

# Randomized Clinical Trial of Parent-Focused Treatment and Family-Based Treatment for Adolescent Anorexia Nervosa

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**Objective:** There have been few randomized clinical trials (RCTs) for adolescents with anorexia nervosa (AN). Most of these posit that involving all family members in treatment supports favorable outcomes. However, at least 2 RCTs suggest that separate parent and adolescent sessions may be just as effective as conjoint treatment. This study compared the relative efficacy of family-based treatment (FBT) and parent-focused treatment (PFT). In PFT, the therapist meets with the parents only, while a nurse monitors the patient.

**Method:** Participants (N = 107) aged 12 to 18 years and meeting *DSM 4<sup>th</sup> Edition* criteria for AN or partial AN were randomized to either FBT or PFT. Participants were assessed at baseline, end of treatment (EOT), and at 6 and 12 months posttreatment. Treatments comprised 18 outpatient sessions over 6 months. The primary outcome was remission, defined as  $\geq 95\%$  of median body mass index and Eating Disorder Examination Global Score within 1 SD of community norms.

**Results:** Remission was higher in PFT than in FBT at EOT (43% versus 22%;  $p = .016$ , odds ratio [OR] = 3.03, 95%

CI = 1.23–7.46), but did not differ statistically at 6-month (PFT 39% versus FBT 22%;  $p = .053$ , OR = 2.48, CI = 0.989–6.22), or 12-month (PFT 37% versus FBT 29%;  $p = .444$ , OR = 1.39, 95% CI = 0.60–3.21) follow-up. Several treatment effect moderators of primary outcome were identified.

**Conclusion:** At EOT, PFT was more efficacious than FBT in bringing about remission in adolescents with AN. However, differences in remission rates between PFT and FBT at follow-up were not statistically significant.

**Clinical trial registration information:** A Randomised Controlled Trial of Two Forms of Family-Based Treatment and the Effect on Percent Ideal Body Weight and Eating Disorders Symptoms in Adolescent Anorexia Nervosa; <http://www.anzctr.org.au/>; ACTRN12610000216011.

**Key words:** anorexia nervosa, adolescents, family-based treatment, parent-focused treatment, treatment outcome

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Anorexia nervosa (AN) is a serious psychiatric disorder with significant psychiatric and medical morbidity,<sup>1</sup> and a mortality rate that is among the highest of any psychiatric illness.<sup>2</sup> The onset of AN is typically in adolescence, in which the lifetime prevalence in 12–18-year-olds is more than 1%.<sup>3</sup> Successful treatment for the majority of patients remains stubbornly elusive, although current evidence underscores that families play a positive role in promoting successful outcomes for medically stable adolescents with AN.<sup>4–6</sup> One specific intervention, family-based treatment (FBT),<sup>7</sup> has received reasonably robust support and is at present the most efficacious outpatient intervention for adolescents with AN.<sup>8</sup> However, outcomes in FBT across recent randomized controlled trials (RCTs) remain modest. For instance, average rates of remission for those studies using the high bar of weight recovery ( $>95\%$  median body mass index [mBMI]) and cognitive recovery (Eating Disorder

Examination Global score within 1 SD of community norms), are reported to be 34% at end-of-treatment (EOT),<sup>5,6</sup> 40% at 12-month follow-up,<sup>5,6</sup> and 33% at 4-year follow-up.<sup>9</sup> Preliminary findings from a recent study that adapted FBT for early nonresponders demonstrated that remission rates at EOT can be enhanced beyond 50% when adding 3 intensive parent counseling sessions.<sup>10</sup> Of note, however, is that this study,<sup>10</sup> and the most recent large, multi-site RCT for adolescent AN,<sup>4</sup> defined remission only in terms of weight recovery. Taken together, there remains considerable room to explore other avenues to improve outcomes for this patient population.

One such avenue is a separated model of family therapy. FBT is typically delivered in conjoint format, whereby everyone who lives with the patient attends treatment. In the first of 2 modestly sized RCTs to test a separated model, 18 adolescents with AN received either conjoint family therapy (CFT) or separated family therapy (SFT).<sup>11</sup> In SFT, the same therapist first meets with the adolescent and then with the parents alone. A somewhat larger RCT followed this work in which 40 adolescents with AN were randomized to CFT or SFT.<sup>12</sup> SFT groups in both studies showed significant improvements. For example,



Clinical guidance is available at the end of this article.

Le Grange *et al.* demonstrated a 20% gain in expected body weight (EBW) for SFT at EOT compared to 13% EBW for CFT,<sup>11</sup> and, using the Morgan-Russell outcome criteria,<sup>13</sup> Eisler *et al.* achieved a good/intermediate outcome in 76% of patients in SFT compared to 47% in CFT.<sup>12</sup> Although group differences in the Morgan-Russell outcome criteria were not statistically significant ( $p = .06$ ), both studies demonstrated that adolescents from more critical families (high expressed emotion [EE]) fared less well in CFT than in SFT.<sup>11,12,14</sup> Notwithstanding the methodological limitations of these studies, they suggest that SFT can yield outcomes that are similar and, in some instances, even superior, to those of CFT.

