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Faculteit Revalidatiewetenschappen

master in de revalidatiewetenschappen en de kinesitherapie

Masterthesis

Innovation in rehabilitation: effectiveness of a compact client-centered modular rehabilitation program for persons with spinal cord injury - the effect on quality of life and well-being

Louise Vanhunsel
Céline Visterin

Scriptie ingediend tot het behalen van de graad van master in de revalidatiewetenschappen en de kinesitherapie, afstudeerrichting revalidatiewetenschappen en kinesitherapie bij musculoskeletale aandoeningen

PROMOTOR :

Prof. dr. Annemie SPOOREN

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2022

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Innovation in rehabilitation: effectiveness of a compact client-oriented modular rehabilitation program for persons with spinal cord injury

The effect on quality of life and well-being

The CoMoSS program seems to have limited significant differences in terms of quality of life and well-being compared to the control group.

The intervention and control group are approximately on the same line in terms of increasing scores, regardless of the fact that the intervention group had a shorter stay at the rehabilitation center.

Further research that takes into account the limitations of this study is needed.

Vanhunsel Louise (1746988)
Visterin Céline (1746641)

Promoter: Prof. Dr. Spooren Annemie

Acknowledgement

This master's thesis is the highlight of our master degree in Physiotherapy and Rehabilitation Sciences at the University of Hasselt. Last year we did a literature study to acquire information about telerehabilitation and technological devices in patients with spinal cord injury. This was executed to complete the writing of the second part of our master's thesis. We would like to thank our promoter, Prof. Dr. Spooren Annemie, for her scientific support and feedback which enabled us to complete our master's thesis. We would like to show our gratitude to all the persons who have collaborated on this master's thesis. We also would like to thank fellow students, collegeagus, friends and family for the support during writing this thesis.

V.L.

V.C.

Oudestraat 11 Bree Belgium, 06/06/2022

Vostertstraat 99 Bree Belgium, 06/06/2022

Master thesis context

This research is framed within the domain of neurological rehabilitation, specifically in patients with Spinal Cord Injury (SCI). The effect of a Condensed client-centered Modular Spinal cord rehabilitation Service (CoMoSS) compared with the Conventional Spinal cord injury Rehab Service (CSRS) in patients with SCI will be investigated in this research.

Rehabilitation is very important for patients with SCI, because they live with a lot of impairments and difficulties. Rehabilitation can play an important role in recovery, learning compensation movements and retaining independence. It can also be important for Quality of Life (QOL) and well-being, which will be researched in this study. Home-based rehabilitation can be used to maintain skills, to ease the accessibility of the physiotherapist and it can be comfortable for the patients since they can stay in their familiar environment.

This investigation was situated in a research project. This research has been led by Prof. Dr. Annemie Spooren from University of Hasselt (Belgium). She was also in charge of leading the continuation of the research as promoter. The measurements of this research had already been performed, based on an existing protocol. The processing of the results was done by two master students of Physiotherapy and Rehabilitation Sciences of the University of Hasselt. The students worked most of the time independently, with approval of the promoter. In case of uncertainties, a discussion between the two students took place. The writing of the manuscript was performed through a cooperation between the students by video-calls and meetings in real life.

This topic can be relevant for physiotherapists who are already active in the clinical setting, but also for future physiotherapists.

Abstract

***Background*:** Spinal cord injury (SCI) is associated with long-term impairments and functional limitations. Rehabilitation is very important for those patients.

***Objectives*:** The purpose of this study was determining the difference between Condensed client-centered Modular Spinal cord rehabilitation Service (CoMoSS) and Conventional Spinal cord injury Rehab Service (CSRS) on quality of life (QOL) and well-being in SCI patients. The CoMoSS program consisted of a basic rehab program, an earlier discharge to a (near)home situation and an individual modular rehab program.

Design: Controlled study with a historical control group.

Participants: 52 participants were recruited from Adelante Rehabilitation Center (intervention group (IG)); 40 patients came from eight rehabilitation centers (control group (CG)). Inclusion criteria were: SCI (all subgroups); age ≥ 18 years. Exclusion criteria was: oncology-based SCI with life-expectancy < 12 months.

***Measurements*:** Primary outcome measures were QOL and well-being. This was measured by the Short-Form-Health-Survey (SF-36) and a well-being questionnaire.

Results: 22 men and 12 women completed the CoMoSS program, 36 men and eight women completed the control program. Within CG, one significant increase was found, namely on the energy/fatigue domain of the SF-36 (T1-T2) (p=0.0033). Within IG, six significant increases were found, namely on the domain of physical functioning (p=0.0004), social functioning (p=0.0007) and pain (p=0.0003) (T1-T2), on the domain of change in health (p=0.0001) and role limitations due to physical health (p=0.0173) of the SF-36 (T3-T4) and on the second question of the well-being questionnaire (T3-T4) (p=0.0044). There was only one significant between-group difference, namely on the emotional well-being domain of the SF-36 in favor of IG (p=0.0281).

Conclusion: The CoMoSS program seems to have limited significant differences in terms of QOL and well-being. IG and CG are approximately on the same line in terms of increasing scores, regardless of the fact that IG had a shorter stay at the rehabilitation center. Further research taking into account the limitations of this study is needed.

Keywords: SCI, CoMoSS program, QOL, well-being, SF-36

Introduction

Spinal cord injury (SCI) is a common neurological disease that results in long term impairments and functional limitations. Depending on the height and extent of the lesion, it can affect lower and upper limbs. SCI due to a traumatic blow causing fractures, dislocations, compressions or crushes to vertebrae, is a traumatic SCI. In a non-traumatic SCI may the cause be arthritis, cancer, inflammation or infections of the spine or disk degeneration. The most common SCI causes are traffic crashes, falls, acts of violence and diseases (www.who.int) (Weerdt W.,2017). The prevalence of patients with spinal cord injury is estimated at 12,000 to 15,000 (Osthertun, Post, van Asbeck, van Leeuwen, Koppenhagen, 2014) and is increasing worldwide due to the aging population. Complete SCI's result in all sensory and motor function loss below the level of injury. Partial sensory and/or motor function below the level of injury, including the lowest sacral segments, are the characteristics of an incomplete SCI. Most common symptoms are changes in strength, mobility, sensation below the level of injury and pain. Pain is an important cause of restricted participation, recreation, social activities and communication. (Jensen, Hoffman, Cardenas, 2015). SCI may be accompanied with secondary problems: urinary tract infection, pressure sores, pulmonary complications and contractures. These primary and secondary limitations cause loss of independence and quality of life (Eckert, Martin, 2017) and affect the patient's psychological and social functioning.

Rehabilitation is the fundamental process of the recovery from SCI (Rodríguez-Mendoza, Santiago-Tovar, Guerrero-Godinez, García-Vences, 2020) and depends on the severity of the injury. There are three stages in recovery, the first stage starts immediately after the spinal cord injury and is called the acute phase. This includes the time spent at the hospital, where the doctors try to limit the damage and reduce the risk of any complications. The second stage, the subacute phase, includes prevention of secondary complications, addressing underlying impairments and maximizing function. And the last stage is a long term stage, which focuses on participation, work and maintaining independence (Lu, Battistuzzo, Zoghi, Galea, 2015) (Mehrholz, Kugler, Pohl, 2012) (Kandola, 2020). SCI patients are often admitted to rehabilitation centers after their hospital stay where they receive a comprehensive and individual rehab program. One of the goals of physical therapy is to facilitate the process of regeneration and neuroplasticity, which may lead to better functional outcomes. Physical

therapy is also needed to reduce symptoms such as pain, spasticity, imbalance and to improve motor skills and compensation movements. Other intentions can serve to teach skills for daily activities. Exercise programs can lead to significant increases in vitality and reductions in perceptions of fatigue. Exercise therapy indirectly has a positive effect on the physical and psychological QOL (Nightingale, Rouse, Walhin, Thompson and Bilzon, 2018). SCI-patients stay in the hospital/rehabilitation unit for an average of 113.5 days. Patients with osteoporosis, urinary tract infection, respiratory infection, neuropathic pain, spasticity, complete SCI, no partner or age 15-29 years, have a significantly longer length of stay in the hospital (Zhang et al., 2020). Complication patterns are often different in traumatic or non-traumatic SCI. Specific prevention and optimal treatment can shorten and optimize the length of primary rehab (Gedde, Lilleberg, Aßmus, Gilhus, Rekand, 2019). Given the chronic character of SCI, they experience changing needs during their rehab period, which is not always dealt with in current programs (Scelza et al., 2007, p. S71-5.; Kennedy et al., 2001, p. 15-20; Ho et al., 2007, p. S49-54). Therefore a personal rehab program that can be regularly adapted would be a solution. High medical costs and difficulties in preparing patients returning to their ordinary life are associated with long rehab periods (Rezaei, Sharifi, Vaccaro, Rahimi-Méovaghar, 2019).

When looking at the SCI patients' point of view, they often report that they don't use skills and activities they have been trained for during rehab in their daily activities. They would have liked to train different skills in order to cope with some (daily) problems they have experienced while living at home (Cott C.A., 2004, p. 1411-22). In this manuscript the effect on quality of life and well-being of the patient of a Condensed client-centered Modular Spinal cord rehabilitation Service (CoMoSS) compared with the Conventional Spinal cord injury Rehab Service (CSRS) will be investigated. CoMoSS consists of 3 phases: 1) a basic rehab program; 2) an earlier discharge to a (near)home situation and 3) a modular rehab program to train on individual needs based on their personal experiences at home. This program will be compared to a usual care program, that consists of stabilization exercises, mobilizations, functional training and a social reintegration phase. It is expected that the CoMoSS approach, focussing on individual needs, will result in an increased patient's well-being and quality of life.

Methods

Research question

This research investigated if there were significant different outcomes between the intervention group and control group on quality of life and patient's well-being.

Participants

Participants of the experimental group were recruited from Adelante Rehabilitation Center, specially from the spinal cord unit. Patients of the control group were recruited from eight different rehabilitation centers which had a SCI unit and participated in the SCI Umbrella Project. These patients received standard care earlier and were used as a historical control group. The inclusion criteria of this study are; SCI of all SCI subgroups, i.e. paraplegic and tetraplegic, complete or incomplete and traumatic or non-traumatic SCI. Patients aged 18 years and older can be included in this study. The exclusion criteria of this study were an oncology-based SCI with a life expectancy less than 12 months.

