discuss its relevance. The author(s) must state clearly the purpose and hypothesis (where applicable) of the work. The introduction should be approximately 2-3 paragraphs and well cited. All papers that present original research findings must be hypothesis driven (i.e., contain a clearly defined hypothesis at the end of the introduction). Other papers (such as position papers, systematic reviews, narrative reviews, student opinions, etc.) should also include a brief 2-3 introduction highlighting the need for this work and the key hypotheses (as appropriate).

### Methods

This exploratory, qualitative study used semi-structured interviews with healthcare professionals to identify recommendations for the frequency, intensity, and time (duration) of therapeutic exercise sessions as part of ED treatment for Anorexia Nervosa (AN), Bulimia Nervosa (BN), Other Specified Feeding and Eating Disorders (OSFED) and Avoidant Restrictive Food Intake Disorder

## Exercise guidelines in eating disorder treatment

---

(ARFID). Unlike the other EDs, in Binge Eating Disorder (BED) there are higher rates of individuals who are overweight or obese and typically these individuals engage in a sedentary life style (Vancampfort et al., 2013). Importantly, compensatory behaviors are not a clinical feature of BED; therefore, the risk of exercise becoming dysfunctional is low (American Psychiatric Association, 2013). As such, the tensions surrounding exercise guidelines are not reflected in this population, thus this study did not encompass BED in its inquiry. Ethical approval was obtained by The Behavioral Research Ethics Board at the University of British Columbia (#H15-01276).

### ***Participants***

A total of 44 participants were identified through ED treatment centers, at professional conferences, by recommendations from other professionals in the field and by their published work. To be eligible to participate in the following study, participants had to: 1) understand and speak English or French, 2) have professional credentials and be registered with their designated licensing body, 3) have a professional interest in the role of exercise in ED treatment (demonstrated through active research and/or clinical practice experience), and 4) have three years of full-time experience working in the field of ED. Purposeful recruitment took place over the course of six months (August 2015- February 2016) by email and face to face. Interested individuals (n = 18) were emailed further information about the study and based on criteria eligibility a total of 13 participants completed the interviews. Reasons for not participating included, unsuccessful contact (e.g., incorrect email address),

scheduling conflict or they did not respond to the invitation email.

### ***Experimental Design***

All participants (n = 13) provided informed consent and demographic information prior to the start of each interview. Three interviews were conducted face to face, seven were completed via Skype and three interviews were done on the telephone. Each interview was directed by a pre-determined, opened ended interview guide which was developed to address gaps in the literature concerning guidelines for incorporating exercise into ED treatment (Bratland-Sanda et al., 2009; Hausenblas et al., 2008; Meyers, Taranis, & Touyz, 2009; Moola et al., 2013; Ng et al., 2013; Vancampfort et al., 2014; Zunker et al., 2011). Sections of the same interview guide were previously utilized in published work by Quesnel et al., 2017. However, the components of the FITT principles were not delineated within that study. Thus, the procedures described in this current study are only pertinent to ascertaining ED professionals use and guidance of how to implement the FITT principle. The FITT principle outlines four distinct components of exercise protocol the frequency, intensity, time and type of activity (American College of Sports Medicine et al., 2018).

All interviews were conducted by the principal researcher (DQ), ranged in duration from 45 to 100 min, and were audio-recorded. The recordings were transcribed verbatim and once transcription was completed participants were sent their relevant transcript to review for accuracy.

### ***Data Analysis Methodologies Employed***

Data management software, NVivo11.0,

was used to store, sort and organize codes in the data. Distinct titles and numbers were assigned to each interview participant to render them anonymous. Inductive thematic analysis, as outlined by Braun and Clark (2006; 2014), was used to analyze the data. The six steps of thematic analysis including 1) becoming familiar with the data 2) initial coding 3) theme formation 4) revision of themes and codes 5) labeling and defining identified themes 6) revision of each theme (Braun & Clarke, 2006; 2014). Methods of rigour were also implemented throughout the study to ensure generalizability/transferability (e.g. peer review, purposeful sampling, auditing), validity (e.g., thinking theoretically, concurrent data collection and analysis) and reliability (e.g., purposeful sampling) of the data (Mayan, 2009).

