

# Comparison of two modalities of aerobic training on health-parameters in adolescent obese

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<b>Registration date</b> 16/02/2016	<b>Overall study status</b> Completed	<input type="checkbox"/> Protocol
<b>Last Edited</b> 15/02/2016	<b>Condition category</b> Nutritional, Metabolic, Endocrine	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
		<input type="checkbox"/> Individual participant data
		<input type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

Obese (very overweight) children are at a higher risk than thought of developing vascular disease (for example, atherosclerosis where the blood vessels become clogged up with fatty deposits). Vascular disease often leads to coronary heart disease, heart disease and stroke in later life. In the early stages of vascular disease, microvascular function (function of the small blood vessels) may be affected, leading, for example, to the walls of the blood vessels to stiffen or become thicker. Studies have not yet been able to show if microvascular function is affected in obese children. Despite the well-established health-related benefits of aerobic training in obese people, it is not clear yet what type and intensity of exercise works best for obese children. There is growing evidence to suggest that high-intensity interval training (HIIT) can be an effective alternative to the more traditional moderate continuous training (MCT). At present there is no information on whether HIIT might have a greater beneficial effect than MCT on the vascular function in obese people. The aims of the present study were to compare the microvascular function of obese and normal-weight adolescents and to determine the effects of three months of HIIT and MCT on microvascular function, body composition (percentage of fat, bone, muscle and water in the body), and aerobic fitness in obese adolescents.

### Who can participate?

Obese adolescents aged 12-16 years and healthy normal weight adolescents aged 12-16 years.

### What does the study involve?

First of all, all participants undergo a blood flow test. All obese adolescents have further tests including height, weight, body composition, fitness, microvascular function and metabolic profile (for example blood sugar levels and liver and kidney function via blood tests). The obese participants are then randomly allocated to one of two groups. Those in group 1 undergo a 3 month weight loss programme including diet and HIIT. Those in group 2 undergo a similar programme but with MCT. All obese participants undergo the same tests that they had at the start of the study after 3 months to assess its effects.

What are the possible benefits and risks of participating?

One potential benefit for obese adolescents taking part is that they have access to a supervised and well-controlled exercise training sessions that may help them to improve their level of fitness. A potential risk could be that severely obese adolescents may not be able to exercise.. All adolescents will have a complete medical check-up before starting the programme. Participants may be reluctant to have their blood taken for analysis but they can choose not to have one if they wish.

Where is the study run from?

Saint-Pierre University Hospital, Pediatric Institute (France)

When is the study starting and how long is it expected to run for?

January 2013 to June 2014

Who is funding the study?

Saint-Pierre University Hospital, Pediatric Institute (France)

Who is the main contact?

Professor Agnes Vinet

## Contact information

### Type(s)

Scientific

### Contact name

Prof Agnes Vinet

### Contact details

LaPEC, Faculty of Science 301 Rue Baruch de Spinoza - BP21239

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## Additional identifiers

### Protocol serial number

N/A

## Study information

### Scientific Title

Microvascular adaptations after moderate continuous and high-intensity interval-training in adolescents with severe obesity

### Study objectives

We hypothesized that high-intensity interval-training induced better improvements in microcirculation function moderate continuous, i.e higher changes in peak cutaneous blood flow.

The aims of the study are:

1. To compare the microvascular phenotype of obese adolescents and normal-weight adolescents
2. To determine the effects of three months of high-intensity interval-training and moderate continuous training on microvascular function, body composition, metabolic markers and aerobic fitness in obese adolescents

### **Ethics approval required**

Old ethics approval format

### **Ethics approval(s)**

Local Ethics Committee (SSR Institut-Saint-Pierre, Palavas-Les-Flots, France), 06/01/2013

### **Study design**

Interventional non-randomised

### **Primary study design**

Interventional

### **Study type(s)**

Treatment

### **Health condition(s) or problem(s) studied**

Obesity

### **Interventions**

At the start of the study, the cutaneous microvascular function of all participants are assessed. Obese adolescents also undergo body composition, metabolic profile and aerobic fitness assessments. They then undergo a 3-months weight loss program consisting of diet and exercise training managed by a single-pediatric weight center. They are randomly allocated into one of 2 groups of exercise training: either high-intensity interval training (HIIT) or moderate continuous training (MCT). They all receive an identical moderately hypocaloric diet with a daily energy deficit of 500 kcal. Only the exercise training program differ in both groups. Exercise training program consists of 3 supervised sessions per week during 3 months. MCT consists of 40 to 60 min at 60-70% of maximal heart rate and HIIT program consists of (4 to 6) x (2 min to 2 min 30s) periods at 90-95% of HRmax interspersed by 1 min 30s period at 55% of HRmax. They undergo the same assessments at the start of the study at the end of the three month intervention period.

### **Intervention Type**

Other

### **Primary outcome(s)**

Cutaneous blood flux (CBF) was determined by means of laser Doppler flowmetry (Periflux PF 5000, Perimed, Stockholm, Sweden) equipped with a thermostatic LDF probe (PF 481, Perimed, Stockholm, Sweden), on the volar surface of the right forearm. Assessed at baseline in obese adolescents and controls, and after 3 months of intervention only in obese adolescents.

### **Key secondary outcome(s)**

1. Body composition, assessed only in obese adolescents at inclusion and after 3 months of intervention
2. Aerobic fitness (including the 20-meter shuttle run test), assessed only in obese adolescents at inclusion and after 3 months of intervention
3. Weight and height measurements were performed and body mass index (BMI) was calculated as weight in kilograms divided by height in squared meters ( $\text{kg}\cdot\text{m}^{-2}$ ), at baseline and after 3 months of intervention
4. Body fat mass, abdominal and gluteal fat masses and lean body mass, assessed in only obese adolescents using dual-energy X-ray absorptiometry (DEXA), (QDR 2000 – Discovery, Hologic, Bedford, MA), at baseline and after 3 months of intervention
4. Plasma glucose, plasma insulin and lipid profile were assessed only in obese adolescents using fasting blood samples, at baseline and after 3 months of intervention

**Completion date**

30/06/2014

## Eligibility

**Key inclusion criteria**

1. Obese adolescents, male or female, aged 12-16 years, non-smokers, not taking any medications and without known cardiovascular or metabolic disease
2. Healthy normal-weight pubertal stage-matched adolescents

**Participant type(s)**

Mixed

**Healthy volunteers allowed**

No

**Age group**

Child

**Lower age limit**

12 years

**Upper age limit**

16 years

**Sex**

All

**Key exclusion criteria**

1. Smokers
2. Adolescents who participated in extra-school sport activities more than 2h per week

**Date of first enrolment**

30/01/2013

**Date of final enrolment**

10/06/2014

## Locations

### Countries of recruitment

France

### Study participating centre

**Saint-Pierre University Hospital, Pediatric Institute (SSR pediatrique Institut-Saint-Pierre)**

71 Av de l'Eveche de Maguelone

Palavas-les-Flots

France

34250

## Sponsor information

### Organisation

Saint-Pierre University Hospital, Pediatric Institute (SSR Institut St Pierre)

### ROR

<https://ror.org/01q046q46>

## Funder(s)

### Funder type

Hospital/treatment centre

### Funder Name

Saint-Pierre University Hospital, Pediatric Institute (SSR Institut St Pierre)

## Results and Publications

### Individual participant data (IPD) sharing plan

### IPD sharing plan summary

Available on request