Study design

The CoMoSS program was compared to the Conventional SCI Rehab Service (CSRS) following the design of a controlled study with a historical control group adjacent to the SCI Umbrella project of ZONMW. This design was the most optimal solution for this study. The first reason was because it was not feasible to provide both services in the same rehabilitation center. This would lead to loss of contrast between the two programs. The second reason was because the different rehabilitation centers, which participated in the SCI Umbrella project, had agreed to provide similar services. Because of these reasons, data of the different rehabilitation centers were considered to be valid and reliable as control group data.

Intervention

Patients that were admitted to the Adelante Rehabilitation Center received a letter with information about the CoMoSS program from their physical therapist. The intervention program was conducted by 52 selected persons out of all possible patients. The control group consisted 40 selected patients, recruited from eight other rehabilitation centers.

As mentioned earlier, CoMoSS consisted of three phases: 1) a basic rehabilitation program; 2) an earlier discharge to a (near) home situation and 3) a modular rehabilitation program to train on patient's individual needs based on their experiences at home. This instead of receiving a comprehensive package of care according to lesion level and lesion completeness.

During the basic rehabilitation phase, a condensed and basic rehabilitation program has been provided aimed at a 'wheelchair mobilized' patient with stable autonomous functions. Basic functional training with the purpose of a rapid reintegration at home was offered. Skills were trained at a basic level and care or aids compensated for all other matters. Caregivers of different care disciplines had their own responsibilities during this phase. The physical therapist was dealing with the treatment at the level of functioning following ICF. Maintaining joint mobility, increasing muscle strength, establishing sitting balance and increasing physical fitness were the most important goals of the physical therapist. The occupational therapist gave advice on bed posture, mattress types, splints, wheelchair features and aids for optimizing daily functioning. Assessment and advice about wheelchair accessibility and friendliness of the patient's home environment was also given. Another important responsibility of the occupational therapist in cooperation with the social worker was to help the patient to apply for financial support. They helped the patient to start the process, but it wasn't necessary to complete it, because there was also the opportunity to rent equipment to be able to return home. The nurses also had important responsibilities during the first phase, such as grooming, medication intake, wound care, giving advice on bowel and bladder management and prevention of pressure sores and applying the learned skills in daily life situations. The social worker helped the patient to return home by dealing with the family and offering advice on financial and administrative matters and on practical issues, such as transport facilities and home care. Also, the social worker gave support on how to cope with the limitations the patient encounters in his daily living. Cognitive, emotional and behavioral problems were assessed by the psychologist. All these services were coordinated and supervised by the rehabilitation physician. The minimum length of stay in this phase was estimated at about three months for a person with paraplegia and about five to six months for a tetraplegic patient. Before moving on to phase two (returning to a (near) home situation), the basic rehabilitation program and some conditions had to be completed. For example, safety precautions had to be in place, a stable level of autonomous functioning had

to be reached, home care services had to be organized and possible family care had to be available and the necessary equipment to enable daily functioning had to be in place.

Thereafter, the patient was able to move to phase two: the early (near) home phase. In this phase, the patients were allowed to experience the problems they encountered in their real environment. Because of this, the patient was able to formulate their own additional experience-based rehabilitation goals. After two months of phase two, the patient was invited for a polyclinic consultation where the different disciplines were involved. During this consultation, the patient was asked if he/she was satisfied and wanted to stay at home during this phase and if he/she had specific rehabilitation goals and wanted to be admitted for the additional modular rehabilitation program of phase three.

Based on the experiences at home, the patient formulated his own rehabilitation goals. These goals were used to set up the third phase: the modular rehabilitation program. The individual goals were identified by the occupational therapist by using the Canadian Occupational Performance Measure. After this, the multidisciplinary team decided on the eligibility of the individual goals. Based on the goals and the decision of the multidisciplinair team, an individual modular rehabilitation program was composed. The rehabilitation program focused on the following domains: mobility, self-care, arm-hand function, regulation of the autonomous functions, leisure/work/daily activities, complications, home adaptations and services and psychosocial well-being. The length of the third phase was individual for each patient. The length depended on the rehabilitation goals chosen by the patient and on which of the different domains it was situated.

Control group

The conventional SCI Rehab Service (CSRS) consisted of a time-continuous program with a mean length of stay within all the possible patients of 272 days. The program targeted a comprehensive set of standard rehabilitation goals, taking into account the extent of the SCI. The program generally involved four phases. First of all, the program started with a stabilization phase, focused on stabilization of the spine, management of the autonomous functions, prevention of complications and psychosocial counseling. Secondly, a primary

mobilization phase took place, focused on increasing spinal loading, verticalization, training of mobility and muscle strengthening. Thereafter, a functional training phase based on lesion level and completeness was started, with the purpose to regain as much independence as possible in ADL, at self-care, dressing, mobility and physical and psychological endurance. At the end of the program, a social reintegration phase took place. This phase addresses reintegration, adaptations in the home environment, a possible re-entry in professional career, specialized transport facilities and additional (non)medical care. The data of the control group were recruited from a historical group of patients who underwent the CSRS.

Measure moments

There were five measure moments for the intervention group (IG): at intake (IG T1), at discharge (IG T2), eight weeks after discharge (IG T3), six months after discharge (IG T4) and one year after discharge (IG T5). In the control group (CG), the measure moments took place on three different measure moments: at intake (CG T1), at discharge (CG T2) and between six and 12 months after discharge (CG T4). For the control group, there were also measurements conducted between CG T1 and CG T2, but these measurements were not included in the data-analysis. The measure moments that were taken were slightly different in both groups. Only T1 (start of rehabilitation) and T2 (at discharge) occurred at the same time in both groups. Of course, these measure moments were taken into account in the analysis. T4 did not completely match between both groups, because T4 occurred at six months after discharge in the intervention group and between six and 12 months in the control group. Measure moment T1 was included in the data-analysis because it gave an overview of quality of life and well-being in patients before the CoMoSS program was conducted. It also showed the baseline differences between the intervention group and the control group. T2 was included to compare both groups after their stay in the rehabilitation program. T4 was included in the analysis to have an idea of the long-term differences and was used as a follow-up measure moment.

Procedure

Primary outcome measures which were evaluated are quality of life and general well-being. WHO defines Quality of Life as an individual's perception of their position in life in the context

of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (www.who.in). This was measured by Generic health related quality of life: Short Form Health Survey (SF-36) and a well-being questionnaire.

The SF-36 is a generic questionnaire and consists of 36 questions of different domains: physical functioning (10 questions), role limitations due to physical problems (4 questions), role limitations due to emotional problems (3 questions), energy/fatigue (4 questions), emotional well-being (5 questions), social functioning (2 questions), pain (2 questions), general health perception (5 questions) and health change (1 question). An overview of the different domains can be found in table 1. The higher the score, the better the state of general health (van der Zee and Sanderman, 1992). The patient had to complete closed-ended questions about their view on their own health status (meetinstrumentenzorg.nl). In the intervention group, all domains were evaluated, in the control group only the domains energy/fatigue, emotional well-being and general health were questioned. The item scores were counted to scale scores and transformed to a hundred point scale (Ware and Sherbourne, 1992).

There is considerable evidence for the reliability and construct validity in terms of distinguishing between groups of the SF-36 in primary care (Cronbach's a > 0.85, reliability coefficient > 0.75 for all dimensions except social functioning). The response rate was very high (83%) and the rate of completion was over 95% for every domain (Brazier et al, 1992). The SF-36 has evidence for strong psychometrics to have a good interpretation of physical health (Gary, Cao, Burns, McDonald, Krause, 2020).

The well-being questionnaire that was used during this investigation consisted of two questions. Both of the questions referred to quality of life and well-being. The first question dealt with the life of the patient and their view on that and went as follows: “People can be more or less satisfied with their lives as a whole, also called their “quality of life”. What is your current assessment of your quality of life?”. Patients could answer the question with six different answer possibilities, going from very unsatisfactory to very satisfactory. The second question asked the difference in QOL before and after the SCI and went as follows: “If you compare your life to your life just before the cross lesion, will you find your quality of life at

this time better or worse than your life for the SCI?". Patients could answer the question with seven different answer possibilities, going from much worse to much better.

Table 1

Overview domains SF-36

Domains	**Items**
Physical functioning	10
Role limitations due to physical health	4
Role limitations due to emotional problems	3
Energy / Fatigue	4
Emotional well-being	5
Social functioning	2
Pain	2
General health	5
Change in health	1

Data-analysis

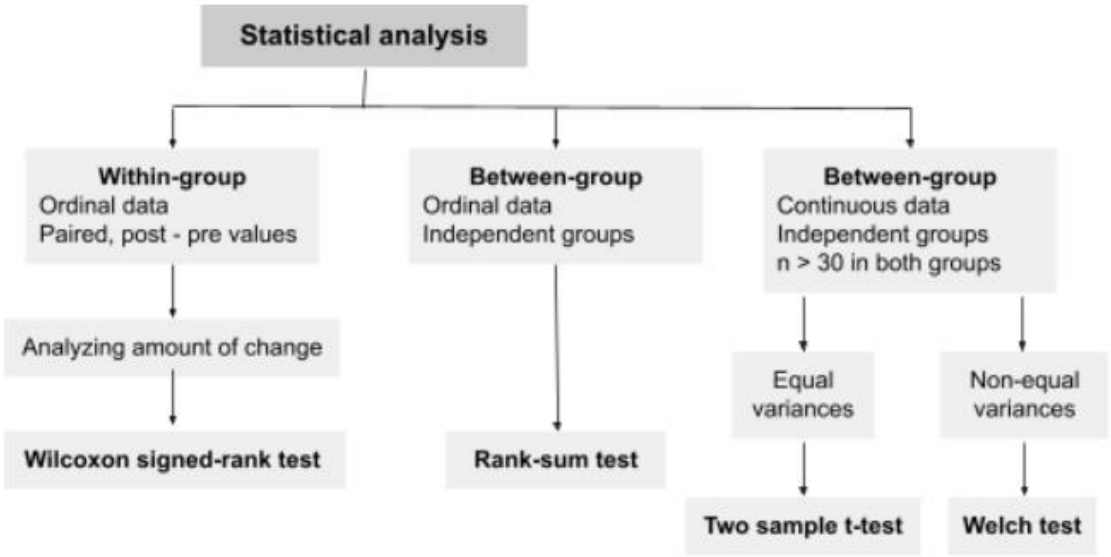
This research investigated the difference in effect between both groups, but also the effect within the two groups were analyzed. The statistical analysis was performed on the transformed data of the SF-36 and on the raw scores of the well-being questionnaire. Data and results were analyzed with JMP PRO 16 software, using a significance level of 0.05 corrected for multiple comparisons by using the Bonferroni method. A Wilcoxon-signed rank test was used for the difference within one group between the different time intervals, since the results of the outcome measures consisted of ordinal data. The results were paired and the amount of change had to be analyzed. The change in difference between the two groups is analyzed by a Wilcoxon rank-sum test, since the two groups were independent.

