

# Finding the Optimal Resistance Training Exercise for type 2 diabetes

**Submission date**

14/01/2010

**Recruitment status**

No longer recruiting

☐ Prospectively registered

☐ Protocol

**Registration date**

21/06/2010

**Overall study status**

Completed

☐ Statistical analysis plan

☐ Results

**Last Edited**

21/06/2010

**Condition category**

Nutritional, Metabolic, Endocrine

☐ Individual participant data

☐ Record updated in last year

**Plain English summary of protocol**

Not provided at time of registration

## Contact information

**Type(s)**

Scientific

**Contact name**

Dr Paul Oh

**Contact details**

Toronto Rehabilitation Institute

347 Rumsey Rd

Toronto

Canada

M4G 1R7

## Additional identifiers

**Protocol serial number**

#19581

## Study information

**Scientific Title**

Finding the optimal volume and intensity of resistance training exercise for type 2 diabetes: a randomised controlled trial

**Acronym**

The FORTE Study

**Study objectives**

A higher intensity, hypertrophic resistance training protocol added to aerobic training would lead to more marked improvements to glycaemic control and cardiovascular risk factors compared to lower intensity endurance training.

**Ethics approval required**

Old ethics approval format

**Ethics approval(s)**

University of Toronto Research Ethics Board (REB) approved in February 2006 (ref: 19581)

**Study design**

Randomised controlled trial

**Primary study design**

Interventional

**Study type(s)**

Quality of life

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

Type 2 diabetes

**Interventions**

Six months of aerobic and resistance training:

1. Aerobic training and minimal resistance training (usual care)
2. Aerobic training and high intensity resistance training
3. Aerobic training and low intensity resistance training

The intervention for all groups was 6 months. Following completion of the program, patients will not be followed-up.

**Intervention Type**

Other

**Phase**

Not Applicable

**Primary outcome(s)**

Measured at baseline and 6 months:

1. HbA1c
2. Maximal aerobic power (VO2 max)

**Key secondary outcome(s)**

Measured at baseline and 6 months:

1. Fasting glucose
2. Insulin
3. Proinsulin
4. Blood lipid profile
5. Body composition (dual energy x-ray absorptiometry [DEXA])

6. Cytokines (interleukin-6 [IL-6], interleukin-1B [IL-1B], c-reactive protein [CRP])
7. Adipokines (tumour necrotising factor-alpha [TNF-alpha], adiponectin, leptin, leptin receptor)
8. Depressive mood (Center for Epidemiologic Studies Depression Scale [CESD])
9. Quality of life (Diabetes Quality of Life Clinical Trial Questionnaire [DQLQ])
10. Nutrition intake

**Completion date**

31/03/2009

## Eligibility

**Key inclusion criteria**

1. Adults aged greater than 18 years, either sex
2. Type 2 Diabetes
3. Participating in the Diabetes Exercise and Healthy Lifestyle Program of the Toronto Rehabilitation Institute

**Participant type(s)**

Patient

**Healthy volunteers allowed**

No

**Age group**

Adult

**Lower age limit**

18 years

**Sex**

All

**Key exclusion criteria**

1. History of diagnosed cardiovascular disease
2. Contraindications to high intensity exercise participation:
  - 2.1. Glaucoma
  - 2.2. Retinopathy
  - 2.3. Musculoskeletal limitations
  - 2.4. Kidney disease
  - 2.5. Balance impairments

**Date of first enrolment**

01/05/2006

**Date of final enrolment**

31/03/2009

## Locations

**Countries of recruitment**

Canada

**Study participating centre**  
**Toronto Rehabilitation Institute**  
Toronto  
Canada  
M4G 1R7

## Sponsor information

**Organisation**  
Toronto Rehabilitation Institute (Canada)

**ROR**  
<https://ror.org/00mxe0976>

## Funder(s)

**Funder type**  
Research organisation

**Funder Name**  
Toronto Rehabilitation Institute (Canada)

**Alternative Name(s)**  
Toronto Rehab, UHN Toronto Rehabilitation Institute, TRI

**Funding Body Type**  
Private sector organisation

**Funding Body Subtype**  
Other non-profit organizations

**Location**  
Canada

**Funder Name**  
Human Physiology Performance Laboratory (Canada)

**Funder Name**  
Canadian Diabetes Association (Canada)

## Results and Publications

Individual participant data (IPD) sharing plan

**IPD sharing plan summary**  
Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes