

Adapting physical activity and exercise to comorbid conditions

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Exercise therapy

- ▶ Effective in a wide range of diseases

Effectiveness of exercise therapy: A best-evidence summary of systematic reviews

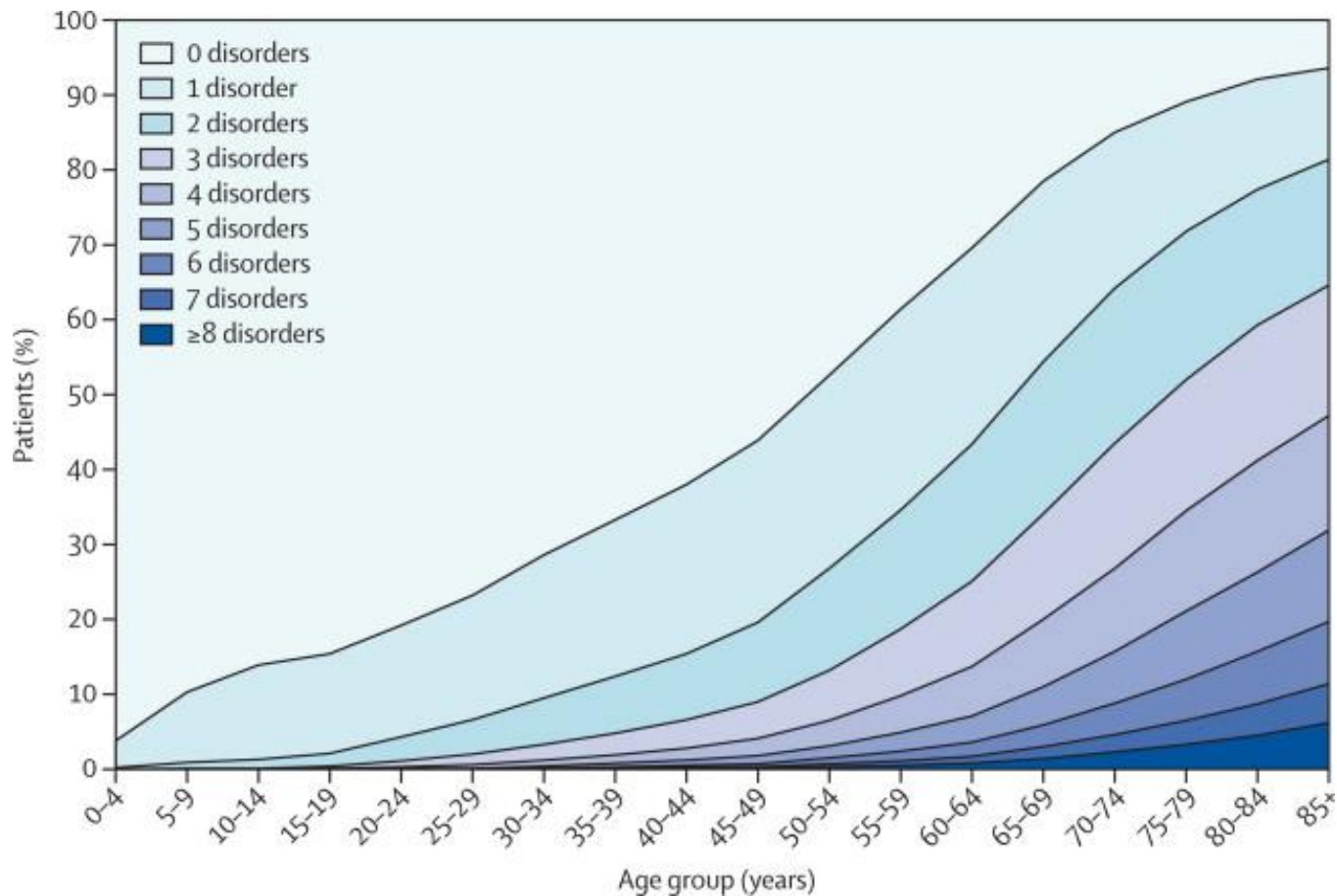
Nynke Smidt, Henrica CW de Vet, Lex M Bouter and Joost Dekker
for the Exercise Therapy Group^a

Therapeutic exercise in physiotherapy practice is beneficial: a summary of systematic reviews 2002–2005

Nicholas F Taylor, Karen J Dodd, Nora Shields and Andrea Bruder
La Trobe University, Australia