The current RCT amplified the differences between the conjoint and separated models of treatment used in these earlier trials. In parent-focused treatment (PFT),<sup>15</sup> the separated model for the present study, the clinician works only with the parents in treatment sessions, while a nurse provides supportive oversight to monitor the adolescent's medical and mental status. Similar to prior parent training-based interventions for behavior and emotional problems in children,<sup>16</sup> in PFT, parents are the primary participants in therapy. By extension, this model excludes the family meal, an intervention considered critical in the conjoint model of family therapy for adolescent AN.<sup>7</sup> Beyond its potential for improved outcomes, the structure and delivery of PFT may represent a more feasible and acceptable version of FBT for parents and therapists alike, with positive implications for dissemination and uptake.

The present study compared the relative efficacy of PFT and FBT in an adequately powered RCT for adolescent AN. Based on prior evidence, we hypothesized that PFT would be more efficacious than FBT as indicated by more participants achieving remission at EOT. In an exploratory moderator analysis, we investigated the potential benefits of these 2 treatments for different patient groups.

## METHOD

### Study Design

This single-site study randomized 107 participants to PFT or conjoint FBT. A detailed study protocol has been previously published.<sup>17</sup> An off-site biostatistician (R.C.) generated a randomization schedule that was stratified by eating disorder severity (low versus high). High severity was defined as <80% mBMI, illness duration >12 months, and the presence of a co-occurring psychiatric disorder. Designated on-site personnel, independent of the current study, consulted the randomization schedule to allocate treatment before session 1. The therapists were 5 psychologists and 3 social work clinicians who were all experienced in the treatment of adolescent AN, underwent an initial 2-day training workshop, and were required to treat at least 1 pilot participant with FBT and PFT before being allocated randomized participants for both treatments. Three registered nurses were responsible for the adolescent PFT sessions. Weekly supervision was provided by author D.L.G. and study consultant K.L.L., providing supervision in both treatments and to all study therapists. The study setting was a specialist pediatric eating disorders program within a tertiary public hospital.<sup>18</sup> The Human Research Ethics Committee of the Royal Children's Hospital approved this study.

### Sample Characteristics

This study was conducted between July 2010 and December 2015. All patients who presented to the specialist clinic during the recruitment period (July 2010 to July 2014) were assessed for eligibility (Figure 1). Following referral to the outpatient program, a phone triage was completed with a parent by a clinical nurse consultant. If appropriate for the service, the adolescent and his/her parents attended a 1-day assessment clinic for diagnosis and treatment planning, which included standardized measures (see below) along with clinical evaluations by a multi-disciplinary team. Adolescents admitted to the inpatient unit and referred for outpatient treatment underwent an assessment before discharge. Eligibility of hospitalized patients was based on weight at discharge rather than hospitalization. Of the 269 adolescents assessed, 73 did not meet study criteria during the phone triage, and another 55 did not meet criteria at the clinical assessment. The study was described to eligible participants following the clinical assessment. Written informed consent was obtained from parents and adolescents before randomization.

Inclusion criteria were *DSM-IV*<sup>19</sup> diagnosis for AN (excluding amenorrhea); age 12 through 18 years inclusive; living with at least 1 parent available to undertake treatment; and English proficiency by adolescents and parents at the sixth-grade level. Given the anticipated publication of the *DSM-5*<sup>20</sup> during the study, with its proposed deletion of the weight cut-off for AN, inclusion criteria for weight was  $\leq 90\%$  mBMI for adolescents  $\leq 75$ th percentile for height, and  $< 95\%$  mBMI for adolescents  $\geq 75$ th percentile for height.<sup>21</sup> Exclusion criteria were medical instability as defined by the American Academy of Pediatrics<sup>22</sup>; current psychotic disorder; drug or alcohol dependence; acute suicidality; physical condition influencing eating or weight (e.g., pregnancy, cancer); previous FBT for AN; and psychotropic medication  $< 8$  weeks. Of the 141 eligible patients, 107 (76%) agreed to randomization.