### Results

#### *Demographic Characteristics*

Participants constituted 13 experts from both clinical and research fields employed in hospitals, universities and private practice clinics, within North America and Europe. One participant did not complete the demographics form thus the following represents the demographic information for 12 of the 13 participants. Participants had a mean age of 46.5 y (SD = 13.23 y) and 75% were female. On average, they worked in the field of ED for a mean of 15.13 y (SD = 9.59 y). Table 1 provides further details of demographic characteristics.

#### **Main Findings**

The findings are presented by each aspect of the FITT principle by addressing the “*Frequency*”, “*Intensity*”, “*Time*” and “*Type*”. Representative quotes are reported to provide evidence of themes within the data.

#### **Frequency**

Participants (n = 13) agreed that session frequency be based on the individual needs of the client; as University Research #4 outlined “*frequency can start at just once a week and progress up to 5-6 days a week. And again, what is going to help them progress in frequency will be health goals, as their nutrition improves, and their weight improves the frequency of the activity can improve*”. More specifically, “*You would have to monitor their electrolytes, to know if three days of activity would be too much, or should they do one [day].*” (Private Clinician #1). Participants also based the recommendations for exercise frequency on the modality of activity chosen; for instance, FLX could “*be done pretty much everyday*” (University Research #1) (n = 9). Contrarily, for other activities such as RT, University Researcher #5 reflected on current research and suggested that “*if the objective is to increase muscle [in ED populations], frequency should be at least three times a week*”.

#### **Intensity**

When reflecting on intensity, participants were in agreement that the intensity should be based on individual needs (n = 13); “*it's really going to depend on where the individual is, how they are feeling about it*” (University Researcher #4). Many highlighted it would also “*depend on their fitness levels*” (University Researcher #6) and the client’s personal goals. Participants consistently recommended that intensity should move from light (i.e., able to continue a conversation) to moderate (i.e., breathing heavy) (n = 12). University Researcher #4 outlined that within research: “*I have never seen an instance of high intensity exercise incorporated into ED population*”. However, Hospital Researcher #1 outlined

## Exercise guidelines in eating disorder treatment

---

*“the intensity is moderate, sometimes vigorous”* in their hospital exercise program. This individual further clarified the reason for these different intensities, indicating *“to help them [clients] know how it feels to be moderately active because what they know is the extremely vigorous activity, so to set back or reduce the intensity is part of the psycho educative aspect of the sessions”*. They recommended *“50-70% of one rep [repetition] maximum”* (University Researcher #6) at the start for all applicable types of RT modalities (e.g., resistance machines, free weights, exercise bands, etc.). University Researcher #5 outlined, *“the intensity has to be enough to help them regain the muscle loss”* and promote other health benefits. As such, if the goal is to *“increase muscle, RT has to be done at least three times a week, using big group muscles, with intensity high; around 70-80% of one rep [repetition] maximum”* (University Researcher #5).

### Time

Participants also offered some insight regarding time/duration of activity. Starting an exercise protocol at 20 - 30 min per session was often suggested (n = 10), and the time *“10min, 20 min, 30 min, would progress with the intensity [of the activity]”* (Private Clinician #2). However, the participants highlighted the need to mindfully choose the activity when determining duration. Hospital Clinician #1 delineated the *“there’s a great difference phenomenologically saying 30 minutes of resistance training X number of times per week rather than 3-30 minutes periods of group activity that could include going to the ball park.”* Participants did suggest that regardless of modality the frequency and duration of sessions should follow a graded protocol (n = 12).

### Type

All participants (n = 13) suggested including FLX. Hospital Clinician #1 recommended it as the first type of exercise to be introduced and another participant highlighted that it may have the greatest utility when it is paired with *“some mindful connection to breathing”* to promote relaxation (Hospital Clinician #2). Including exercise bands, seated whole body *“stretching”*, and group yoga classes in a climate-controlled environment, were recommended as modes of stretching (Hospital Clinician #1 & University Researcher #3) (n = 11).