Australian Journal Physiotherapy, 2005, 2007





Number of chronic disorders by age-group

Comorbidity and exercise therapy

- ▶ Patients with comorbidity excluded from trials
 - Comorbid diabetes: patients excluded due to concerns related to hypoglycemia
- ▶ Comorbidity
 - Therapists reduce the intensity of exercise therapy to an ineffective level
- Patients exercise at a low level of intensity

Holden et al, Arthritis Rheum, 2009

Holden et al, Arthritis Care Res, 2012

Comorbidity and exercise therapy

- ▶ Current guidelines
 - Exercise therapy in the index disease
 - Osteoarthritis or diabetes as index disease
- ▶ No proper guidance on adaptations required because of the presence of comorbidity
 - Osteoarthritis and diabetes as comorbid disease

Strategy

- ▶ Strategy for the development of comorbidity-related adaptations to exercise therapy in index disease

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PERSPECTIVE IN REHABILITATION

Exercise and comorbidity: the i3-S strategy for developing comorbidity-related adaptations to exercise therapy

Joost Dekker¹, Mariëtte de Rooij², and Marike van der Leeden^{1,2}

Overview of my presentation

- ▶ Strategy
- ▶ Application to exercise therapy in osteoarthritis and comorbid disease
- ▶ Randomized clinical trial
- ▶ Broadening the scope

Index disease

Step 1. Inventory of comorbid diseases

Step 2. Inventory of restrictions and contraindications

Step 3. Inventory of potential adaptations to exercise therapy

Step 4. Synthesis

- Starting point is regular exercise therapy for the index disease
- Adaptations to diagnostic phase, intervention phase, and evaluation phase
- Emphasis on clinical reasoning

Osteoarthritis

- ▶ High prevalence of comorbidity
 - Estimates range from 68% to 85%
 - Coronary artery disease, heart failure, hypertension
 - Diabetes, obesity
 - COPD
 - Depression
 - Chronic pain



Index disease

Knee osteoarthritis (OA)

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Osteoarthritis of the hip or knee: which coexisting disorders are disabling?

Kerstin G. Reeuwijk · Mariëtte de Rooij ·
Gabriella M. van Dijk · Cindy Veenhof ·
Martijn P. Steultjens · Joost Dekker

Index disease

Narrative Review

Restrictions and contraindications for exercise therapy in patients with hip and knee osteoarthritis and comorbidity

Mariëtte de Rooij¹, Martijn P. M. Steultjens², Ellis Avezaat³, Arja Häkkinen⁴, Rob Klaver¹, Marika van der Leeden¹, Tjieu Maas⁵, Leo D. Roorda¹, Hanneke van der Velde⁶, Willem F. Lems^{1,7}, Joost Dekker^{1,8}

Physical Therapy Reviews, 2013

Step 1. Inventory of comorbid diseases

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Step 3. Inventory of potential adaptations to exercise therapy

Step 4. Synthesis

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- Emphasis on clinical reasoning

Development of comorbidity-adapted exercise protocols for patients with knee osteoarthritis

This article was published in the following Dove Press journal:
Clinical Interventions in Aging
14 May 2014
Number of times this article has been viewed

Mariëtte de Rooij¹
Marika van der Leeden^{1,2}

Background: Exercise therapy is generally recommended for patients with osteoarthritis (OA) of the knee. Comorbidity, which is highly prevalent in OA, may interfere with exercise therapy.

Synthesis

- ▶ Regular exercise therapy in knee OA
 - Adaptations to
 - Diagnostic phase
 - Intervention phase
 - Evaluation phase
- ▶ Source of adaptations
 - Guidelines on regular exercise therapy in each comorbid disease (e.g. COPD)
 - General guidelines on exercise (e.g. American College of Sports Medicine)
 - General medical guidelines
 - Expert opinion
- ▶ Emphasis on clinical reasoning

Clinical reasoning

- ▶ Anamnestic interview
 - *e.g.* Neuropathy, cardiac problems ? Contraindication for physical examination ? Need to consult physician?
- ▶ Physical examination
 - *e.g.* Blood pressure ? Lesions of the foot ?
- ▶ Treatment plan
 - *e.g.* Risk of hypoglycemia, loss of protective sensation in feet
- ▶ Monitoring treatment
 - *e.g.* Monitoring blood glucose level, feet inspection