### Participant Safety

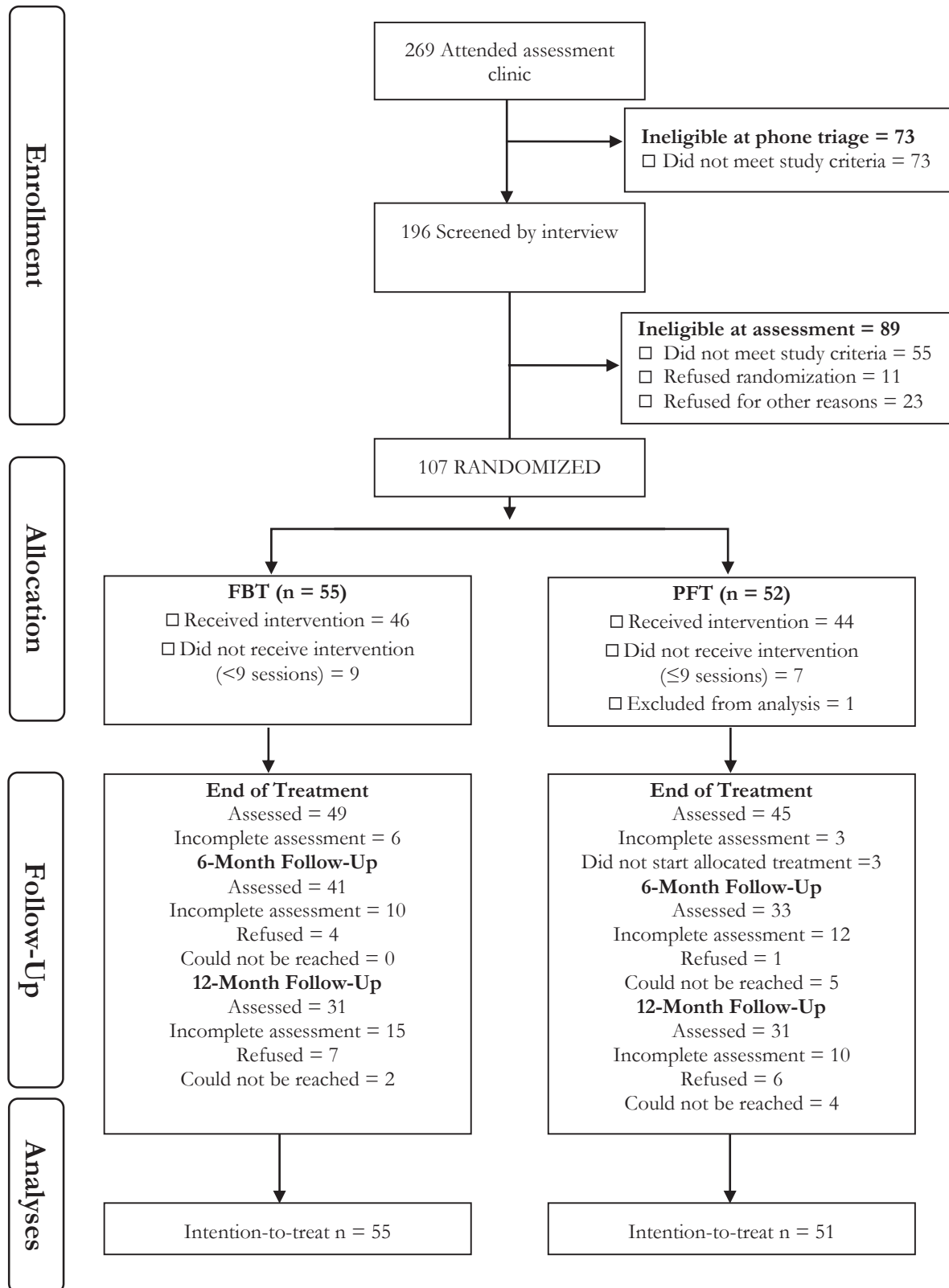
Medical stability was monitored by on-site pediatricians at least every 5 weeks for both treatments and as clinically required during follow-up. Participants were hospitalized if they met criteria for medical instability and were discharged once medically stable to continue their assigned study arm. Participants hospitalized for more than 21 consecutive days ( $n = 0$ ) or on more than 2 occasions (PFT = 2, FBT = 2) during the study treatment were withdrawn from the trial and offered appropriate on-site treatment or a referral to an external provider. Comorbid psychiatric conditions and psychotropic medications were managed by the study psychiatrist (A.C.).

### Study Interventions

Both interventions were manualized<sup>7,15</sup> and delivered within 18 sessions over 6 months. For each family, 1 therapist (for FBT), or 1 therapist and 1 nurse (for PFT), were assigned for the duration of treatment.

**Family-Based Treatment.** Family-based treatment (FBT)<sup>7</sup> includes the entire family in treatment sessions. Treatment progresses through 3 phases, with the first phase (sessions 1–12) exclusively focused on supporting the parents in their efforts to assist their offspring to gain weight. The second session is a family meal. Phase 2 (sessions 13–16) aims to transition control over eating to the adolescent in a developmentally appropriate manner. Phase 3 (sessions 17–18) is brief and introduces adolescent developmental tasks once eating disorder symptoms have largely abated. The primary therapist weighs the patient at the start of each session (10 minutes)

**FIGURE 1** Consolidated Standards of Reporting Trials (CONSORT) diagram. Note: FBT = family-based treatment; PFT = parent-focused treatment.



before having the rest of the family join for the remainder of the session (50 minutes).

**Parent-Focused Treatment.** Parent-Focused Treatment (PFT)<sup>15</sup> is an adaptation of FBT, yet distinct in significant ways. That is, PFT requires the adolescent to attend a brief session with the nurse (15 minutes) before his/her parents' session with the therapist. The nurse weighs the adolescent, shares this information with the adolescent, assesses medical stability, and provides brief supportive counseling. The nurse communicates the weight and any other pertinent information to the therapist, who then sees the parents for 50 minutes. The focus and content of the parent sessions are the same as in FBT. However, these sessions are conducted without any interaction with the adolescent or his/her siblings. The only direct contact between the therapist and adolescent is at the first session, when the therapist makes a brief self-introduction, and at the end of the final session, when the therapist bids farewell to the family. There is no family meal session in PFT.