*“The most important [type of activity] is the strength or resistance training.”* (University Researcher #6) (n = 7) due to its *“lower calorie[s] demand”* (University Researcher #5), importance in restoring muscle mass and function (n = 10) and the benefit of *“weight bearing activities for bone health”* (Hospital Clinician #2). It was regarded as imposing a lower risk than CV because *“cardiovascular training is where the abuse happened but very few [clients] did weight training”* (Private Clinician #3). Participants suggested that RT should be incorporated at the beginning in a *“simple and accessible way”* and *“have them experience activities [they didn’t previously engage in] such as different types of yoga, TRX, interval training, spinning, sports, etc. and then have them do more of what interests them instead of prescribing a specific type for everyone”* (Hospital Clinician #4) (n = 11). Additionally, safety was considered by many (n = 9), as such University Researcher #4 recommended *“stationary weight machines, at least at the beginning, should be used because the joints and the core need to be protected to prevent injury”*. Other types of RT suggested were body weight exercises, Pilates, circuit training, and use of exercise bands,

punching bags, bars, and dumbbells.

A common concern among participants was clients engaging in CV to produce a caloric deficit (n = 12). Hospital Researcher #3 explained that *“those who do compulsive exercise, they run and run and run and run”*. However, *“if you make [CV] exercise a no no in a program, you are probably guaranteed of getting people exercising secretly”* (Private Clinician #3). Despite concerns, *“I wouldn’t necessarily say all cardiovascular activity is out”* (Hospital Clinician #2). Instead *“I would encourage them to consider other [CV] activities”* while being mindful that *“their bodies can be so fragile and there is a risk of different types of injury”*. Essentially, many suggested incorporating different varieties of activities (e.g., nature walks, group relay games, playing sport) while taking a break from a dysfunctional activity to avoid triggering compulsive exercise (n = 10). For example, *“if they were a runner not to start running again yet. We shouldn’t be starting with it [abused activity] because it just triggers the thoughts of calories. We should try and find other activities that are going to help them [clients], help their mood, but also retrain their brain to accept different forms of exercise that are more social and are not intended on burning calories and/or focusing on perfection”* (Hospital Clinician #3)

Thus, participants suggested that CV should include *“fun activities and adding playful elements”* (Hospital Researcher #3) such as *“hiking and games”* (Hospital Clinician #3) that take place in a group setting. As they progress through treatment *“they can jog, they can bike, they can use elliptical or the step machine all of that different equipment. I don’t see why they cannot use equipment when their physical muscle function is correct, when the joints are protected all that stuff”* (Hospital

Clinician #4).

On the basis of the interviews, we have identified the following guidelines for how to employ the FITT principles in ED treatment (please see Table 2 below).

### Discussion

The purpose of this study was to identify ED-specific guidelines on the frequency, intensity, time (duration), and type (American College of Sports Medicine et al., 2018) of exercise in ED treatment. Our results extend the literature by providing a necessary next step beyond previously reported general guidelines concerning exercise protocols (Cook et al., 2016; Quesnel et al., 2017) taking into account variations between research and clinical practice. This study is the first to provide specific recommendations concerning the use of the FITT principle in ED treatment.

The inclusion of exercise as part of ED treatment represents a holistic approach to recovery that addresses establishing a beneficial relationship with movement and may impart several mental and physical health improvements (Cook et al., 2016; Quesnel et al., 2017; Schegel et al., 2016). In terms of frequency, participants reported that ED clients may engage in therapeutic exercise on most if not all days of the week. This matches previous research that has included different modalities of exercise, even CV, for up to five sessions per week during ED treatment (Schegel et al., 2015; Thien, Thoman, Markin, & Birmingham, 2000; Tokumura, Yoshida, Tanaka, Nari, & Watanabe, 2002). Further, two to three sessions per week of RT have shown strength and functionality benefit (Chantler et al., 2006; Fernandez del Valle et al., 2014). Previous research incorporating a range of activities three or four times a week for 30 - 60 min per session was successful for improving