RCT

- ▶ P: Patients with knee OA and comorbidity (cardiac disease, diabetes, COPD, obesity)
- ▶ I: Comorbidity-adapted exercise protocol
- ▶ C: In comparison to control group (usual care, waiting list)
- ▶ O: Efficacy and safety

Method

- ▶ Primary outcome
 - WOMAC Physical Functioning
 - 6 Minute Walk Test

- ▶ Secondary outcomes
 - Adverse events
 - Pain
 -

- ▶ Measurements

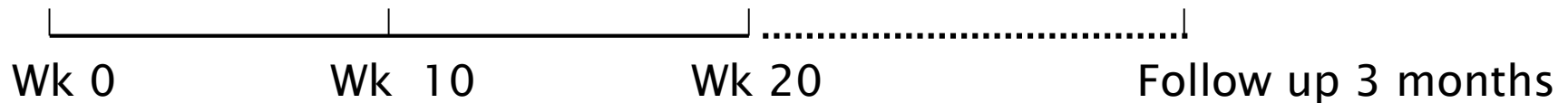


Table 1. Patient characteristics

	Exp. group n=63		Con. group n=63	
	Mean $\pm$ sd	N (%)	Mean $\pm$ sd	N (%)
Age (years)	63.2 $\pm$ 8.4		63.9 $\pm$ 12.4	
BMI	36.0 $\pm$ 6.8		35.0 $\pm$ 7.6	
Total number of comorbidities (CIRS score ≥ 2) range 0-12				
1		31 (49.2)		24 (38.1)
2		17 (27.6)		21 (33.3)
≥ 3		15 (23.8)		18 (28.9)
Comorbidities of inclusion				
Cardiac diseases		24 (38)		21 (33)
Diabetes type 2		10 (15)		9 (14)
COPD		20 (31)		19 (30)
Obesity		41 (65)		36 (57)
Six minute walking test (meters)	406.3 $\pm$ 107.6		406.4 $\pm$ 116.9	
WOMAC physical functioning (0-68)	35.1 $\pm$ 11.9		31.0 $\pm$ 12.3	
NRS knee pain severity (0-10)	6.4 $\pm$ 1.8		5.9 $\pm$ 2.1	

