

# Physical Activity as an Adjunct Therapy in Quiescent and Mildly Active Inflammatory Bowel Disease - A Systematic Review and Meta-Analysis

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## ABSTRACT

### Introduction

Individuals with IBD in remission (i.e., quiescent IBD) can continue to have several symptoms, such as fatigue and depression. Physical activity (PA) may benefit people with quiescent IBD by improving immunological response and psychological health. The aim of our study was to distill available evidence on the efficacy and safety of PA to relieve persistent symptoms of fatigue, joint pain, abdominal pain, stress, anxiety, and depression; and improve health-related quality of life (HRQoL) in individuals with quiescent or mildly active IBD.

### Methods

We searched for RCTs and non-RCTs in eight databases, trial registries and conference proceedings. Trials using PA as an adjunct therapy in the management of adults (>18 years) with quiescent or mildly active IBD, published in English between 2011 and 2021 were identified. Risk of bias of RCTs and non-RCTs was assessed using the Cochrane Risk of Bias tool and Newcastle Ottawa Scale respectively.

### Results

We identified seven RCTs and one non-RCT that met our inclusion criteria. PA was moderately efficacious in improving HRQoL among trials using similar outcome measures (standardized mean difference (SMD) 0.51, 95% CI 0.22 to 0.79; I<sup>2</sup> 0%), and reducing anxiety (SMD -0.35, 95% CI -0.65 to -0.05; I<sup>2</sup> 0%). There was insufficient evidence to make conclusions regarding changes in fatigue and depression. Only one study reported on stress, and only one study reported on joint pain. None was identified for abdominal pain. All trials deemed PA safe for individuals with quiescent or mildly active IBD who experience persistent symptoms. Average adherence rate in PA programs was 69%.

### Discussion

PA is efficacious in improving HRQoL and alleviating anxiety in those with quiescent or mildly active IBD. However, more RCTs are required to precisely estimate the magnitude of effect and make more definitive conclusions about the efficacy of PA as an adjunct therapy for adults with IBD.

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## INTRODUCTION

### Inflammatory Bowel Disease (IBD)

- Some symptoms persist during periods of inactive disease.

### Aim

To critically appraise available evidence on the efficacy and safety of physical activity (PA) to relieve persistent symptoms and improve health-related quality of life (HRQoL) in individuals with quiescent and mildly active IBD.

## METHODS

### Search Strategy:

RCTs and non-RCTs, eight databases (2011 – 2021), trial registries and conference proceedings (2016 – 2021).

### Inclusion/Exclusion:

**P:** Adults > 18 yrs. with quiescent and mildly active IBD.

**I:** Physical activity (yoga, mod-high intensity, endurance training, aerobic ex, resistance training, walking)

**C:** Medical therapy/No therapy.

**O:** HRQoL and ongoing symptoms of fatigue, joint pain, abdominal pain, stress, anxiety and depression.

### Screening:

- We imported eligible citations into Endnote™ for reference management and deduplication.
- Title and full text screening was performed in Rayyan independently by two reviewers.

### Data Extraction:

- Performed by two reviewers independently.
- Risk of bias: Cochrane Risk of Bias tool V1 (RCTs) and Newcastle-Ottawa Scale (non-RCTs).

### Analysis:

- RevMan (version 5.4).
- Summary effect estimate: Mean Difference (MD)/Standardized Mean Difference (SMD) and Risk Ratios (RR) at 95% CI.
- Heterogeneity: I<sup>2</sup> statistic.
- Quality of evidence: GRADE.

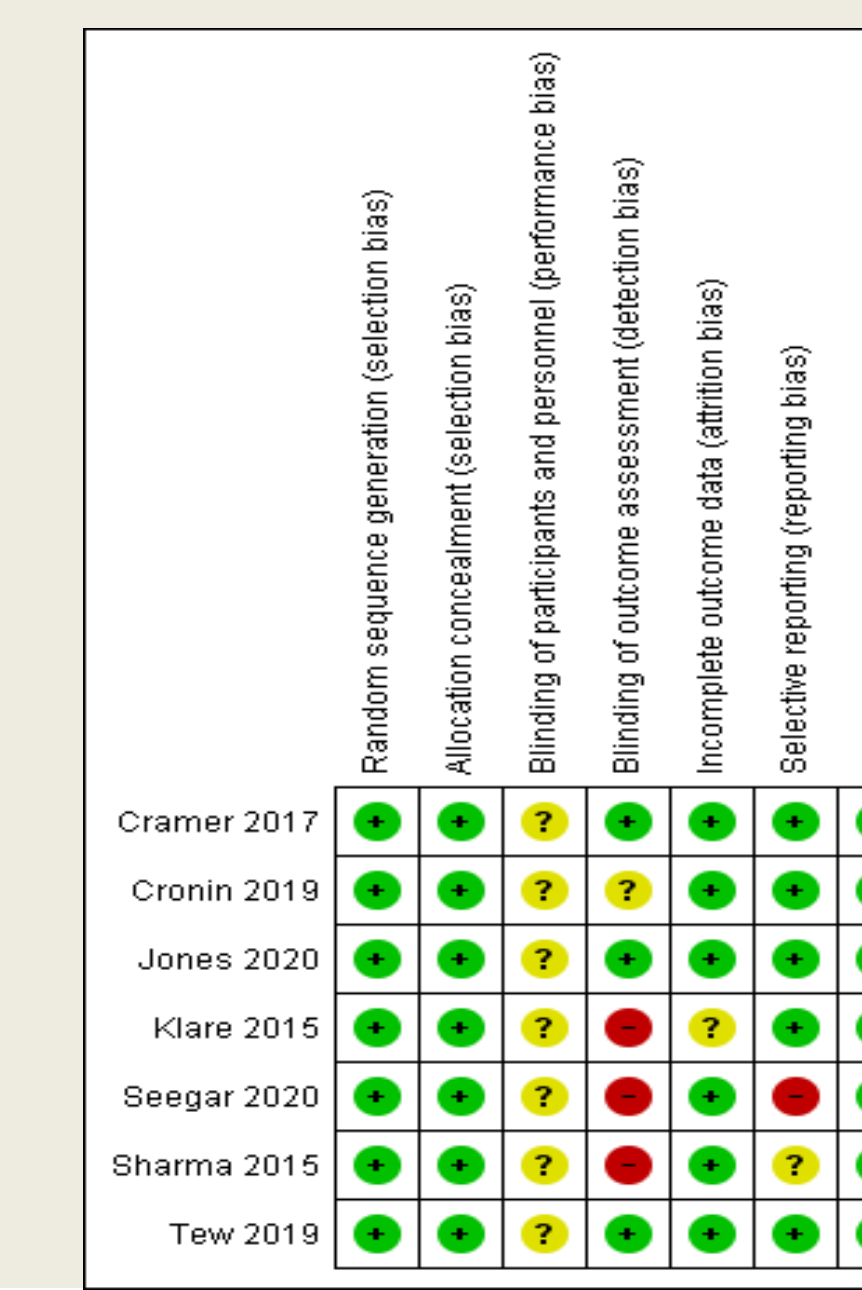
## RESULTS

- From 10,862 retrieved citations, we included seven RCTs and one non-RCT.
- Among trials using similar outcome measures, PA was efficacious in improving HRQoL (SMD 0.51, 95% CI 0.22 to 0.79; I<sup>2</sup> 0%) - moderate certainty evidence.
- PA was found to be efficacious in reducing anxiety (SMD -0.35, 95% CI -0.65 to -0.05; I<sup>2</sup> 0%) - low certainty evidence.

Table 1: Characteristics of included trials

Author/Year	Mean age (SD)	Total Ppts	Diagnosis Dis. Sev.	PA intervention	Authors' description of intensity	Control group	Interv. duration	Duration Freq of PA
Cramer et al., 2017	Not reported	77	UC Quiesc.	Yoga (Exercise class = 1/week Home = daily).	Not defined	Medical Therapy	12 weeks	45 min Daily
Cronin et al., 2019	32.6 ± 3.0	14	IBD Quiesc.	Aerobic and resistance training (with machines/free weights)	Mod intensity defined as 5-7 out of 10 on Borg RPE	Usual care	8 weeks	Not reported 3 days/week
Jones et al., 2020	46.1 ± 11.9	47	CD Quiesc.+	Resistance training (squats, lunges, rope-skipping using body weight and Theraband for resistance)	Mod to high intensity self-rated with Resistance Intensity Scale for Exercise	Medical Therapy	26 weeks	60 mins 3 days/week
Klare et al., 2015	41.1 ± 14.1	30	IBD Quiesc.+	Running program (Outdoors)	Mod intensity defined as being able to talk while running	Medical Therapy / No therapy	10 weeks	Not reported 3 days/week
Seegar et al., 2020	45.3 ± 12.4	45	CD Quiesc.+	Grp 1 - Resistance training (push ups, sit-ups). Grp 2 - Aerobic Ex (jogging, cycling)	Mod intensity rated with Borg RPE and set at 60-80% of HRmax.	Medical Therapy	12 weeks	30 - 40 mins 3 days/week
Sharma et al., 2015	Not reported	44	IBD Quiesc.	Yoga	Not defined	Medical Therapy	8 weeks	60 mins Daily
Tew et al., 2019	37.0 ± 11.1	36	IBD Quiesc.+	Leg cycle ergometer: Grp 1 - HIIT = 1 min x 90% + 1 min x 15% Wpeak for 20 minutes. Grp 2 - MICT = 30 min x 35% Wpeak. 30 mins aerobic ex (cycling, treadmill) + 30 min resistance training with machines	Peak Power Output (Wpeak) - determined for each individual at baseline.	Medical Therapy	12 weeks	~ 30 mins 3 days/week
Van Erp et al., 2021	45 ± 2.6	25	IBD Quiesc.		Intensity for aerobic training set at 65-80% of HRmax.	Medical Therapy	12 weeks	60 mins 3 days/week