### Assessments

Interviews were completed with adolescents and parents at baseline, EOT, and at 6 and 12 months posttreatment. Questionnaires were completed bi-weekly for the first 3 months of treatment and at each interview assessment. Independent and trained assessors, who were not involved in treatment delivery, administered all assessments. The primary outcome was remission at EOT, which was defined a priori as  $\geq 95\%$  mBMI and a Global Eating Disorder Examination (EDE)<sup>23</sup> score within 1 SD of community norms.<sup>17,24-26</sup>

The EDE<sup>23</sup> is a standardized investigator-based interview and determines the severity of eating disorder psychopathology. It is a gauge of current state, primarily focused on the 4 weeks before the assessment. Weight was measured using calibrated digital scales while wearing a gown and after voiding. Height was measured using calibrated wall-mounted stadiometers. In addition to the EDE, weight, height, and demographic variables, the following measures were used to explore potential predictors and moderators of outcome: Child Depression Inventory (CDI),<sup>27</sup> Rosenberg Self-Esteem Scale (RSES),<sup>28</sup> Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS),<sup>29</sup> Yale-Brown-Cornell Eating

Disorder Scale (YBC-EDS),<sup>30</sup> Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-Kid),<sup>31</sup> Symptom Checklist-90-Revised (SCL-90-R),<sup>32</sup> Five Minute Speech Sample (FMSS),<sup>33</sup> Therapy Suitability and Patient Expectancy (TSPE),<sup>34</sup> Helping Relationship Questionnaire (HRQ),<sup>35</sup> Parents Versus Anorexia (PVA),<sup>36</sup> Positive and Negative Affect Scale-Expanded (PANAS-X),<sup>37</sup> Borderline Personality Questionnaire (BPQ),<sup>38</sup> and the Family Environment Scale (FES).<sup>39</sup>

### Statistical Analysis

Analyses for this study were conducted using SPSS version 19.0.0 (SPSS Inc., Chicago, IL). The a priori sample size calculation for this study was based on 2 prior studies comparing CFT and SFT.<sup>6,8</sup> A sample size of 50 participants per group would provide 80% power to detect a difference in excess of 20% between FBT and PFT in remission status at EOT, assuming a dropout rate of 10%. A 2-tailed  $\alpha$  value of .05 was used to evaluate all tests of significance. Treatment groups were compared at baseline on sociodemographic and clinical characteristics, as well as primary and secondary outcome measures using independent-samples *t* tests or Mann-Whitney *U* tests for continuous measures and  $\chi^2$  or Fisher's Exact tests for categorical measures.

A total of 107 participants were randomized to PFT ( $n = 52$ ) or FBT ( $n = 55$ ). One participant who met inclusion criteria was hospitalized before study entry, and upon discharge was randomized to PFT despite no longer meeting inclusion criteria ( $< 95\%$  mBMI). This was deemed a randomization error and was not included in the intention-to-treat sample. Thus, the final sample for analysis was 106 (51 PFT and 55 FBT).

The PFT and FBT groups were compared on completion of treatment (attended  $\geq 9$  sessions, i.e., 50%) and completion of assessments at EOT, 6- and 12-month follow-ups (defined as valid weight and completion of EDE) using  $\chi^2$  analyses. All outcome analyses were based upon intention-to-treat. The primary outcome for this study was remission, defined as  $\geq 95\%$  mBMI and EDE Global score  $\leq 1.59$ .<sup>17,24-26</sup> Those participants with missing body weight at EOT or follow-up were considered to be not remitted. In the event of valid weight but missing EDE data, the imputed value

**TABLE 1** Demographic and Clinical Characteristics at Baseline by Treatment Group

Characteristic	PFT (n = 51)	FBT (n = 55)	Total (N = 106)	PFT vs. FBT Significance
Female, n (%)	44 (86.3)	49 (89.1)	93 (87.7)	Fisher's Exact $p = .770$
Age, y, mean (SD)	15.7 (1.6)	15.4 (1.3)	15.5 (1.5)	$t = -0.84$ ; $df = 104$ ; $p = .402$
Australian born, n (%)	47 (92.2)	51 (92.7)	98 (92.5)	Fisher's Exact $p = 1.00$
University degree, mother, n (%)	15 (31.9)	22 (43.1)	37 (37.8)	Fisher's Exact $p = .300$
University degree, father, n (%)	13 (36.1)	16 (40.0)	29 (38.2)	Fisher's Exact $p = .815$
Intact family, n (%)	33 (64.7)	34 (61.8)	67 (63.2)	Fisher's Exact $p = .841$
Duration of illness, mo, mean (SD)	10.0 (8.1)	11.0 (9.4)	10.5 (8.8)	$t = 0.56$ ; $df = 104$ ; $p = .576$
Psychiatric medication, n (%)	2 (3.9)	6 (10.9)	8 (7.5)	Fisher's Exact $p = .273$
Eating Disorder Examination Global, mean (SD)	2.09 (1.54)	2.20 (1.81)	2.15 (1.68)	$t = 0.33$ ; $df = 104$ ; $p = .744$
% Median BMI, mean (SD)	82.8 (6.2)	81.1 (5.9)	81.9 (6.1)	$t = -1.44$ ; $df = 104$ ; $p = .152$
BMI, mean (SD)	16.7 (1.4)	16.3 (1.2)	16.5 (1.3)	$t = -1.64$ ; $df = 104$ ; $p = .104$
Hospitalized at presentation, n (%)	18 (35.3)	21 (38.2)	39 (36.8)	Fisher's Exact $p = .841$
Mood disorder, n (%)	15 (29.4)	9 (16.4)	24 (22.6)	Fisher's Exact $p = .163$
Anxiety disorder, n (%)	12 (23.5)	12 (21.8)	24 (22.6)	Fisher's Exact $p = 1.00$
OCD, n (%)	4 (7.8)	2 (3.6)	6 (5.7)	Fisher's Exact $p = .425$
Behavioral disorder, n (%)	0 (0.0)	2 (3.6)	2 (1.9)	Fisher's Exact $p = .496$
Suicide or self-harm risk, n (%)	4 (7.8)	7 (12.7)	11 (10.4)	Fisher's Exact $p = .530$

Note: BMI = body mass index; FBT = family-based treatment; OCD = obsessive-compulsive disorder; PFT = parent-focused treatment.