## Exercise guidelines in eating disorder treatment

---

treatment outcomes and did not interfere with weight restoration (Calogero & Pedrotty, 2004; Thien et al., 2000; Touyz, Lennerts, Arthus, & Beumont, 1993). Indeed, when Calogero and Pedrotty incorporated an exercise protocol into a sample of 127 individuals with ED they gained a third more weight than the control non exercise group despite engaging in activity four times a week for 60 min a day. Similarly, Thien and colleagues (2000) incorporated a graded exercise protocol into AN treatment and delivered an exercise intervention at least 3 times per week at their first “level” of integration without adverse outcomes. By slowly incorporating additional sessions of activity, it may help clients gradually become more comfortable with nourishing themselves adequately before, during, and after activity. Supporting activity with nutrition has been outlined as a crucial component of ensuring safety when a client is engaging in activity (Fewell et al., 2018; Ng et al., 2013; Quesnel et al., 2018).

Additionally, gradually increasing the frequency of exercise sessions permits the individual to engage in psychoeducation about activity during their rest days. A recent randomized controlled trial has found that psychoeducation included with standard cognitive behavioral therapy reduces exercise compulsivity (Hay et al., 2018). Results of our study may help inform how exercise frequency may be used to incorporate experiential opportunities to practice and apply knowledge from such psychoeducation programs while still under close exercise supervision as part of treatment. Lastly, the rest periods offered by lower frequency activity supports the needs of a malnourished body. The American College of Sport Medicine recommends at least 48 hours of rest to fully realize the

physiological benefits consequential to a bout of exercise for the healthy body (American College of Sports Medicine et al., 2018). As such, more frequent and longer rest periods may be warranted in the malnourished body. As the body’s physical state improves, the frequency of exercise may also increase. In turn, this can help teach the client to exercise in correspondence their health, not for shape or weight.

The results of our study indicating a gradual increase in exercise intensity are similar to previous reports that suggest intensity progression as the best way to build muscle and strength for individuals with AN (Chantler, Szabo & Green, 2006; Fernandez del Valle et al., 2014; Szabo & Green, 2002). Previous ED specific RT programs have fostered benefits in strength through three sets of eight to 15 repetitions with a resting period of 1-2 min between sets (Chantler, Szabo, & Green, 2006; Fernandez del Valle et al., 2014) and increases in repetitions or weight should progress by 5-10% every second week provided that patient’s health has also been improving (Fernandez del Valle et al., 2014). The physiological systems of individuals with EDs are evidently compromised, thus slow and gradual increases in exercise intensity are necessary as they offer clients the opportunity to slowly and safely condition their bodies (Hausenblas et al., 2008).

In regard to the type of activity, there is great concern for patient health and safety when it comes to cardiovascular types of activity due to its greater caloric demand and tendency to be dysfunctional for individuals with ED (Beumont, Arthur, Russell, & Touyz, 1994; Quesnel et al., 2017). As such, our results indicated that CV may be incorporated to help prepare clients for when supervision is no longer



## Exercise guidelines in eating disorder treatment

---

needed. Thus, the clients would first encounter CV in the format of noncompetitive recreational sports or hikes in groups. It is important to note that competitiveness is a noted clinical feature of ED. Thus, group CV activities must be careful to avoid opportunities for individuals to compete with each other, themselves, or otherwise find dysfunctional ways to increase CV activity intensity, duration, or frequency (Schleien & Bardone-Cone, 2016). If an individual would like to return to an activity which was previously dysfunctional (e.g., running, swimming, biking etc.) participants outlined that it may be beneficial for them to have a “break” from this activity before slowly reintegrating it by starting at a low intensity and moving cautiously to a moderate intensity. The benefit of this may be to have clients experience different types of CV activity, and perhaps help them discover an activity they prefer besides one their previously abused.

