Summary
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The introduction, the background and aims of this thesis have been described in chapter 1. As in other countries, the population of the Netherlands is ageing. Ageing is characterised by a reduction in physical reserve, the physiological capacity in excess of that needed for daily activities, that provides a margin of safety that absorbs age- or disease-related changes without a loss in function. When physical capacity falls below the ability required for the performance of daily tasks, functional limitations and a loss of independence may occur. Approximately 20% of people between 65 and 75 years of age report problems with activities of daily living (ADLs), a proportion which increases to 48% in people older than 85. The loss of independence results in a decreased quality of life and is the most distressing aspect of ageing for many older adults. Limitations in physical function of a growing segment of the population herald an increased expenditure for health care and long-term care systems.

Exercise studies and exercise promotion for older adults offer the potential for improving the performance of daily activities and quality of life. However, the results of current exercise programmes are limited and inconsistent. The performance of functional tasks is complex and involves an interplay of cognitive, perceptual and motor functions, and is closely linked to the individual’s dynamic environment. None of the studied reported in the literature investigated the effect of functional tasks exercises on the performance of daily activities and the quality of life of older adults. Further, there is a need for comparative studies, to determine which type of exercise is most effective in terms of performance of daily activities. Also, the mechanisms that underlie successful initiation and adherence to exercise programmes are not well understood.

The aim of the studies described in this thesis was to study the difference in effect between functional tasks exercises and resistance strength exercises on the physical functional performance and health-related quality of life of older community-dwelling women.

In Chapter 2, the feasibility of a newly developed functional tasks exercise programme was studied compared with a resistance strength exercise programme. Feasibility was determined by information on participants’ satisfaction, drop-out, and
attendance, as well as occurrence of adverse events. Twenty-four community-dwelling, medically stable women (mean age 74.6 ±4.8) were randomly assigned to 12 weeks of functional tasks exercises (function group) or resistance exercises (resistance group). Three participants (two in the function group) withdrew from the study. Exercise adherence was 81% in the function group and 90% in the resistance group. Participants reported a greater satisfaction with the resistance exercises than with the functional exercises. Both exercise programmes appeared feasible and well tolerated by women over the age of 70 years and living in the community.

Chapter 3 addresses the reliability and validity of the newly designed assessment of daily activity performance (ADAP) test. The ADAP test was based on the Continuous-scale Physical Functional Performance (CS-PFP) test and provides a quantitative assessment of older adults’ physical functional performance. The ADAP includes 16 common tasks, such as transferring laundry and boarding a bus, performed at maximal effort. Construct validity was assessed by comparing the baseline ADAP scores of 24 community-living older women with self-perceived SF-36 Health Survey physical function, muscle function tests, and the Timed Up and Go (TUG) test. Intra-examiner reliability was determined by comparing test and retest scores of 19 community-dwelling, medically stable women aged 70 or older by an experienced and an inexperienced tester. The experienced tester had good consistency and reliability scores, whereas the inexperienced tester had lower reliability scores, with a systematic difference between test and retest scores for the ADAP domain lower body strength. ADAP total scores correlated highly with the TUG test (r = -.91), isometric knee extensor strength (r = .80) and SF-36 Physical Functioning scale (r = .67). The ADAP test proved to be reliable and valid for measuring the performance of daily activities by community-dwelling older women. However, testers should be trained in its use to improve reliability.

In Chapter 4 the central research question of this study: “To determine whether a functional tasks exercise programme and a resistance exercise programme have different effects on the ability of community-living older people to perform daily tasks.” was addressed. Ninety-eight healthy women aged 70 and older were randomly assigned to either the function group (n = 33), the resistance group (n = 34) or a control group (n = 31). Participants attended exercise classes three times a week for
12 weeks. Functional task performance (ADAP test), isometric knee extensor strength (IKES), handgrip strength, isometric elbow flexor strength (IEFS) and leg extension power were measured at baseline, at the end of training (at 3 months) and 6 months after the end of training (at 9 months). The ADAP total score increased more in the function group than in the resistance group or the control group. The ADAP total score of the resistance group did not change compared with the control group. In contrast, IKES and IEFS increased significantly in the resistance group compared with the function group and the control group. Six months after the end of training, the increase in ADAP scores were sustained in the function group, whereas the strength gains of the resistance group had disappeared. Functional tasks exercises are more effective in improving physical functional performance than common resistance strength exercises and the effects are preserved for longer than the gain in muscle strength achieved with resistance exercises.

Chapter 5 presents the effects of functional tasks exercises and resistance strength exercises on the health-related quality of life (HRQOL) and free-time physical activity of the 98 community-living older women of chapter 4. The SF-36 Health Survey questionnaire and self-reported physical activity were assessed at baseline, directly after completion of the intervention (3 months), and 6 months later (9 months). At 3 months, no exercise effect on the HRQOL and physical activity scores was seen found, except for an increase in SF-36 physical functioning score in the resistance group compared with that in the control group and the function group. The participants of both exercise groups had lower SF-36 physical functioning scores, some even lower than at baseline, 6 months after completion of the exercise programmes. Exercise has a limited effect on the HRQOL of community-living older women. The HRQOL outcomes are probably affected by ceiling effect and response shift. After completion of the exercise programmes, neither group had changed their habitual physical activity. Physical activity 6 months after completion of the exercise programme was diminished in the resistance group but sustained in the function group. Functional tasks exercises may positively influence habitual physical activity more than resistance training does.
Chapter 6 investigated the differences in participants’ satisfaction with functional tasks exercises and resistance strength exercises, and the influence of participants’ satisfaction and health status on exercise compliance and the effectiveness of the two programmes are discussed. Data for 67 participants from both the function group and the resistance group were used. An 17-item questionnaire on the satisfaction with the exercise programmes was developed and evaluated. A factor analysis identified four subscales: 1) general satisfaction with the programme, 2) intensity of core exercises of the programme, 3) intensity of the warm-up and cool-down periods, 4) exercise location. Satisfaction with the programmes (function group 84.8 ±6.3; resistance group 87.6 ±6.9) and compliance (function group 90 ±9.1%; resistance group 90 ±8.1%) was high in both groups. In the function group, satisfaction with the programme was positively associated with an increase of physical activity after completion of the exercise programme. A low initial health status was associated with sustained physical activity after completion of the exercise programme and improved performance-based physical functioning in the resistance exercise programme. Both exercise programmes were well accepted and appreciated. Functional tasks exercises may positively influence daily habits more than resistance training, which means that older individuals may continue exercising and thus maintain the effects of exercise.

Chapter 7 is a retrospective view on the findings of this study, and discusses methodological issues and implications for clinical practice and future research. We recommend that task-specific functional exercises are incorporated in exercise interventions to enhance the physical performance and independence of older adults. Functional tasks exercises are more effective in improving physical functional performance than resistance strength exercises and the effects are preserved for longer than the gain in strength achieved with resistance exercises. More research is needed to confirm the potential of functional tasks exercise to positively change free-time physical activity. Other considerations for future research are studies to provide insight into the effect of task-specific exercises on the physical functional performance of older men and frail older persons.