**TABLE 2** Primary and Secondary Outcomes by Treatment Group<sup>a</sup>

	End of Treatment	6-Month Follow-Up	12-Month Follow-Up
<b>Primary Outcome</b>			
Remission, n (%)			
PFT (n = 51)	22 (43.1)	20 (39.2)	19 (37.3)
FBT (n = 55)	12 (21.8)	12 (21.8)	16 (29.1)
Significance	<i>p</i> = .016	<i>p</i> = .053	<i>p</i> = .444
<b>Secondary Outcomes</b>			
EDE Global, mean (SD)			
PFT (n = 51)	0.81 (1.22)	0.74 (1.01)	0.81 (1.13)
FBT (n = 55)	1.10 (1.32)	0.98 (1.28)	1.04 (1.24)
Significance	<i>p</i> = .255	<i>p</i> = .858	<i>p</i> = .965
% mBMI, mean (SD)			
PFT (n = 51)	93.9 (10.4)	95.0 (11.4)	95.6 (10.0)
FBT (n = 55)	90.7 (8.7)	92.8 (9.9)	93.3 (9.7)
Significance	<i>p</i> = .166	<i>p</i> = .456	<i>p</i> = .603

Note: EDE Global = Eating Disorder Examination Global score; FBT = family-based treatment; mBMI = median body mass index; PFT = parent-focused treatment.  
<sup>a</sup>Logistic regression, all *p* values controlling for sex, age, and illness severity.

for the EDE Global score based upon multiple imputation (described below) was used to determine remission status. Treatment groups were compared on remission status separately at EOT and at 6- and 12-month follow-up using logistic regression controlling for sex, age at baseline, and illness severity (as defined for randomization).

Missing data for continuous outcome measures at EOT and follow-up were imputed using multiple imputation based on fully conditional Markov chain Monte Carlo<sup>40</sup> modeling. The final analyses were based on the pooled results of 5 separate imputations. Treatment groups were then compared separately at EOT and at 6- and 12-month follow-up using a general linear model for symmetric continuous outcomes, or a generalized linear model for nonsymmetric data. Covariates for all models included baseline observation, sex, age at baseline, and illness severity. Sensitivity analyses were conducted using maximum likelihood imputation and last observation carried forward, with results compared across the 3 methods.

Exploratory analyses were conducted investigating predictors and moderators of remission status separately at EOT and at 6- and 12-month follow-up. Analyses were based on logistic regression, with models using treatment group, predictor, and treatment group-by-predictor interaction (i.e., test of moderation) to predict remission status. Treatment group and all categorical predictor/moderator variables were coded as -0.5 versus 0.5, and all continuous predictors were centered around the grand mean before the analyses.

## RESULTS

### Study Participants

There were 106 study participants with an average age of 15.5 years (SD 1.5). Their mean percent mBMI was 81.9 (SD 6.1), and mean duration of illness was 10.5 months (SD 8.8) (range, 2–48 months). The majority of participants were female (93/106; 87.7%) and from intact families (67/106; 63.2%). More than one-third were hospitalized at presentation (36.8%), and only 7.5% (*n* = 8) were on psychiatric medications. Table 1 presents baseline demographic and clinical characteristics. There were no significant differences between groups.

### Treatment and Assessment Completion

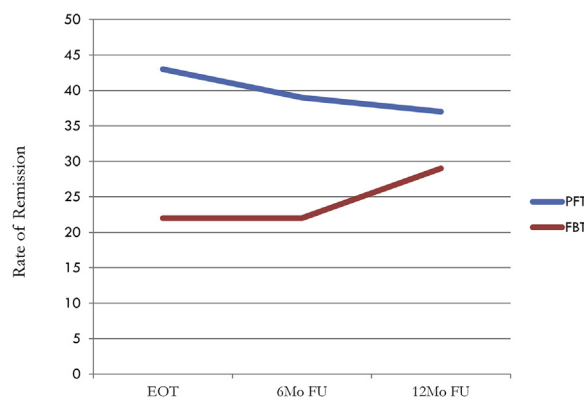
A total of 90 participants (84.9%) completed treatment ( $\geq 9$  sessions/50% of dose). This included 44 (86.3%) in PFT and 46 (83.6%) in FBT, which did not differ between treatment groups (Fisher's Exact *p* = .790). Rates of assessment completion (valid weight and EDE) were 88.7% at EOT (88.2% PFT, 89.1% FBT), 69.8% at 6-month follow-up (64.7% PFT, 74.5% FBT), and 58.5% at 12-month follow-up (60.8% PFT, 56.4% FBT). Assessment completion rates did not significantly differ between treatment groups at any assessment point.

### Primary and Secondary Treatment Outcomes

Table 2 presents primary and secondary outcomes at each time point by treatment group. Remission rates at EOT were significantly higher for PFT (43.1%) than FBT (21.8%) (Wald  $\chi^2 = 5.85$ ; *df* = 1; *p* = .016; OR = 3.03; 95% CI = 1.23–7.46).