The complexity of addressing and reorienting a client to CV activity also reinforces the importance of utilizing an exercise professional with an understanding of ED to individually and safely prescribe exercise to this population (Quesnel et al., 2017; Wattles, 2001). Thus, our results inform and support the need for comprehensive treatment teams that include exercise professionals (Cook et al., 2016). Further, the phenomenon of clients returning to a previously abused activity underscores the importance of challenging deeply held dysfunctional beliefs about exercise and/or particular modes of exercise (Hay et al., 2018). Challenging these beliefs may in turn address the underlying functional relationship of exercise with the ED (Meyer et al., 2013). Importantly, our results suggest that

allowing time for such clinical work while simultaneously engaging in appropriate forms of CV activities may provide experiential opportunities to challenge beliefs and process cognitive aspects related to exercise during treatment. Additionally, these preliminary results offer the opportunity for continued research to inquire into the feasibility and acceptability of combined psychoeducation and therapeutic exercise initiatives in ED.

Lastly with regards to time, our study found that many ED professionals would limit duration (e.g., time of exercise participation) to 10, 20, or 30-min bouts. This aligns with previous recommendations (Cook et al., 2016; Danielsen, RO, & Bjornelv, 2018) and further highlights the importance of gradually increasing the load on the body for safety and ensuring that each client is engaging in a program that is tailored to their unique health needs. It also allows clinicians to closely monitor all aspects of exercise, adjust intensity if needed, and limit instances for exercise to become excessive in scope and thereby impact caloric balance and/or weight restoration. Most importantly, limiting the amount of time and intensity of exercise limits the potential caloric expenditure of exercise and therefore the caloric imbalance created by dysfunctional exercise.

Together much of the FITT components make up the volume of exercise, also known as the total amount of activity or work executed in a single session such as the number muscles worked, repetitions and sets (ACSM, 2018). Initially, exercise volume or more specifically duration was used as a marker to define excessive exercise (under the umbrella term of dysfunctional exercise). Indeed, Bratland-Sanda and colleagues (2010) defined an excessive exercise as equal to or greater

than six hours of moderate to vigorous exercise per week. Such criteria leads one to wonder, would we label an individual who walks their dog 30 min per day (i.e. moderate intensity exercise; ACSM, 2018) and attends a 45 min aerobics class at a gym four times per week (i.e., totaling 6.5 hr of exercise in a week) as an excessive exerciser? Ultimately, markers of duration, intensity or other exercise metrics can play a role in characterising dysfunctional exercise (Bratland-Sanda et al., 2010) that being, said more recent conceptualization underscore the quality of the individual's relationship with exercise as a primary factor in characterizing dysfunctional exercise (Cook, Hausenblas, Tuccitto, & Giacobbi, 2011). Volumes of exercise have varied greatly in ED and exercise research protocols (Carei et al., 2013; Moola et al., 2010; Tomakura et al., 2013). Fortunately, to date, no volume of monitored, nutritionally supported and safe exercise incorporated into ED populations have results in adverse outcomes (Moola et al., 2013; Ng et al. 2013; Zunker et al., 2011). A graded protocol, as suggested by our results inherently present a gradual increase in training volume, accurately reflecting the range of training volumes present in the available literature.

Despite the preliminary nature of these recommendations, the current study holds value as it presents delineated concepts for health professionals. The use of qualitative methodologies allowed an in-depth exploration of the participants personal opinion's and beliefs surrounding the research topic. However, this study is not without limitations. First, our results do not definitively identify which aspects of client health should be reviewed to assign and progress clients through the levels of the FITT protocol, limiting application to some extent. Similarly, the collective

responses from the participants cannot be distilled into specific recommendations for each of the different ED (AN, BN, OSFED), warranting further research to elucidate exercise –specific factors of each variant of ED. Additionally, barriers to incorporating new protocols into ED treatment exist. First, professionals typically do not follow protocols, despite their desire for such protocols (Waller, 2016). Specifically, only between 6 and 35% of clinicians report adhering to evidence-based guidelines (Waller, 2016). Therefore, more work needs to be done to help clinicians understand and apply guidelines such as those presented in our study. In addition, the concept of incorporating exercise into ED treatment remains somewhat “taboo” despite research advances and presents several barriers for its initiation into treatment (Quesnel et al., 2017). Clinical attitudes towards exercise in ED, a reported lack of knowledge and understanding, resistance to change, and availability of specialized staff slow the incorporation of exercise into ED treatment settings (Quesnel et al., 2017). As a result, continued research supporting the safety and appropriates of exercise in ED treatment is warranted, if not necessary.