Primary outcome

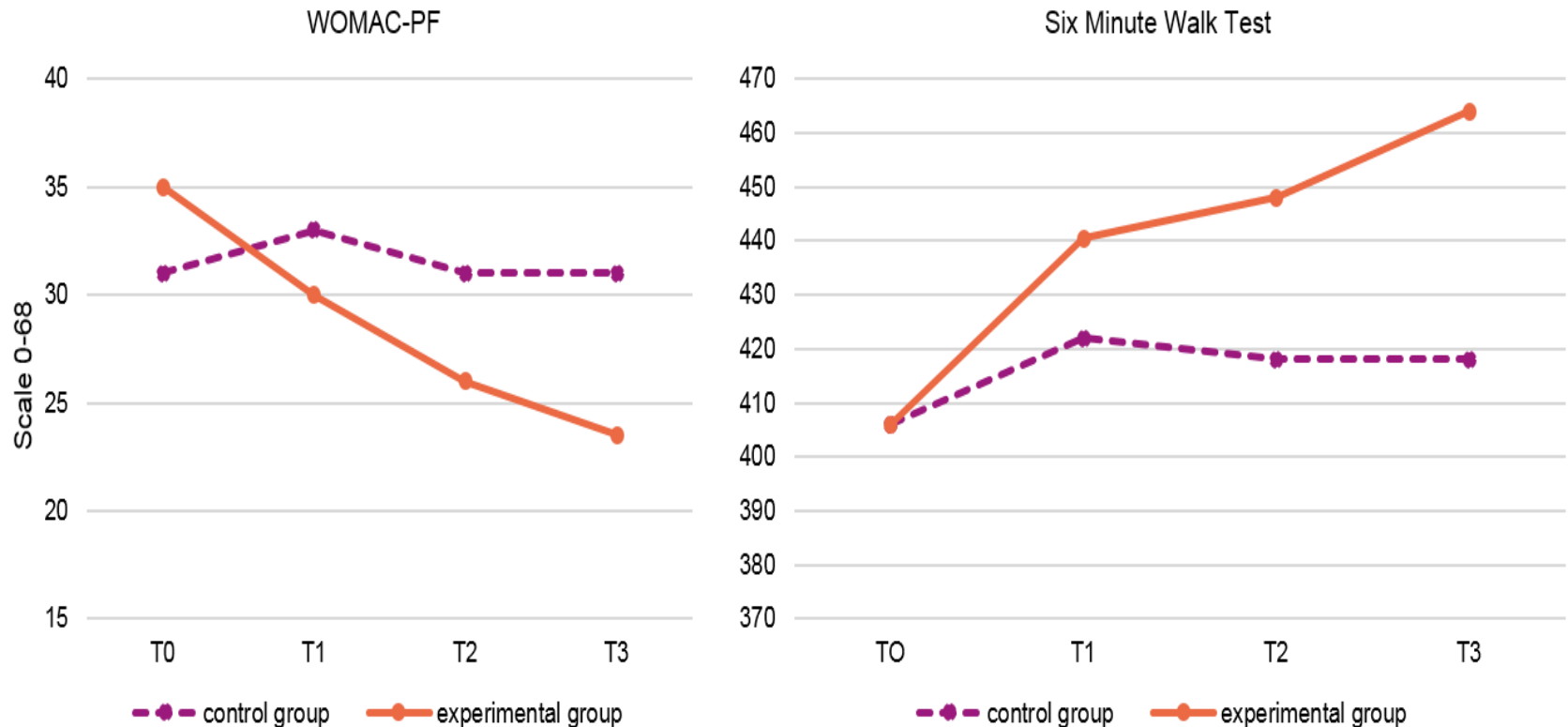


Figure 2. WOMAC physical functioning (PF) and Six Minute Walk Test outcome at week 10 (T1 mid- treatment), week 20 (T2 directly post-treatment), and week 32 (T3 3 months post-treatment)

Secondary outcomes

- ▶ No adverse events
- ▶ Beneficial effects
 - Pain
 - Get Up and Go test
 - Stairclimbing test, up and down
 - Physical Component Summary score of SF36
 - Fatigue
 - Upper leg muscle strength
 - Physical activity
 - Frailty index
 - Patient Specific Symptoms

Table 2. Comorbidity -related adaptations to the exercise program

General comorbidity-related adaptations	100%
• extended intake procedure: identification of comorbidity related contraindication and restrictions for exercise therapy by history taken and physical examination • extended training program of 20 weeks • during and after every training session therapists monitored symptoms and clinical parameters related to comorbidity and adapted the exercise program when required	
Exercise program: adaptations of FITT factors	76%
• frequency (number of repetition per exercise set)	15%
• intensity of exercises (exercise load)	76%
• time (duration of exercise session)	17%
• type of exercises	52%

FITT factors: Frequency, Intensity, Time, Type

Table 2. Comorbidity -related adaptations to the exercise program – *cont'd*

Additions to exercise program	96%
• coaching on body weight reduction	76%
• coaching on fear of exertion	20%
• education related to the comorbid disease and exercise	69%
Other adaptations	
• consulting a medical specialist or GP about the comorbid disease (e.g. medication or high blood pressure or trainability of the patient)	24%
• monitoring blood glucose levels before and after the training and in the evening in patients with diabetes	7.4%
• postponement of the training session (e.g. high blood pressure, pain on the chest, dyspnea)	17%
• referred to a dietician	13%

Conclusion of RCT

- ▶ Tailored exercise therapy for patients with knee OA and comorbidity
 - Effective in improving physical functioning and pain
 - Safe
- ▶ Clinicians
 - Consider exercise therapy as a treatment option in knee OA, also in the presence of comorbidity



Broadening the scope

▶ Systematic review

- Strategies for the development of comorbidity-related adaptations to exercise therapy in an index disease

Dekker et al, Disability and Rehabilitation, 2016

▶ Three studies

- COPD + comorbid diseases
- HIV + comorbid diseases
- OA + comorbid diseases

Camp et al, Can Resp J, 2013

O'Brien et al, BMJ Open, 2014

de Rooij et al, Clin Interv Aging, 2014

Broadening the scope

- ▶ Very similar approaches
 - Inventory of comorbidities
 - Inventory of comorbidity-related restrictions and contraindications for exercise (de Rooij et al only)
 - Inventory of potential adaptations
 - Derived from guidelines on specific comorbidities
 - Synthesis
 - Expert knowledge and advise
 - Various approaches to elicit this advise

Conclusion

- ▶ Strategy for the development of comorbidity-related adaptations to physical activity and exercise therapy in index disease



- ▶ In line with approach of two other groups
- ▶ Resulting in effective and safe exercise for patients with knee OA and comorbidity

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- ▶ Joost Dekker