### FIGURE 2 Change in remission rates across treatments.

Note: 6Mo FU = 6-month follow-up; 12Mo FU = 12-month follow-up; EOT = end-of-treatment; FBT = family-based treatment; PFT = parent-focused treatment.



**TABLE 3** Additional Outcomes by Treatment Group<sup>a</sup>

Additional Outcomes	End of Treatment	6-Month Follow-Up	12-Month Follow-Up
EDE Restraint, mean (SD)			
PFT (n = 51)	0.63 (1.34)	0.53 (0.89)	0.55 (0.96)
FBT (n = 55)	0.92 (1.43)	0.85 (1.40)	0.77 (1.18)
Significance	<i>p</i> = .256	<i>p</i> = .834	<i>p</i> = .930
EDE Eating Concerns, mean (SD)			
PFT (n = 51)	0.54 (1.09)	0.56 (0.95)	0.65 (1.15)
FBT (n = 55)	0.67 (0.96)	0.61 (1.01)	0.79 (1.13)
Significance	<i>p</i> = .293	<i>p</i> = .555	<i>p</i> = .730
EDE Weight Concerns, mean (SD)			
PFT (n = 51)	0.89 (1.39)	0.85 (1.13)	0.94 (1.21)
FBT (n = 55)	1.27 (1.50)	1.22 (1.42)	1.10 (1.28)
Significance	<i>p</i> = .297	<i>p</i> = .659	<i>p</i> = .704
EDE Shape Concerns, mean (SD)			
PFT (n = 51)	1.16 (1.48)	0.94 (1.28)	1.11 (1.37)
FBT (n = 55)	1.58 (1.80)	1.31 (1.67)	1.42 (1.66)
Significance	<i>p</i> = .424	<i>p</i> = .702	<i>p</i> = .764
CDI Total, mean (SD)			
PFT (n = 51)	10.2 (10.3)	8.1 (7.4)	7.0 (5.5)
FBT (n = 55)	11.3 (9.1)	8.0 (8.0)	10.2 (9.0)
Significance	<i>p</i> = .513	<i>p</i> = .788	<i>p</i> = .272
RSE Total, mean (SD)			
PFT (n = 51)	29.1 (6.4)	29.7 (6.2)	30.7 (5.1)
FBT (n = 55)	28.0 (7.2)	29.9 (5.8)	29.4 (6.1)
Significance	<i>p</i> = .465	<i>p</i> = .820	<i>p</i> = .290
Days driven exercise, mean (SD)			
PFT (n = 51)	1.0 (4.1)	1.8 (3.4)	2.8 (4.2)
FBT (n = 55)	3.1 (7.5)	3.0 (6.4)	4.3 (7.1)
Significance	<i>p</i> = .080	<i>p</i> = .987	<i>p</i> = .447

Note: CDI = Child Depression Inventory; EDE = Eating Disorder Examination; FBT = family-based treatment; PFT = parent-focused treatment; RSE = Rosenberg Self-Esteem Scale.  
<sup>a</sup>Logistic regression, all *p* values controlling for sex, age, and illness severity.

Differences in remission rates at 6-month follow-up were also higher for PFT (39.2%) than for FBT (21.8%), although this did not reach statistical significance (Wald  $\chi^2 = 3.75$ ; *df* = 1; *p* = .053; OR = 2.48; 95% CI = 0.989–6.22). There were no differences in remission rates between PFT (37%) and FBT (29%) at 12-month follow-up (Wald  $\chi^2 = 0.59$ ; *df* = 1; *p* = .444, OR = 1.39, 95% CI = 0.60–3.21) (Figure 2). There were no significant differences between treatment groups on any secondary outcome measures, and all results were confirmed with sensitivity analyses (Table 3).