### Conclusions

In conclusion, the findings from this study expand the role of exercise professionals in clinical mental health settings, and provide a foundation for the future development of safe and appropriate exercise protocols based in the FITT principle for managing exercise in ED treatment. Our results can as a starting point to inform researchers about measurable acute exercise variables, dose response to exercise, and appropriateness of particular types of exercise in ED

## Exercise guidelines in eating disorder treatment

treatment. Ultimately, this may lead to clinical advancements that are client-centered and assists individuals with ED in managing and improving their relationship with exercise during recovery.

### Acknowledgements

We would like to thank and acknowledge the panel of international experts who agreed to participate and offer their time to this study.

### Authors' Qualifications

The authors' qualifications are as follows: Danika A. Quesnel, MSc, CSEP-CPT, Brian Cook, PhD, and Cristina M. Caperchione PhD.

### References

- American Psychiatric Association. (2013). Eating Disorders. In *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- American College of Sports Medicine, Riebe, D., Ehrman, J. K., Liguori, G., & Magal, M. (2018). *ACSM's guidelines for exercise testing and prescription* (Tenth edition.). Philadelphia: Wolters Kluwer.
- Beumont, P. J., Arthur, B., Russell, J. D., & Touyz, S. W. (1994). Excessive physical activity in dieting disorder patients: Proposals for a supervised exercise program. *International Journal of Eating Disorders, 15*(1), 21-36.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. doi:10.1191/1478088706qp063o
- Braun, V., & Clarke, V. (2014). What can "thematic analysis" offer health and welling being researchers. *International Journal of Qualitative Studies on Health and Well-being, 9*. <http://dx.doi.org/10.3402/qhw.v9.26152>
- Bratland-Sanda, S., Rosenvinge, J. H., Vrabell, K. A. R., Norring, C., Sundgot-Borgen, J., Rø, Ø., & Martinsen, E. W. (2009). Physical activity in treatment units for eating disorders: Clinical practice and attitudes. *Eating and Weight Disorders, 14*(2-3), e106-e112. doi: 10.1007/BF03327807.
- Calogero, R. M., & Pedrotty, K. N. (2004). The practice and process of healthy exercise: An investigation of the treatment of exercise abuse in women with eating disorders. *Eating Disorders, 12*(4), 273-291. doi:10.1080/10640260490521352
- Chantler, I., Szabo, C. P., & Green, K. (2006). Muscular strength changes in hospitalized anorexic patients after an eight-week resistance training program. *International Journal of Sports Medicine, 27*(08), 660-665. doi:10.1055/s-2005-865812
- Cook, B., Wonderlich, S. A., Mitchell, J., Thompson, R., Sherman, R., & McCallum, K. (2016). Exercise in eating disorders treatment: Systematic review and proposal of guidelines. *Medicine and Science in Sports and Exercise, 48*(7), 1408.
- Cook, B., Leininger, (2017). The ethics of exercise in eating disorders: Can an ethical principles approach guide the next generation of research and clinical practice? *The Journal of Sport and Health Sciences, 6*, 295-298.
- Crow, S. J., & Nyman, J. A. (2004). The cost-effectiveness of anorexia nervosa treatment. *International Journal of Eating Disorders, 35*(2), 155-160.
- Hausenblas, H., Cook, B., & Chittester, N. (2008). Can exercise treat eating disorders? *Exercise and Sport Sciences Reviews, 36*(1), 43-47. doi:10.1016/S1469-0292(00)00015-7
- Hausenblas, H. A., & Downs, D. S. (2002). How much is too much? The development and validation of the exercise dependence scale. *Psychology and health, 17*(4), 387-404.
- Dalle Grave, R., Calugi, S., & Marchesini, G. (2008). Compulsive exercise to control shape or weight in eating disorders: Prevalence, associated features, and treatment outcome. *Comprehensive Psychiatry, 49*(4), 346-352. doi: 10.1016/j.comppsy.2007.12.007
- Danielsen, M. R., Ro, O. R., & Bjornelv, S. C. (2018). How to integrate physical activity and exercise approaches into inpatient treatment for eating disorders: Fifteen years of clinical experience and research. *Journal of Eating Disorders, 6*(34), 286-297. doi: <https://doi.org/10.1186/s40337-018-0203-5>
- El Ghoch, M., Milanese, C., Calugi, S., Pellegrini, M., Battistini, N. C., & Dalle Grave, R. (2014).

