English summary

Background: Overweight and obesity have grown into a worldwide societal burden. Consequently, the stress on the health care systems is escalating, leading to increased expenses. The WHO has urged all member states to stop the rising obesity before 2025. Overweight and obesity has several negative consequences for children. Childhood obesity increased the risk of reduced well-being and later morbidity and mortality. Furthermore, being overweight as a child has shown to increase the risk of overweight in young adulthood.

Only few well-designed randomized controlled trials have been conducted on treating overweight in childhood and adolescence. The most promising have suggested including a combination of diet, physical activity, parent involvement and behavioural components, thus, applying a multi-component approach. Fulfilling many of these components, intensive weight-loss camps have been showing promising results. However, previous evaluations primarily have applied non-randomised designs with short-term follow up.

Aim: The Municipality of Odense have been running a camp-based weight-loss concept for overweight children since 2005. This was translated into a day-camp concept in 2011; the Odense Overweight Intervention Study (OOIS). The aim of the present thesis is to report the effectiveness of the day-camp weight-loss programme with a sub-sequent family-based intervention compared to a minimum intensive intervention. Through the presentation of four studies, the specific objectives of the thesis are to:

1. Describe the study design, the design of the intervention components, data collection methods, and outcome measures of the OOIS.
2. Determine the development of weight loss, body composition, and metabolic health-related effects of the OOIS.
3. Determine the development of motor performance effect of the OOIS.
4. Determine the cost-effectiveness of the OOIS.

Materials and methods: The thesis is based on experimental data from the two compared intervention arms. The day-camp intervention (DCIA) was composed by six weeks of intensive day-camp with 3 hours of motivation-enhancing daily physical activity, a healthy diet, and a behavioural approach to healthy habits. Subsequently, a family-based intervention lasting 46 weeks

was initiated. The day-camp intervention was compared to an intervention composed by a weekly activity session for six weeks (SIA). Children (appr. 12yr) were offered participation if assessed overweight in a mandatory health examination in schools. One-hundred fifteen children were allocated into the DCIA (N=59) or the SIA (N=56). The children participated in three comprehensive measurements; baseline, six week follow up, and 52 week follow up. Moreover, parents answered questionnaires about ethnicity, health, income, and education. The most relevant outcomes in the present thesis were BMI, BMI z-score, clustered cardiovascular risk z-score, body composition, overweight status, physical fitness, motor skills, costs, and cost-effectiveness.

Results: Overall lost to follow up was 25% over one year. There was found an improvement in BMI and BMI z-score after both six and after 52 weeks in favour of the DCIA. Improvements of CCR z-score in the DCIA were present after six weeks, but only borderline significant after 52 weeks. A similar pattern was observed in body composition. No difference in development of motor skills was observed at either follow up. However, physical fitness improved at both follow ups. The cost-effectiveness analyses showed that the DCIA would cost DDK 24,928 more than the SIA per BMI decrease.

Discussion and conclusions: The study design, intervention components, and measurements of the OOIS were presented in the study protocol and throughout parts of the thesis. Furthermore, the study outcomes were stated prior to data collection, thus, minimising publication- and reporting bias. The day-camp intervention was superior to the standard intervention with respect to weight loss over the entire year. However, the same was found only to be observed after the six week follow up with respect to clustered cardiovascular risk z-score and body composition. Thus, these effects seemed to diminish over time. Furthermore, children in the day-camp improved in physical fitness after one year, but no changes in motor skills were observed. Lastly, the day-camp intervention was cost-ineffective when compared to the standard intervention. The day-camp shows a large potential for aiding children with overweight and obesity. However, we also suggest that alterations for improving the sustainability and costs of the concept are considered.