Descriptive statistics were also performed with JMP PRO 16 software by using the distribution function. For this, mean values and standard deviations were used. There was a significant difference between measurements if the p-value was less than 0.05. The determination of the statistical analysis is shown in figure 1. The hypothesis of this study was if there was a

significant change in scores between the different measure moments and between the two groups.

Figure 1

Flowchart of statistical analysis



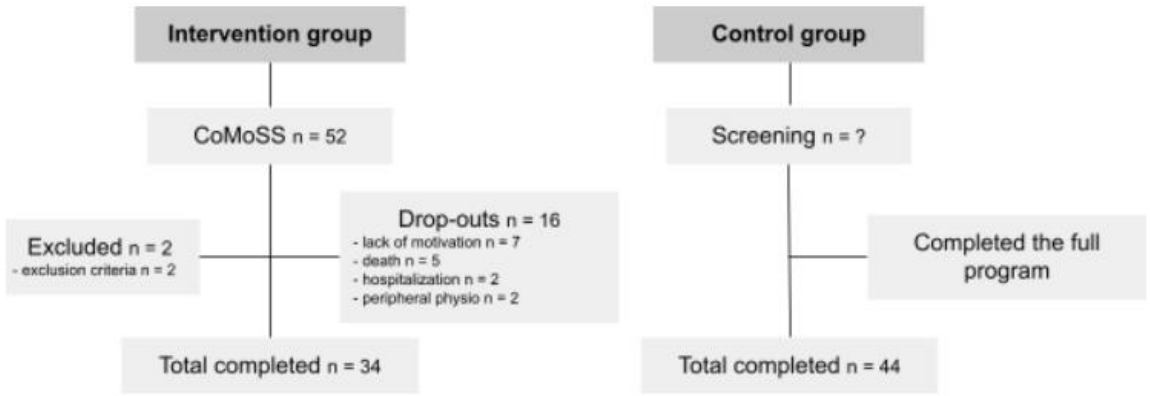
Results

Participants

In figure 2, a flowchart of the participants of both groups is displayed. In the intervention group, 16 persons dropped-out due to several reasons like lack of motivation, hospitalization, death or because they followed peripheral physiotherapy. Two persons were excluded because they met the exclusion criteria of having an oncology-based SCI. In the control group only people who completed the full control program were included. Eventually, 22 men and 12 women aged 59.68 years +- 17.85 (mean +- SD) years completed the CoMoSS program. 36 men and eight women aged 50.50 years +- 13.18 (mean +- SD) years completed the control program.

Figure 2

Flowchart of participants



Baseline characteristics

In table 2, baseline characteristics of the two groups are shown. Age was significant different between the two groups (p = 0.0108*) as shown in table 2. There were no significant differences in quality of life at the start of rehabilitation (T1) between the intervention and control group for the domains energy/fatigue (p = 0.7433), emotional well-being (p = 0.5573) and general health (p = 0.2346). The other items of the SF-36 were only completed for the intervention group, so the associated domains couldn't be compared between both groups. For the well-being questionnaire there was no significant difference found either (figure 3).

Table 2

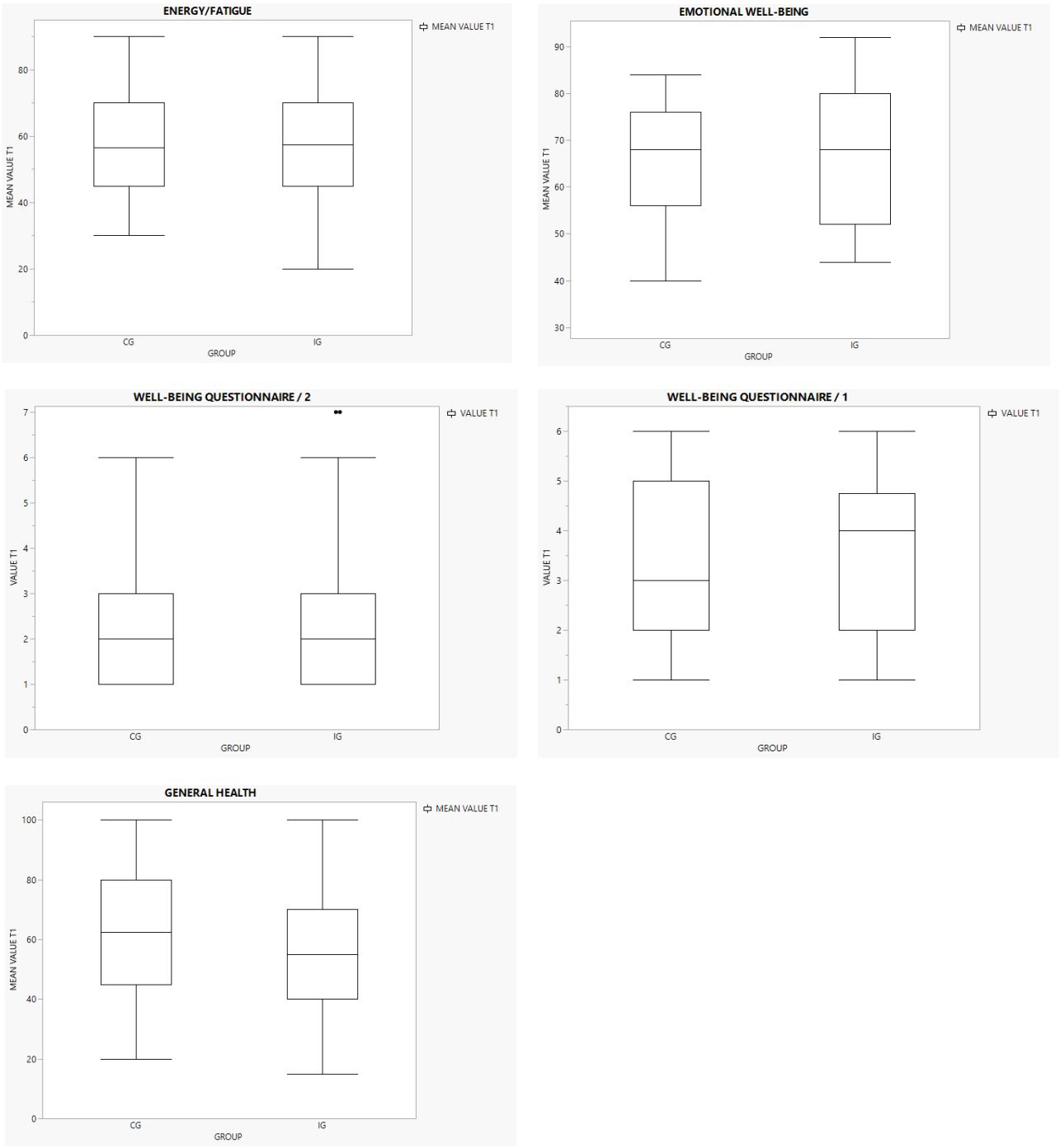
Baseline characteristics by group

Characteristic	**Intervention group** (mean +- SD)	**Control group** (mean +- SD)	**Two sample t-test** (p-value)
Participants	34	44	
Gender (M/F)	22 / 12	36 / 8	
Age (years)	59.68 +- 17.85	50.50 +- 13.18	***0.0108****
Cause of injury (traumatic / non-traumatic/ oncologic)	19 / 13 / 2	24 / 18 / 2	
Height of the lesion (paraplegia / tetraplegia)	28 / 6	36 / 8	
Complete / incomplete	10 / 24	14 / 30	

* = significant p-value (<0.05)

Figure 3

Box-plots of between-group differences at baseline



* = significant difference ($p < 0.05$)

Length of stay

The patients in the intervention group had a mean length of stay of 137.18 +- 85.78 (mean +- SD) days and the patients in the control group had a mean length of stay of 176.97 +- 95.70 (mean +- SD) days. There was a difference in length of stay at the rehabilitation center, but

the difference between both groups was not significant (p = 0.0671) as shown in table 3. There was observed a high standard deviation in both groups as seen in table 3. It indicated how much the observed values deviated from the mean value in the groups, a high degree of dispersion was found in this data.

Table 3

Results length of stay

Characteristic	**Intervention group** (mean +- SD)	**Control group** (mean +- SD)	**Two sample t-test** (p-value)
Length of hospital stay (days)	137.18 +- 85.78	176.97 +-95.70	0.0671

* = significant p-value (< 0.05)

Effect on primary outcomes

Within-group effects SF-36

The mean values of the SF-36 at the different measure moments are shown in figure 4-5.