Figure 1: Risk of Bias summary

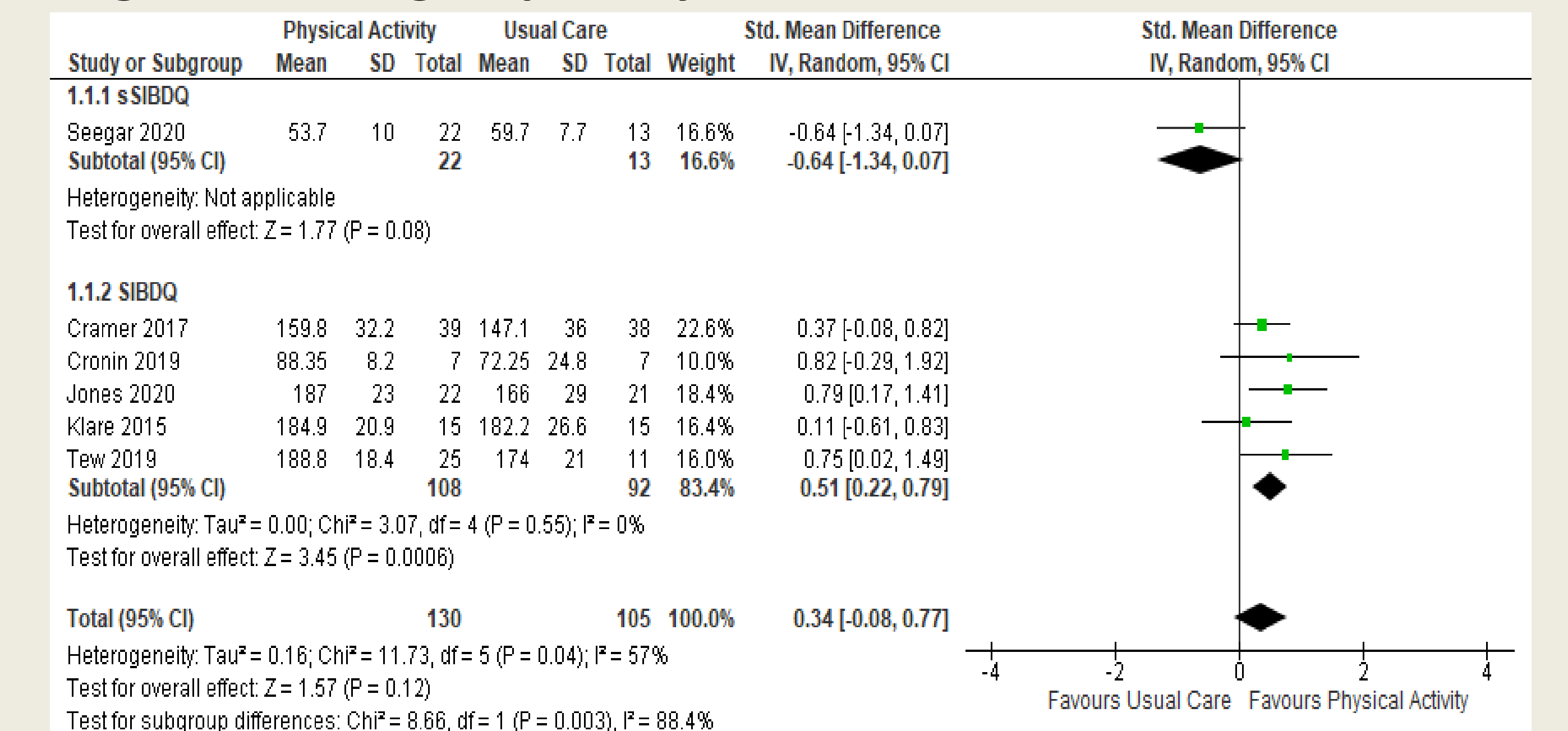


- No statistically significant increase in adverse effects due to PA (RR 2.07, 95% CI 0.7 to 5.49; I<sup>2</sup> 0%; 7 RCTs, 174 participants).
- Average adherence rate was 69%.

## DISCUSSION

- PA may be efficacious in improving HRQoL in individuals with quiescent and mildly active IBD.
- It has been proposed that PA achieves this benefit by interrupting the cycle of physical inactivity and muscle deconditioning, causing a decrease in fatigue and anxiety, which in turn improves HRQoL.

Figure 2: Sub-group analysis HRQoL



## CONCLUSIONS

- Physical activity may be efficacious in improving HRQoL and alleviating anxiety in those with quiescent or mildly active IBD.
- More RCTs are needed to make more definitive conclusions about the efficacy and type of physical activity as an adjunct therapy for adults with quiescent IBD.

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