#### Treatment Effect Moderators of Primary Outcome

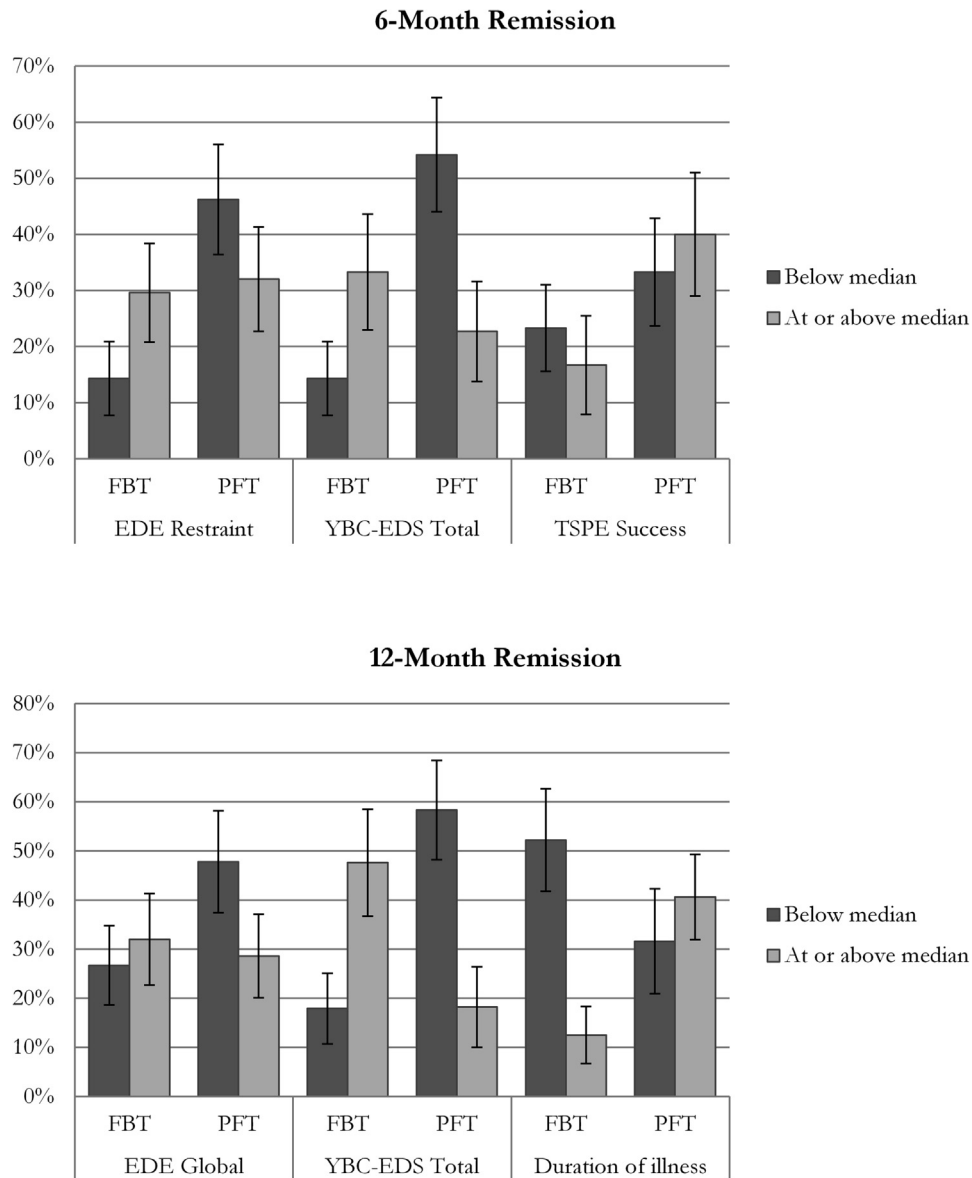
No baseline variable was identified as a treatment effect moderator at EOT. However, EDE Restraint (*p* = .046), EDE Eating Concern (*p* = .034), YBC-EDS Preoccupation (*p* = .006), YBC-EDS Rituals (*p* = .028), YBC-EDS Total (*p* = .016), and TSPE Adolescent Success (*p* = .043) were identified as treatment moderators at 6-month follow-up. EDE Restraint (*p* = .012), EDE Eating Concern (*p* = .039), EDE Shape Concern (*p* = .040), EDE Global (*p* = .019), YBC-EDS Preoccupation (*p* = .005), YBC-EDS Rituals (*p* = .005), YBC-EDS Total (*p* = .006), and duration of illness (*p* = .020) were identified as treatment effect moderators at 12-month

follow-up. Participants with more severe eating disorder psychopathology (i.e., high EDE) did as well in either treatment, whereas those with more eating disorder-related obsessions and compulsions (i.e., high YBC-EDS) did better in FBT. Conversely, participants with lower scores on these measures did markedly better in PFT (Figure 3). At 6-month follow-up, adolescents with higher baseline expectation of treatment success (i.e., high TSPE) had higher rates of remission in PFT than those in FBT, whereas there was no difference in remission between treatments for adolescents with lower expectation of treatment. Participants with a shorter duration of illness did better at 12-month follow-up in FBT, whereas those with a longer duration did better in PFT.

#### Nonspecific Predictors of Primary Outcome

There were no nonspecific predictors of remission at EOT. Baseline expressed emotion (father FMSS) (*p* = .024) emerged as a nonspecific predictor of remission at 6-month follow-up. Duration of illness (*p* = .020) emerged as a nonspecific predictor of remission at 12-month follow-up. Regardless of treatment type, individuals with lower paternal expressed emotion and shorter duration of illness all showed higher remission at follow-up.

**FIGURE 3** Moderator effect on remission at follow-up for Eating Disorder Examination (EDE), Yale–Brown–Cornell Eating Disorder Scale (YBC-EDS), therapy suitability and patient expectancy, and duration of illness. Note: Error bars are standard error. FBT = family-based treatment; PFT = parent-focused treatment; TSPE = Therapy Suitability and Patient Expectancy.



#### Hospitalization During Treatment Phase

A total of 19 participants (17.9%) were hospitalized during treatment, including 13 (23.6%) from FBT and 6 (11.8%) from PFT (Fisher's Exact  $p = .133$ ). Of the hospitalizations, 83% were for medical reasons.

#### Treatment During Follow-Up

A total of 61 participants received treatment during the study follow-up: 32 for eating disorders, 18 for other mental health concerns, or both ( $n = 11$ ) (FBT = 33 versus PFT = 28; Fisher's Exact  $p = .420$ ). A total of 15 participants were readmitted to the hospital during follow-up (FBT=10 versus PFT=5; Fisher's Exact  $p = .271$ ).

#### Treatment Suitability and Patient Expectancy

Adolescent and parent TSPE ratings at session 1, mid-treatment, and EOT did not differ between PFT and FBT. On a Likert scale (0–10), means (min/max) varied from 5.37 to 7.56 for adolescents, 7.47–8.52 for mothers, and 7.57–8.31 for fathers (all  $p$  values not significant).