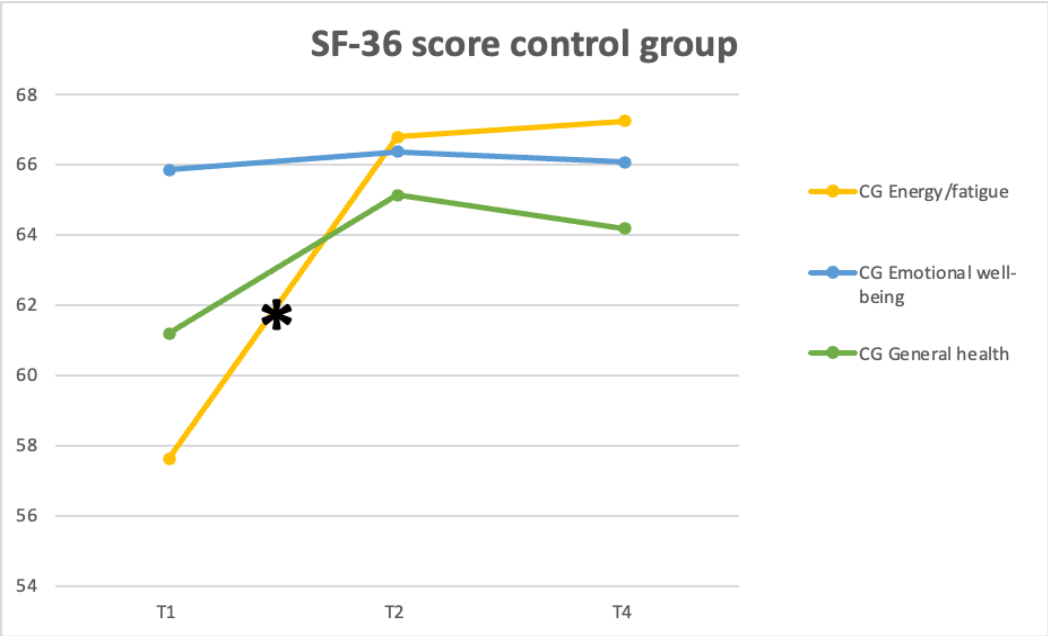
Control group

In figure 4, an overview of the mean scores of the analyzed items of the SF-36 in the control group can be seen. In the control group only the items of the domains energy/fatigue, emotional well-being and general health of this questionnaire were evaluated.

In the figure, it can be seen that all domains show an increase between the start of the rehabilitation (T1) and discharge (T2). Between T2 and T4, the domain energy/fatigue shows a slight increase, while the two other domains; emotional well-being and general health showed a slight decrease. After performing the statistical tests, the domain energy/fatigue showed a significant increase in mean score between time interval T1 and T2 (p = 0.0033*) as seen in figure 4 by looking at the asterix on the chart at the time interval. For this domain, there was no significant difference found between T2 and T4. For the two other domains, there were also no significant differences found for the time intervals T2-T1 and T4-T2.

Figure 4

Mean scores subscales of SF-36 questionnaires in the control group



* = significant difference ($p < 0.025$) (corrected with Bonferroni)

Intervention group

In figure 5, an overview of the mean scores of the analyzed items of the SF-36 in the intervention group can be seen. In the intervention group all the different items of all of the domains of this questionnaire were evaluated.

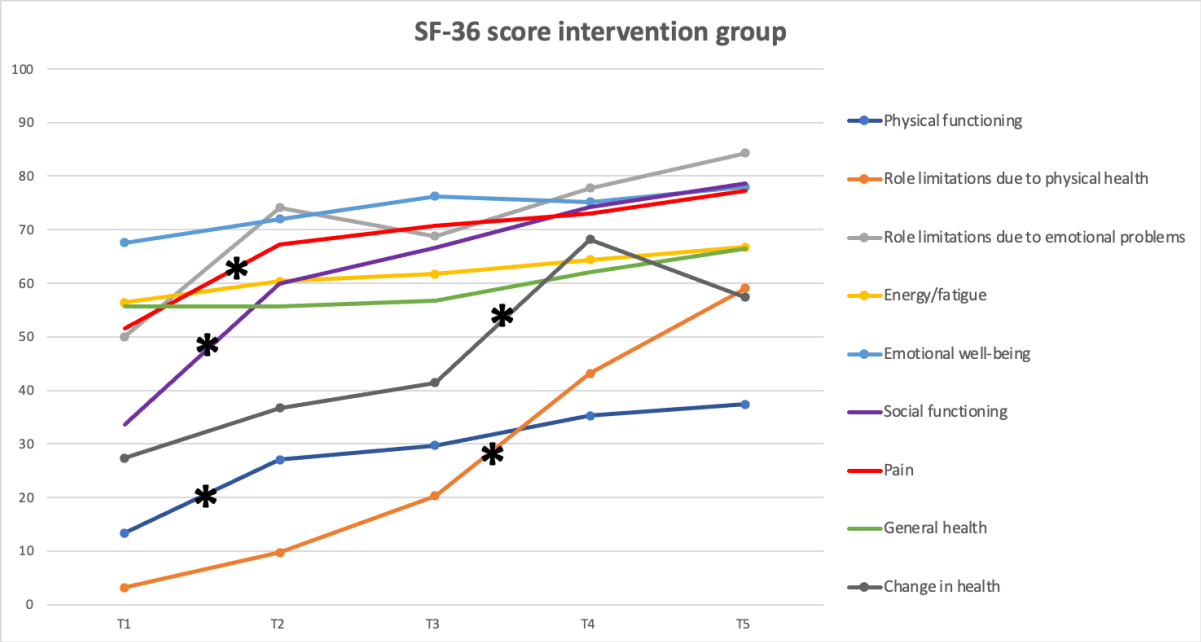
In the figure, it can be seen that all domains show an increase between the start of the rehabilitation (T1) and discharge (T2), except for the domain general health that stays unchanged in this time interval. Also in the time interval between T2 and 6 weeks after discharge (T3), all domains show an increase in mean score, except for the domain role limitations due to emotional problems which shows a decrease in mean score. Between measure moment T3 and six months after discharge (T4), all domains show an increase in mean score. Between T4 and 12 months after discharge (T5), the domain change in health shows a decrease, while all of the other domains show an increase in mean score.

After performing the statistical tests, there were found five time intervals that showed a significant increase in mean score as shown in figure 5 by using an asterix. In the time interval between T1 and T2 for the domains physical functioning ($p = 0.0004$*), social functioning (p =

0.0007*) and pain (p = 0.0003*) showed a significant increase in mean score. All of the other domains showed no significant increases or decreases between this time interval. Between the time interval T3 and T4 there were also two domains which showed a significant increase in mean score, namely role limitations due to physical health (p = 0.0173*) and change in health (p = 0.0001*). All of the other domains showed no significant increases or decreases in this time interval. For the time intervals between T2 and T3 and between T4 and T5, there were found no significant changes in mean scores for all domains.

Figure 5

Mean scores subscales SF-36 questionnaire in the intervention group



* = significant p-value (<0.0125) (corrected with Bonferroni)

Within-group effects well-being questionnaire

The mean values of the well-being questionnaire at the different measure moments are shown in figure 6-7.

Control group

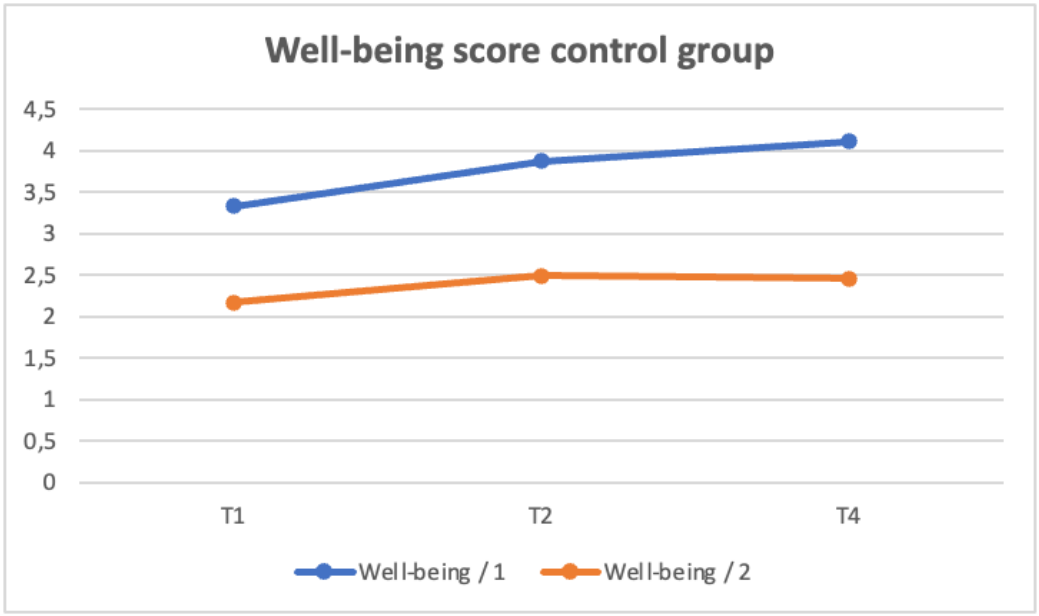
In figure 6, an overview of the mean scores of the two questions of the well-being questionnaire in the control group can be seen.

In the figure, it can be seen that the mean scores of both questions show an increase between T1 and T2. The first question shows also an increase in mean score between T2 and T4, while the mean score of the second question shows a slight decrease in this time interval.

After performing the statistical tests, there were found no time intervals that showed a significant increase or decrease in mean score for both questions as shown in figure 7.