## Exercise guidelines in eating disorder treatment

- Body composition, eating disorder psychopathology, and psychological distress in anorexia nervosa: a longitudinal study. *The American journal of clinical nutrition*, 99(4), 771-778.
- Fernandez-del-Valle, M., Larumbe-Zabala, E., Villasenor-Montarroso, A., Cardona Gonzalez, C., Diez-Vega, I., Miguel Lopez Mojares, L., & Perez Ruiz, M. (2014). Resistance training enhances muscular performance in patients with anorexia nervosa: A randomized controlled trial. *International Journal of Eating Disorders*, 47, 601-609. doi:10.1002/eat.22251
- Fewell, L. K., Nickols, R., Schlitzer Tierney, A., & Levinson, C. A. (2018). Strength and Power Improvements in Athlete and Non-Athletes During Intensive Eating Disorder Treatment. *Journal of Clinical Sport Psychology*, 12(4), 562-577.
- Hay, P., Touyz, S., Arcelus, J., Pike, K., Attia, E., Crosby, R. D., ... & Young, S. (2018). A randomized controlled trial of the compulsive Exercise Activity Therapy (LEAP): A new approach to compulsive exercise in anorexia nervosa. *International Journal of Eating Disorders*, 51(8), 999-1004.
- Mayan, M. (2009). *Essentials of qualitative inquiry* (pp. 11-103). Walnut Creek, California: Left Coast Press.
- Meyer, C., Taranis, L., & Touyz, S. (2008). Excessive exercise in the eating disorders: A need for less activity from patients and more from researchers. *European Eating Disorders Review*, 16, 81-83. doi:10.1002/erv.863
- Meyer, C., Taranis, L., Goodwin, H., & Haycraft, E. (2011). Compulsive exercise and eating disorders. *European Eating Disorders Review*, 19(3), 174-189. doi: 10.1002/erv.112
- Meyer, C., Blissett, J., Alberry, R., & Sykes, A. (2013). Beliefs about exercise: Relationship to eating psychopathology and core beliefs among young female exercisers. *Eating Behaviors*, 14, 79-82.
- Mond, J. M., Hay, P. J., Rodgers, B., & Owen, C. (2006). An update on the definition of "excessive exercise" in eating disorders research. *International Journal of Eating Disorders*, 39(2), 147-153.
- Moola, F., Gairdner, S., & Amara, C. (2013). Exercise in the care of patients with anorexia nervosa: A systematic review of the literature. *Mental Health and Physical Activity*, 6, 59-68. doi:10.1016/j.mhpa.2013.04.002
- Ng, L. W. C., Ng, D. P., & Wong, W. P. (2013). Is supervised exercise training safe in patients with anorexia nervosa? A meta-analysis. *Physiotherapy*, 99(1), 1-11. doi:10.1016/j.physio.2012.05.006
- Quesnel, D. A., Libben, M., Oelke, N. D., Clark, M. I., Willis-Stewart, S., & Caperchione, C. M. (2017). Is abstinence really the best option? Exploring the role of exercise in the treatment and management of eating disorders. *Eating Disorders*, 1-21.
- Quesnel, D. A., Libben, M., & Caperchione, C. M. (2018). Preliminary assessment criteria for prescribing exercise when treating eating disorders: What do the experts have to say? *Mental Health and Physical Activity*, 15, 27-33. doi: <https://doi.org/10.1016/j.mhpa.2018.06.006>
- Ströhle, A. (2009). Physical activity, exercise, depression and anxiety disorders. *Journal of Neural Transmission*, 116(6), 777.
- Stuhldreher, N., Konnopka, A., Wild, B., Herzog, W., Zipfel, S., Löwe, B., & König, H. H. (2012). Cost-of-illness studies and cost-effectiveness analyses in eating disorders: A systematic review. *International Journal of Eating Disorders*, 45(4), 476-491.
- Schlegel, S., Hartmann, A., Fuchs, R., & Zeeck, A. (2015). The Freiburg sport therapy program for eating disordered outpatients: A pilot study. *Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity*, 20(3), 319-327. doi:10.1007/s40519-015-0182-3
- Schleien, J.L., & Bardone-Cone, A.M. (2016). Competitiveness as a moderator of the relation between appearance-related factors and disordered eating behaviors. *Body Image*, 17, 30-37.
- Szabo, C., & Green, K. (2002). Hospitalized anorexics and resistance training: Impact on body composition and psychological well-being. A preliminary study. *Eating Weight Disorders*, 7, 293-297. doi:10.1007/BF03324975.
- Schuch, F. B., Vancampfort, D., Richards, J., Rosenbaum, S., Ward, P. B., & Stubbs, B. (2016). Exercise as a treatment for depression: A meta-analysis adjusting for publication bias. *Journal of Psychiatric*