## DISCUSSION

The results of this study support the primary hypothesis that PFT is superior to FBT on remission at EOT. Indeed, there was a 3-fold increase in the odds of remission in those who received PFT compared to FBT. However, differences between treatments were no longer statistically significant at

6- and 12-month follow-up. None of the proposed baseline variables significantly moderated treatment outcome at EOT; however, there was an indication that eating disorder psychopathology (EDE) and eating disorder-related obsessions and compulsions (YBC-EDS) moderated outcome at 6- and 12-month follow-up. There were no differences between treatment groups in terms of secondary outcome measures. Our findings amplify those of the only 2 previous RCTs for adolescent AN<sup>11,12</sup> that compared conjoint and separated models of family therapy. The larger current RCT underscores that a separated model can provide an alternative therapeutic platform for rapid weight restoration in adolescent AN.

This study has several strengths, including a relatively large sample size, manualized treatments, therapists trained and skilled in family-based interventions for adolescents, expert supervision, and independent assessors using standardized outcome measures. Furthermore, both treatment attrition and study dropout were quite low.

There are also some study limitations. In particular, the loss of follow-up data by 12 months, as well as the specialist treatment program study site, may limit the generalizability of the findings. There also appears to be a difference in remission rates (weight + EDE) for FBT at EOT in the 2 Australian studies (22% for the present RCT and 25% for the Westmead RCT<sup>6</sup>), as opposed to the single United States-based study using this definition of remission (42%).<sup>5</sup> Although speculative, this disparity could be the result of demographic differences, given the public and private health care environments of the Australian and US studies, respectively. Finally, the exploratory analyses of predictors and moderators did not adjust for multiple comparisons. Consequently, current findings should be interpreted with appropriate caution.

Findings from the present study demonstrate that a separated family therapy model (PFT) can be more efficacious in the treatment of adolescents with AN. In addition, this treatment modality may also have additional advantages over conjoint FBT that could potentially facilitate broader dissemination of family therapy for adolescent AN. For example, PFT may appeal to clinicians without formal family therapy training who are hesitant to work in a format that includes the patient, parents, other caregivers, and siblings.<sup>15,41</sup> PFT does not include a family meal, which removes an intervention that some therapists view as a significant challenge.<sup>42</sup> PFT also does not place expectations upon siblings (or the patient), which perhaps allows parents and the therapist to more actively engage in therapeutic work. Conversely, therapists committed to working directly with adolescents or full family systems may be discouraged by the idea of working with parents without engaging with the adolescent and siblings. In addition, few providers might work in a setting in which a nurse, in lieu of the therapist, could see the patient. That said, physicians who provide medical clearance and monitoring alongside FBT may be able to function in this role by increasing the frequency of patient visits during a course of PFT.

Our exploratory analysis did not identify moderators at EOT, perhaps because the difference in remission between PFT and FBT was quite substantial at that time point.

However, a number of important baseline variables, most notably EDE and YBC-EDS, were shown to be associated with remission at both the 6- and 12-month follow-ups. Of interest, at the 12-month follow-up, FBT was the more potent intervention for adolescents who demonstrated particularly high levels of eating disorder-related obsessions and compulsions at baseline. This is in keeping with a prior study comparing FBT to adolescent-focused therapy,<sup>43</sup> but it is in contrast to another that suggested that obsessive-compulsive features were more responsive to systemic family therapy as opposed to FBT.<sup>4</sup> These seemingly contradictory findings may be more reflective of the exploratory nature of moderator analyses rather than substantive differences in these family interventions.

EE did not emerge as a moderator, unlike what appeared to be evident in the data from earlier SFT versus CFT comparisons,<sup>11,12</sup> which might be explained by the publication of the FBT manual<sup>7</sup> since these early studies were conducted. In the FBT manual, the potential detrimental impact of high EE in treatment outcome is acknowledged, and clear therapeutic strategies to remedy high levels of EE are provided. In our study, however, low paternal EE predicted higher remission at 12-month follow-up, regardless of treatment group. Taken together, these findings add to our cautiously growing capacity to better match patients with treatment modality, an ability that remains largely elusive.

The current study is now the seventh RCT to use family interventions for adolescent AN since the seminal work by Russell *et al.* almost 30 years ago.<sup>44</sup> Taken together, engaging families to support adolescents with eating disorders remains encouraging, especially considering the absence of alternative treatments with comparable efficacy. Yet, when applying strict weight and cognition criteria, remission rates in FBT remain modest, both in terms of the proportion remitted at the EOT, as well as the maintenance of remission at 1- and 4-year follow-up. Given the impact of this severe disorder during adolescence and beyond, there remains an ongoing need to develop other innovative treatments or to explore additional adaptations of FBT. ☺

#### **CG** Clinical Guidance

- Parents are a great resource in the outpatient treatment of medically stable adolescents with anorexia nervosa (AN).
- Family-based treatment (FBT) is an efficacious intervention to mobilize parents to restore weight in this patient population.
- A separated model of FBT where the clinician meets with the parents and a nurse monitors the patient, called parent-focused treatment (PFT), can accomplish weight restoration more efficiently than FBT.
- PFT is “user friendly” in that the mental health provider mostly works with the parents, while the adolescent with AN is monitored by a nurse for medical stability and mental status.



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