Figure 6

Mean scores well-being questionnaire in the control group



* = significant p-value (<0.0250) (corrected with Bonferroni)

Intervention group

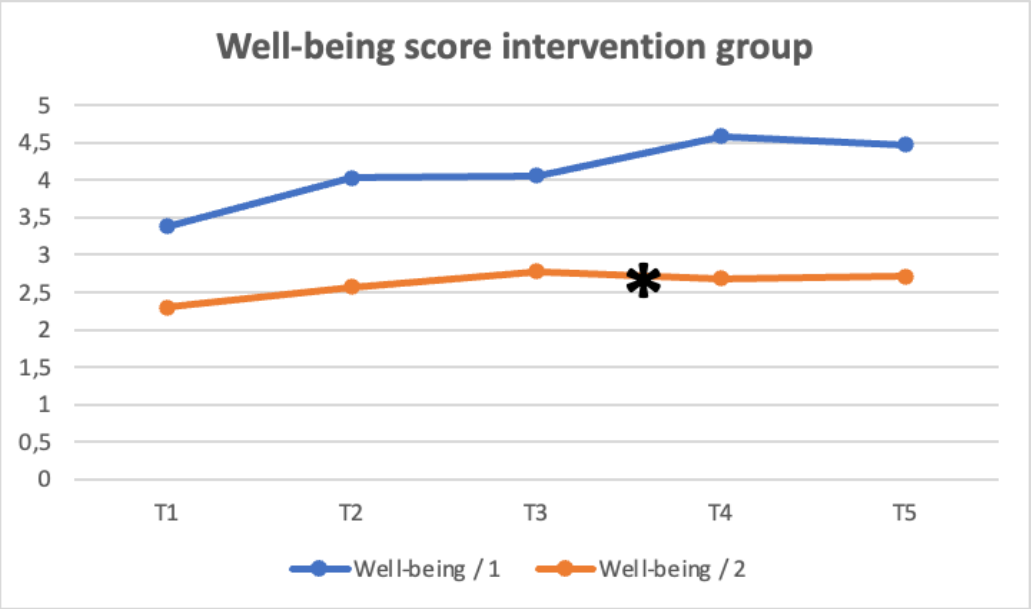
In figure 7, an overview of the mean scores of the two questions of the well-being questionnaire in the intervention group can be seen.

In the figure, it can be seen that the mean scores of both questions show an increase between T1 and T2. The second question shows also an increase in mean score between T2 and T3, while the mean score of the first question stays quite the same in this time interval. For time interval T4-T3 the first question shows an increase in mean score, while the second questions shows a decrease in mean score. Between T4 and T5, the mean score of the first question decreases while the mean score of the second question stays the same.

After performing the statistical tests, there was only one time interval that showed a significant increase or decrease in mean score as shown in figure 7 by using an asterix. The second question of the questionnaire showed a significant decrease in mean score for the time interval between T3 and T4 (p = 0.0044*). All the other time intervals showed no significant differences in mean scores for both questions.

Figure 7

Mean scores well-being questionnaire intervention group



* = significant p-value (<0.0125) (corrected with Bonferroni)

Between-group effects SF-36

Between-group effects were analyzed after discharge from the rehabilitation center (T2), this could give an overview of how much the program in the rehabilitation center has contributed to improving quality of life and well-being. There has also been calculated a between group effect after follow-up (T4) to have an idea of the long-term effects of the CoMoSS program. Between-group effects could only be calculated for the domains who were surveyed in both groups (domains energy/fatigue, emotional well-being and general health).

Table 4 shows an overview of the mean values for the different domains between intervention and control group after discharge (T2) of the rehabilitation center. It can be seen that the mean values of the different domains do not differ much. For the domains

energy/fatigue and general health the control group had a higher mean value, while the intervention group had a higher mean value for the domain emotional well-being. But the differences were found to be not significant for any domain between the intervention and control group after discharge from the rehabilitation center.

Table 4

Between group effects SF-36 after discharge (T2)

Question or domain of SF-36	**T2 IG** (mean +- SD)	**T2 CG** (mean +- SD)	**Two sample t-test** (p-value)
SF-36 energy/fatigue	60.31 +- 19.29	66.79 +- 19.65	0.1537
SF-36 emotional well-being	71.94 +- 18.36	66.36 +- 12.94	0.1297
SF-36 general health	55.63 +- 20.76	65.13 +- 23.58	0.0608

* = significant p-value (<0.05)

Table 5 shows an overview of the mean values for the different domains between intervention and control group after follow-up (T4). It can be seen that the difference between the mean values of the control and intervention group is not high for the domain of energy/fatigue and general health. The difference between the mean values of emotional well-being is more remarkable. For this domain, a significant difference (p = 0.0281*) between both groups was found, in favor of the intervention group. There were no significant differences found for the other two domains after follow-up of the CoMoSS program.

Table 5

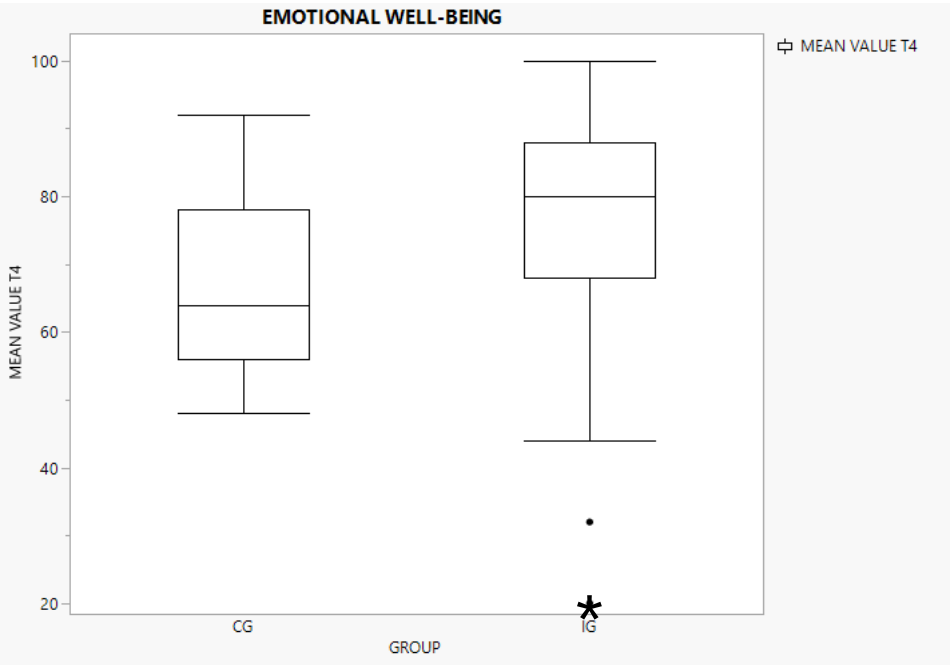
Between group effects SF-36 after follow-up (T4)

Question or domain of SF-36	**T4 IG** (mean +- SD)	**T4 CG** (mean +- SD)	**Two sample t-test** (p-value)
SF-36 energy/fatigue	64.39 +- 16.00	66.79 +- 19.65	0.5239
SF-36 emotional well-being	75.15 +- 18.54	66.07 +- 12.08	***0.0281****
SF-36 general health	62.06 +- 22.13	65.13 +- 23.58	0.7050

* = significant p-value (<0.05)

Figure 8

Box-plot of the significant between-group difference for emotional well-being



* = significant p-value (<0.05)

Between-group effects well-being

Table 6 shows an overview of the mean values of the two questions of the well-being questionnaire between intervention and control group after discharge (T2) of the rehabilitation center. It can be seen that the difference between the mean values of the

control and intervention group is not high for the two questions. There was not found a significant difference between both groups after discharge from the rehabilitation center.

Table 6

Between group effects well-being questionnaire after discharge (T2)

Question or domain well-being	**T2 IG** (mean +- SD)	**T2 CG** (mean +- SD)	**Rank-sum test** (p-value)
Well-being / 1	4.58 +- 0.85	4.11 +- 1.31	0.6085
Well-being / 2	2.68 +- 1.38	2.46 +- 1.10	0.7821

* = significant p-value (<0.05)

Table 7 shows an overview of the mean values of the two questions of the well-being questionnaire between intervention and control group after follow-up (T4). Also at this measure moment, the difference between the mean values of the control and intervention group can be seen, but there was not found a significant difference between both groups at the follow-up measure moment.

Table 7

Between group effects well-being questionnaire after follow-up (T4)

Question or domain well-being	**T4 IG** (mean +- SD)	**T4 CG** (mean +- SD)	**Rank-sum test** (p-value)
Well-being / 1	4.58 +- 0.85	4.11 +- 1.31	0.1024
Well-being / 2	2.68 +- 1.38	2.46 +- 1.10	0.6672

* = significant p-value (<0.05)

Additional recording at the rehabilitation center

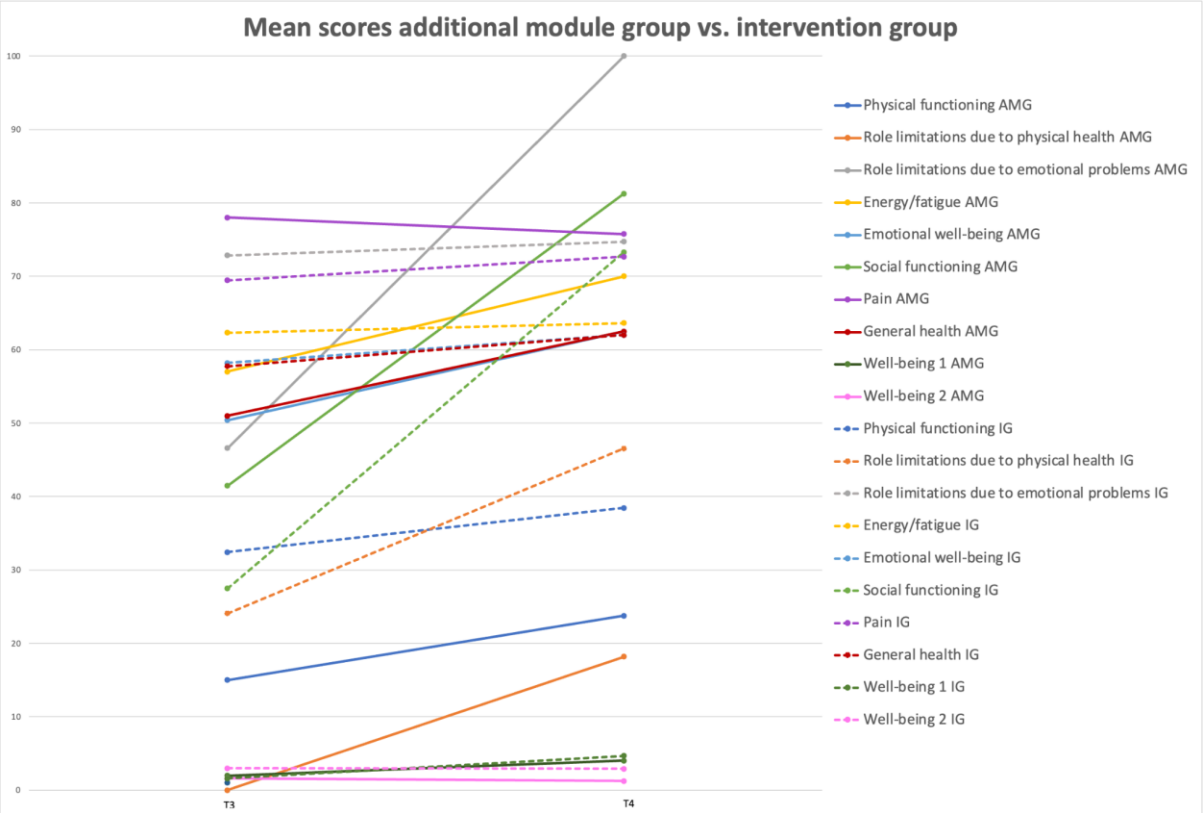
Seven participants of the intervention group followed an extra module at the rehabilitation center in Adelante during the rehabilitation period of this investigation. This module took place at the time interval between measure moment T3 and T4. One of these participants dropped-out during the rehabilitation period, so six out of 34 participants of the intervention group underwent the additional module in the rehabilitation center. Two women and four

men aged 56.33 years +- 17.28 (mean +- SD) years were among this additional module group (AMG).