## Exercise guidelines in eating disorder treatment

---

- Research*, 77, 42-51. doi: <https://doi.org/10.1016/j.jpsychires.2016.02.023>.
- Stonerock, G. L., Hoffman, B. M., Smith, P. J., & Blumenthal, J. A. (2015). Exercise as treatment for anxiety: Systematic review and analysis. *Annals of behavioral medicine*, 49(4), 542-556. doi: <https://doi.org/10.1007/s12160-014-9685-9>
- Thien, V., Thomas, A., Markin, D., & Birmingham, C. (2000). Pilot study of a graded exercise program for the treatment of anorexia nervosa. *International Journal of Eating Disorders*, 28(1), 101-106. doi: 10.1002/(sici)1098-108x(200007)28:1<101::aid-eat12>3.0.co;2-v.
- Tokumura, M., Yoshiba, S., Tanaka, T., Nanri, S., & Watanabe, H. (2002). Prescribed exercise training improves exercise capacity of convalescent children and adolescents with anorexia nervosa. *European Journal of Paediatrics*, 162, 430-431. doi:10.1007/s00431-003-1203-1
- Touyz, S. W., Lennerts, W., Arthur, B., & Beumont, P. J. (1993). Anaerobic exercise as an adjunct to refeeding patients with anorexia nervosa: Does it compromise weight gain? *European Eating Disorders Review*, 1(3), 177-182. doi: 10.1002/erv.2400010306
- Vancampfort, D., Vanderlinden, J., De Hert, M., Adamkova, M., Skjaerven, L. H., Catalán-Matamoros, D., ... & Probst, M. (2013). A systematic review on physical therapy interventions for patients with binge eating disorder. *Disability and Rehabilitation*, 35(26), 2191-2196.
- Vancampfort, D., Vanderlinden, J., De Hert, M., Soundy, A., Adamkova, M., Skjaerven, L., Gomez-Conesa, A. (2014). A systematic review of physical therapy interventions for patients with anorexia and bulimia nervosa. *Disability and Rehabilitation*, 36(8), 628-634. doi:10.3109/09638288.2013.808271
- Waller, G. (2016). Treatment protocols for eating disorders: Clinicians' attitudes, concerns, adherence and difficulties delivering evidence-based psychological interventions. *Current psychiatry reports*, 18(4), 36. <https://doi.org/10.1007/s11920-016-0679-0>
- Wattles, M. (2001). The role of the exercise physiologist in mental health. *Professionalization Exercise Physiology*, 4(4).
- Zunker, C., Mitchell, J. E., & Wonderlich, S. A. (2011). Exercise interventions for women with anorexia nervosa: A review of the literature. *International Journal of Eating Disorders*, 44(7), 579-584. doi: 10.1002/eat.20862