At T3, there were found no statistical differences in quality of life and well-being between this AM Group and the group consisting of the other 28 participants of the intervention group (IG2). When looking at figure 9, an increase in all of the domains between T3 and T4 can be seen for both the AMG (full line) and the IG2 (dotted line). When looking at the effects between AMG and IG2, there is only found a significant between-group difference (p = 0.0197*) in mean score for the second question of the well-being questionnaire in favor of the intervention group (IG2) (T4). All of the other domains show a similar increase of mean score in both groups.

Figure 9

Mean scores of the SF-36 for additional module group (AMG) and intervention group (IG2)



Discussion

An individual rehabilitation program that can be adapted regularly is thought to be positively influencing the quality of life of the patients, since SCI patients experience changing needs throughout the rehabilitation period. (Scelza et al., 2007 ; Kennedy et al., 2001 ; Ho et al., 2007). However, from the results of this investigation it can be concluded that both the intervention and the control group achieved a positive effect on quality of life and that there was only a very limited significant difference between both groups. These findings show that the quality of life and well-being of the patient didn't changed by shortening the length of stay in the rehabilitation center. This was actually a positive finding, since it means that a longer length of stay, which is accompanied with high medical costs, is actually not necessary in terms of quality of life and well-being of the patient.

Contrary to our hypothesis, there was only one domain/question with a significant between-group difference. A possible explanation for this is that exercise therapy in general, in any form, can lead to significant increases in vitality, reductions in perceptions of fatigue and has a positive effect on the physical and psychological quality of life (Nightingale, Rouse, Walhin, Thompson, Bilzon, 2018). There were also found very high standard deviations for both groups in the statistical analysis. This indicated a high degree of dispersion in the data and can also be a possible explanation for the within- and between-group differences that weren't found statistically significant. It is already known that participation and quality of life issues need a greater priority during post-acute rehabilitation, follow-up and subsequent care efforts provided in the community (Halvorsen et al., 2021). In this study, it seems that even the new CoMoSS program didn't focus enough on this topic to show significant differences compared to a control program. But since it is a completely new program, similar results between intervention and control group are very acceptable. It is also known that bladder and bowel problems contribute to a reduction in quality of life and well-being (Gong, Wang, Zhong, Jia, Liu, Li, 2021). This is a problem that has only been focused on during the first phase of the CoMoSS program, but not in long-term. This could be an explanation for the scores that didn't increase significantly between the different time intervals.

Seven participants of the intervention group underwent a readmission during the rehabilitation period to follow an extra module in the program. They were readmitted to the rehabilitation center between measure moment T3 and T4. After the statistical analysis, there was found only one significant difference for a question from the well-being questionnaire. This means that following an additional module has no effect on quality of life and well-being.

Strengths, limitations and recommendations

One of the strengths of this study is the long follow-up period for the intervention group. Another strength that has to be pointed out is that the data-analysis was performed by two independent researchers and a discussion took place in case of any disagreements.

Since it is the first study related to the CoMoSS program in SCI patients, it also has some limitations. More significant between-group effects in favor of the CoMoSS program were expected, but the results of the study do not quite match the expectations of the researchers. A possible reason for not finding the expected results can be that the measure moments didn't match completely. Possibly, there could be a significant difference at another matching measure moment. This makes it difficult to generalize the results, especially for the follow up (T4). This is also the biggest limitation of this study and can be taken into account in further research. It would be recommended to use identical measure moments for both groups to get a better overview of the outcomes. Another possible reason for not finding more between-group differences is that there were only three domains of the SF-36 that were analyzed in the control group, while the whole questionnaire was conducted in the intervention group. This led to a few matching analyzed domains between the two groups to perform the statistics on.

Another limitation is the possibility of a selection bias in this study, because all of the participants of the intervention group came from the same SCI Rehabilitation Center. Because of this, there is also an allocation bias, since the participants were not randomized to the intervention or control group. The small sample size is also a limitation, but the identification and recruitment of SCI patients is already known as a challenge (Yilmaz, 2006). The patients were also not blinded and knew which intervention they were receiving during their

rehabilitation, this leads to a possible performance bias. Another limitation is that this research did not study all the topics of the approach. There is an assumption that there would be a reduction in costs by following the program, but this is not researched in this study. This can be taken into account in further research. The difference in results between paraplegia and tetraplegia patients can also be investigated in future research, because this was also not researched in this research. Further research that takes into account the previous limitations is needed.

Conclusion

The CoMoSS program seems to have limited significant differences compared to the Conventional Spinal Cord injury Rehab Service in terms of quality of life and well-being. The intervention and control group are approximately on the same line in terms of increasing scores, regardless of the fact that the intervention group had a shorter stay at the rehabilitation center. Further research that takes into account the limitations of this study is needed.

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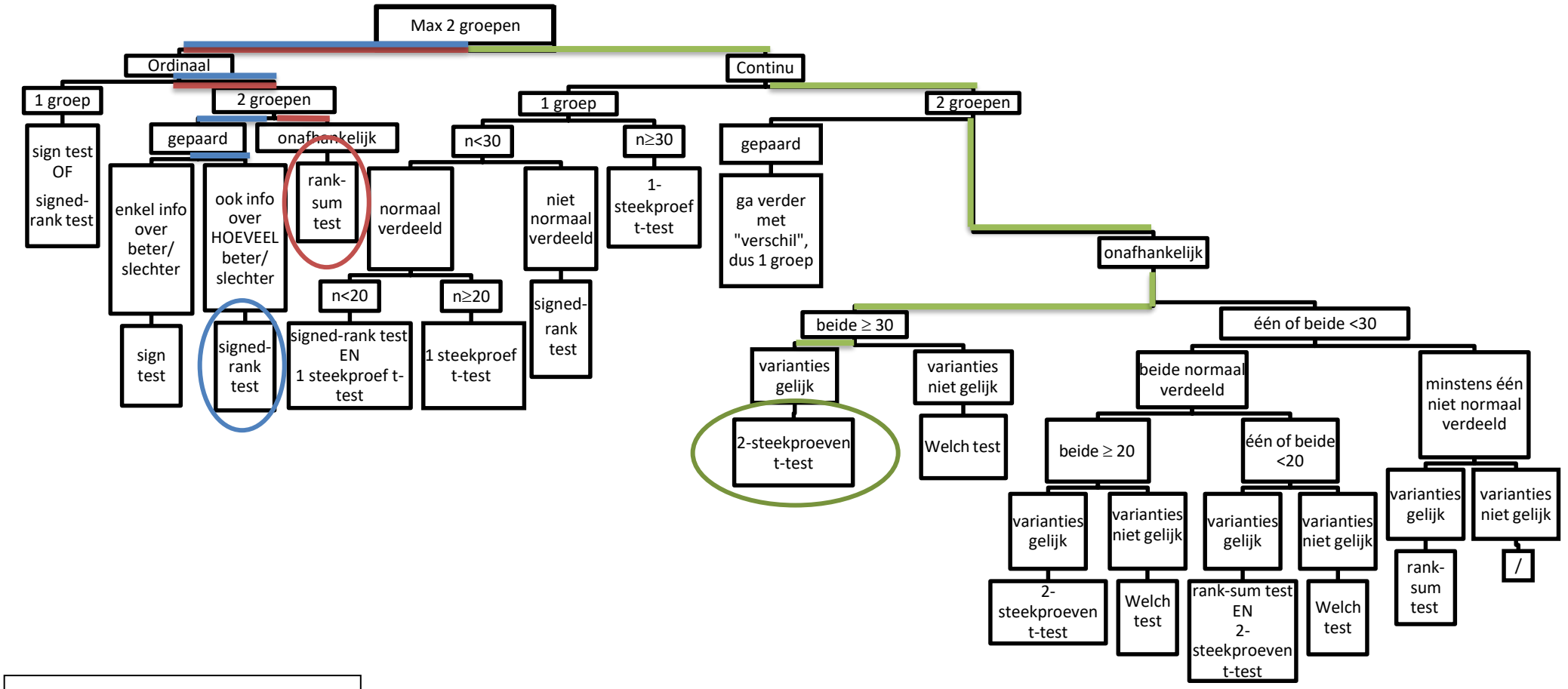
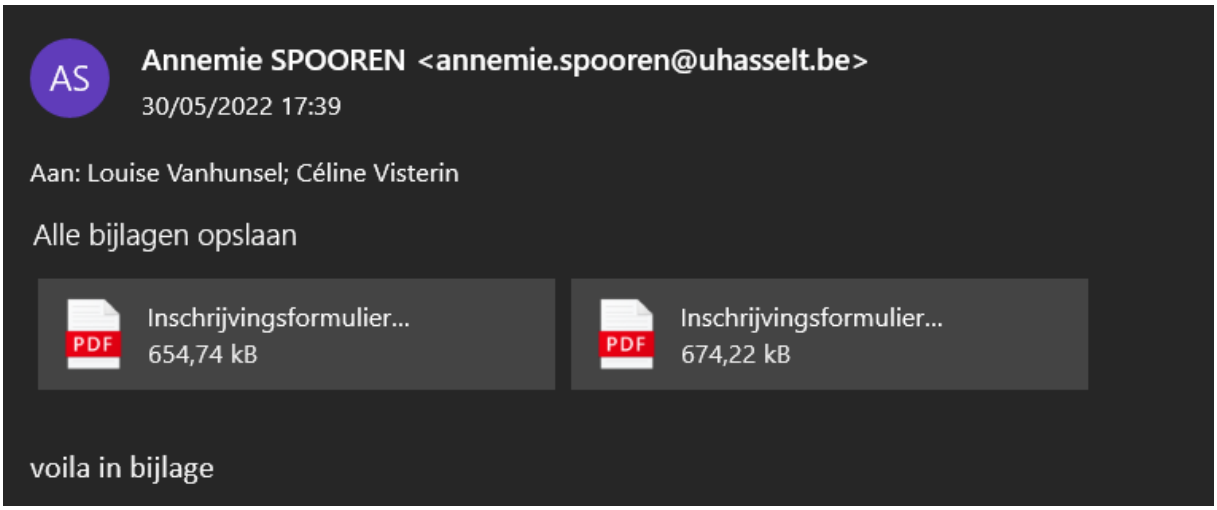
Appendix



GROEN = Beschrijvende statistiek
BLAUW = within-group differences
ROOD = between-group differences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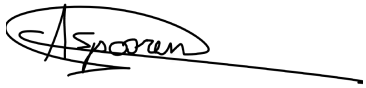

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O wijzigen - *change to:*

LUIK B - VERPLICHT - IN TE VULLEN DOOR DE PROMOTOR(EN)
PART B - MANDATORY - TO BE FILLED OUT BY THE SUPERVISOR(S)

Wijziging gegevens masterproef in luik A/*Change information Master's thesis in part A:*

O goedgekeurd - *approved*

X O goedgekeurd mits wijziging van - *approved if modification of:* mits een aantal major changes, zie feedback document

Scriptie/*Thesis:*

O openbaar (beschikbaar in de document server van de universiteit)- *public (available in document server of university)*

O ~~x~~ vertrouwelijk (niet beschikbaar in de document server van de universiteit) - *confidential (not available in document server of university)*

Juryverdediging/*Jury Defense:*

De promotor(en) geeft (geven) de student(en) het niet-bindend advies om de bovenvermelde masterproef in de bovenvermelde periode/*The supervisor(s) give(s) the student(s) the non-binding advice:*

O te verdedigen/*to defend the aforementioned Master's thesis within the aforementioned period of time*

O de verdediging is openbaar/*in public*

O de verdediging is niet openbaar/*not in public*

X O niet te verdedigen/*not to defend the aforementioned Master's thesis within the aforementioned period of time*

LUIK C - OPTIONEEL - IN TE VULLEN DOOR STUDENT, alleen als hij luik B wil overrulen
PART C - OPTIONAL - TO BE FILLED OUT BY THE STUDENT, only if he wants to overrule part B

In tegenstelling tot het niet-bindend advies van de promotor(en) wenst de student de bovenvermelde masterproef in de bovenvermelde periode/*In contrast to the non-binding advice put forward by the supervisor(s), the student wishes:*

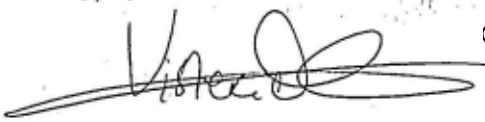
O niet te verdedigen/*not to defend the aforementioned Master's thesis within the aforementioned period of time*

O te verdedigen/*to defend the aforementioned Master's thesis within the aforementioned period of time*

LUIK D - VERPLICHT - IN TE VULLEN DOOR DE STUDENT EN DE PROMOTOR(EN)
PART D - MANDATORY - TO BE FILLED OUT BY THE STUDENT AND THE SUPERVISOR(S)

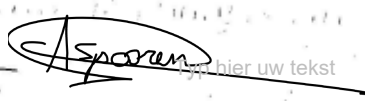
Datum en handtekening student(en)
Date and signature student(s)

29/05/22



Datum en handtekening promotor(en)
Date and signature supervisor(s)

30/05/2022



Typ hier uw tekst

Verklaring op Eer

Ondergetekende, student aan de Universiteit Hasselt (UHasselt), faculteit *Revalidatiewetenschappen* aanvaardt de volgende voorwaarden en bepalingen van deze verklaring:

1. Ik ben ingeschreven als student aan de UHasselt in de opleiding *Revalidatiewetenschappen - Kinesitherapie*, waarbij ik de kans krijg om *in het kader van mijn opleiding* mee te werken aan onderzoek van de faculteit *Revalidatiewetenschappen* aan de UHasselt. Dit onderzoek wordt begeleid door *Prof. Dr. Annemie Spooren* en kadert binnen *het opleidingsonderdeel wetenschappelijke stage/masterproef deel 2*. Ik zal in het kader van dit onderzoek creaties, schetsen, ontwerpen, prototypes en/of onderzoeksresultaten tot stand brengen in het domein van *de neurologie* (hierna: "De Onderzoeksresultaten").

2. Bij de creatie van De Onderzoeksresultaten doe ik beroep op de achtergrondkennis, vertrouwelijke informatie[1], universitaire middelen en faciliteiten van UHasselt (hierna: de "Expertise").

3. Ik zal de Expertise, met inbegrip van vertrouwelijke informatie, uitsluitend aanwenden voor het uitvoeren van hogergenoemd onderzoek binnen UHasselt. Ik zal hierbij steeds de toepasselijke regelgeving, in het bijzonder de Algemene Verordening Gegevensbescherming (EU 2016-679), in acht nemen.

4. Ik zal de Expertise (i) voor geen enkele andere doelstelling gebruiken, en (ii) niet zonder voorafgaande schriftelijke toestemming van UHasselt op directe of indirecte wijze publiek maken.

5. Aangezien ik in het kader van mijn onderzoek beroep doe op de Expertise van de UHasselt, draag ik hierbij alle bestaande en toekomstige intellectuele eigendomsrechten op De Onderzoeksresultaten over aan de UHasselt. Deze overdracht omvat alle vormen van intellectuele eigendomsrechten, zoals onder meer – zonder daartoe beperkt te zijn – het auteursrecht, octrooirecht, merkenrecht, modellenrecht en knowhow. De overdracht geschiedt in de meest volledige omvang, voor de gehele wereld en voor de gehele beschermingsduur van de betrokken rechten.

6. In zoverre De Onderzoeksresultaten auteursrechtelijk beschermd zijn, omvat bovenstaande overdracht onder meer de volgende exploitatiewijzen, en dit steeds voor de hele beschermingsduur, voor de gehele wereld en zonder vergoeding:

   - het recht om De Onderzoeksresultaten vast te (laten) leggen door alle technieken en op alle dragers;
   - het recht om De Onderzoeksresultaten geheel of gedeeltelijk te (laten) reproduceren, openbaar te (laten) maken, uit te (laten) geven, te (laten) exploiteren en te (laten) verspreiden in eender welke vorm, in een onbeperkt aantal exemplaren;

[1] Vertrouwelijke informatie betekent alle informatie en data door de UHasselt meegedeeld aan de student voor de uitvoering van deze overeenkomst, inclusief alle persoonsgegevens in de zin van de Algemene Verordening Gegevensbescherming (EU 2016/679), met uitzondering van de informatie die (a) reeds algemeen bekend is; (b) reeds in het bezit was van de student voor de mededeling ervan door de UHasselt; (c) de student verkregen heeft van een derde zonder enige geheimhoudingsplicht; (d) de student onafhankelijk heeft ontwikkeld zonder gebruik te maken van de vertrouwelijke informatie van de UHasselt; (e) wettelijk of als gevolg van een rechterlijke beslissing moet worden bekendgemaakt, op voorwaarde dat de student de UHasselt hiervan schriftelijk en zo snel mogelijk op de hoogte brengt.

- het recht om De Onderzoeksresultaten te (laten) verspreiden en mee te (laten) delen aan het publiek door alle technieken met inbegrip van de kabel, de satelliet, het internet en alle vormen van computernetwerken;
- het recht De Onderzoeksresultaten geheel of gedeeltelijk te (laten) bewerken of te (laten) vertalen en het (laten) reproduceren van die bewerkingen of vertalingen;
- het recht De Onderzoeksresultaten te (laten) bewerken of (laten) wijzigen, onder meer door het reproduceren van bepaalde elementen door alle technieken en/of door het wijzigen van bepaalde parameters (zoals de kleuren en de afmetingen).

De overdracht van rechten voor deze exploitatiewijzen heeft ook betrekking op toekomstige onderzoeksresultaten tot stand gekomen tijdens het onderzoek aan UHasselt, eveneens voor de hele beschermingsduur, voor de gehele wereld en zonder vergoeding.

Ik behoud daarbij steeds het recht op naamvermelding als (mede)auteur van de betreffende Onderzoeksresultaten.

7. Ik zal alle onderzoeksdata, ideeën en uitvoeringen neerschrijven in een "laboratory notebook" en deze gegevens niet vrijgeven, tenzij met uitdrukkelijke toestemming van mijn UHasseltbegeleider *Prof. Dr. Annemie Spooren.*

8. Na de eindevaluatie van mijn onderzoek aan de UHasselt zal ik alle verkregen vertrouwelijke informatie, materialen, en kopieën daarvan, die nog in mijn bezit zouden zijn, aan UHasselt terugbezorgen.

Gelezen voor akkoord en goedgekeurd,

Naam: *Vanhunsel Louise*

Adres: *Oudestraat 11, 3960 Bree*

Geboortedatum en –plaats : *26/09/1999 te Bree*

Datum: *28/05/2022*

Handtekening:

Verklaring op Eer

Ondergetekende, student aan de Universiteit Hasselt (UHasselt), faculteit *Revalidatiewetenschappen* aanvaardt de volgende voorwaarden en bepalingen van deze verklaring:

1. Ik ben ingeschreven als student aan de UHasselt in de opleiding *Revalidatiewetenschappen en kinesitherapie*, waarbij ik de kans krijg *om in het kader van mijn opleiding* mee te werken aan onderzoek van de faculteit *Revalidatiewetenschappen* aan de UHasselt. Dit onderzoek wordt beleid door *Prof. Dr. Annemie Spooren* en kadert *binnen het opleidingsonderdeel wetenschappelijke stage / masterproef deel 2.* Ik zal in het kader van dit onderzoek creaties, schetsen, ontwerpen, prototypes en/of onderzoeksresultaten tot stand brengen in het domein van de neurologie (hierna: "De Onderzoeksresultaten").

2. Bij de creatie van De Onderzoeksresultaten doe ik beroep op de achtergrondkennis, vertrouwelijke informatie[1], universitaire middelen en faciliteiten van UHasselt (hierna: de "Expertise").

3. Ik zal de Expertise, met inbegrip van vertrouwelijke informatie, uitsluitend aanwenden voor het uitvoeren van hogergenoemd onderzoek binnen UHasselt. Ik zal hierbij steeds de toepasselijke regelgeving, in het bijzonder de Algemene Verordening Gegevensbescherming (EU 2016-679), in acht nemen.

4. Ik zal de Expertise (i) voor geen enkele andere doelstelling gebruiken, en (ii) niet zonder voorafgaande schriftelijke toestemming van UHasselt op directe of indirecte wijze publiek maken.

5. Aangezien ik in het kader van mijn onderzoek beroep doe op de Expertise van de UHasselt, draag ik hierbij alle bestaande en toekomstige intellectuele eigendomsrechten op De Onderzoeksresultaten over aan de UHasselt. Deze overdracht omvat alle vormen van intellectuele eigendomsrechten, zoals onder meer – zonder daartoe beperkt te zijn – het auteursrecht, octrooirecht, merkenrecht, modellenrecht en knowhow. De overdracht geschiedt in de meest volledige omvang, voor de gehele wereld en voor de gehele beschermingsduur van de betrokken rechten.

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8. Na de eindevaluatie van mijn onderzoek aan de UHasselt zal ik alle verkregen vertrouwelijke informatie, materialen, en kopieën daarvan, die nog in mijn bezit zouden zijn, aan UHasselt terugbezorgen.

Gelezen voor akkoord en goedgekeurd,

Naam: Visterin Céline

Adres: Vostertstraat 99, 3960 Bree

Geboortedatum en –plaats : 06/01/1999 te Keulen

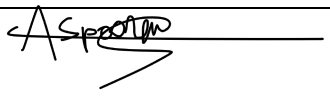
Datum: 28/05/2022

Handtekening:

www.uhasselt.be
Campus Hasselt | Martelarenlaan 42 | BE-3500 Hasselt
Campus Diepenbeek | Agoralaan gebouw D | BE-3590 Diepenbeek
T + 32(0)11 26 81 11 | E-mail: info@uhasselt.be

b

INVENTARISATIEFORMULIER WETENSCHAPPELIJKE STAGE DEEL 2

DATUM	INHOUD OVERLEG	HANDTEKENINGEN
02/09/2021	Online meeting: kennismaking met onderzoek.	Promotor: Copromotor/Begeleider: Student(e): Student(e):
27/09/2021	Online meeting: updates over onderzoek besproken.	Promotor: Copromotor/Begeleider: Student(e): Student(e):
14/10/2021	Online meeting: voorstelling onderzoeken door promotor aan alle groepjes.	Promotor: Copromotor/Begeleider: Student(e): Student(e):
01/12/2021	Online meeting: bespreking plan van aanpak + verdere toelichting onderzoek.	Promotor: Copromotor/Begeleider: Student(e): Student(e):
21/04/2022	Online meeting: vragen van studenten aan promotor + statistiek besproken.	Promotor: Copromotor/Begeleider: Student(e): Student(e):
12/05/2022	Mail: laatste planning afgesproken + enkele vragen beantwoord door promotor.	Promotor: Copromotor/Begeleider: Student(e): Student(e):
17/05/2022	Mail: opmerkingen inleiding + methodologie doorgekregen.	Promotor: Copromotor/Begeleider: Student(e): Student(e):
		Promotor: Copromotor/Begeleider: Student(e): Student(e):
		Promotor: Copromotor/Begeleider: Student(e): Student(e):
		Promotor: Copromotor/Begeleider: Student(e): Student(e):

In te vullen door de promotor(en) en eventuele copromotor aan het einde van MP2:

Naam Student(e): Vanhunsel Louise **Datum:** 28/05/2022

Titel Masterproef: Innovation in rehabilitation: effectiveness of a compact client-oriented modular rehabilitation program for persons with spinal cord injury. The effect on quality of life and well-being

1) Geef aan in hoeverre de student(e) onderstaande competenties zelfstandig uitvoerde:
   - NVT: De student(e) leverde hierin geen bijdrage, aangezien hij/zij in een reeds lopende studie meewerkte.
   - 1: De student(e) was niet zelfstandig en sterk afhankelijk van medestudent(e) of promotor en teamleden bij de uitwerking en uitvoering.
   - 2: De student(e) had veel hulp en ondersteuning nodig bij de uitwerking en uitvoering.
   - 3: De student(e) was redelijk zelfstandig bij de uitwerking en uitvoering
   - 4: De student(e) had weinig tot geringe hulp nodig bij de uitwerking en uitvoering.
   - 5: De student(e) werkte zeer zelfstandig en had slechts zeer sporadisch hulp en bijsturing nodig van de promotor of zijn team bij de uitwerking en uitvoering.

Competenties	NVT	1	2	3	4	5
Opstelling onderzoeksvraag	O	O	O	x O	O	O
Methodologische uitwerking	O	O	O	O	x O	O
Data acquisitie	x O	O	O	O	O	O
Data management	O	O	O	O	x O	O
Dataverwerking/Statistiek	O	O	O	x O	x O	O
Rapportage	O	O	O	x O	O	O

2) Niet-bindend advies: Student(e) krijgt toelating/geen toelating (schrappen wat niet past) om bovenvermelde Wetenschappelijke stage/masterproef deel 2 te verdedigen in bovenvermelde periode. Deze eventuele toelating houdt geen garantie in dat de student geslaagd is voor dit opleidingsonderdeel.

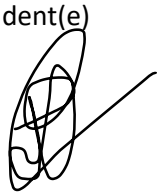
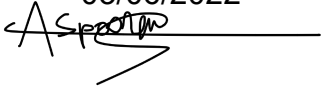
   toelating, echter zonder garantie op succes

3) Deze wetenschappelijke stage/masterproef deel 2 mag wel/niet (schrappen wat niet past) openbaar verdedigd worden.

   mag wel

4) Deze wetenschappelijke stage/masterproef deel 2 mag wel/niet (schrappen wat niet past) opgenomen worden in de bibliotheek en docserver van de UHasselt.

   mag niet

Datum en handtekening Student(e)	Datum en handtekening promotor(en)	Datum en handtekening Co-promotor(en)
	03/06/2022 	

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T + 32(0)11 26 81 11 | E-mail: info@uhasselt.be

UHASSELT
KNOWLEDGE IN ACTION

INVENTARISATIEFORMULIER WETENSCHAPPELIJKE STAGE DEEL 2

DATUM	INHOUD OVERLEG	HANDTEKENINGEN
02/09/2021	Online meeting: kennismaking met onderzoek.	Promotor: Copromotor/Begeleider: Student(e): Student(e):
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	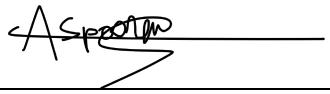	Promotor: Copromotor/Begeleider: Student(e): Student(e):
		Promotor: Copromotor/Begeleider: Student(e): Student(e):
		Promotor: Copromotor/Begeleider: Student(e): Student(e):

In te vullen door de promotor(en) en eventuele copromotor aan het einde van MP2:

Naam Student(e): Visterin Céline **Datum:** 28/05/2022

Titel Masterproef: Innovation in rehabilitation: effectiveness of a compact client-oriented modular rehabilitation program for persons with spinal cord injury. The effect on quality of life and well-being

1) Geef aan in hoeverre de student(e) onderstaande competenties zelfstandig uitvoerde:
   - NVT: De student(e) leverde hierin geen bijdrage, aangezien hij/zij in een reeds lopende studie meewerkte.
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   - 5: De student(e) werkte zeer zelfstandig en had slechts zeer sporadisch hulp en bijsturing nodig van de promotor of zijn team bij de uitwerking en uitvoering.

Competenties	NVT	1	2	3	4	5
Opstelling onderzoeksvraag	O	O	O	x O	O	O
Methodologische uitwerking	O	O	O	O	x O	O
Data acquisitie	x O	O	O	O	O	O
Data management	O	O	O	O	x O	O
Dataverwerking/Statistiek	O	O	O	xO	x O	O
Rapportage	O	O	O	xO	O	O

2) Niet-bindend advies: Student(e) krijgt toelating/geen toelating (schrappen wat niet past) om bovenvermelde Wetenschappelijke stage/masterproef deel 2 te verdedigen in bovenvermelde periode. Deze eventuele toelating houdt geen garantie in dat de student geslaagd is voor dit opleidingsonderdeel.

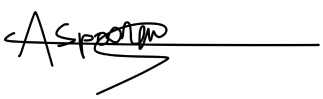
toelating, maar geen garantie op succes

3) Deze wetenschappelijke stage/masterproef deel 2 mag wel/niet (schrappen wat niet past) openbaar verdedigd worden.

mag wel

4) Deze wetenschappelijke stage/masterproef deel 2 mag wel/niet (schrappen wat niet past) opgenomen worden in de bibliotheek en docserver van de UHasselt.

mag niet

Datum en handtekening Student(e)	Datum en handtekening promotor(en)	Datum en handtekening Co-promotor(en)
		
	03/06/2022	