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[K1] Pain management and cannabinoids

Nanna Brix Finnerup, Danish Pain Research Center, Department of Clinical Medicine, Aarhus University, Denmark

Individuals with spinal cord injury often suffer from chronic pain. About 50% develop chronic neuropathic pain due to the lesion of the somatosensory pathways in the spinal cord or nerve roots. Neuropathic pain tends to persist despite treatments attempts and may have a major impact on the quality of life. Relatively few randomized controlled trials exist. These support the use of tricyclic antidepressants and gabapentin and pregabalin as first line treatments, but the effect sizes are low and the treatments may be associated with intolerable side effects. Psychological treatments, physical activity, and self-management skills are important despite limited evidence from trials. In many countries, there is a public and political interest in using cannabis for pain treatment despite lack of evidence and concerns about side effects. I will present results from a population-based questionnaire study on the use of recreational and medical cannabis use among individuals with SCI in Denmark and discuss the evidence for the use of cannabinoids for neuropathic pain.

[K2] A USER'S EXPERIENCE AND POINT OF VIEW
Leo Thomsen

I graduated as a medical doctor in 1982 and has been a general practitioner for 25 years. I had an accident in September 2014. It occurred due to a hit to the head, where I got a C5 lesion. I was primarily paretic, but with intensive rehabilitation throughout a year, I regained some function in my left arm, and was able to walk with a modified walker. I was primarily plagued by very strong spasms, but I refused to get a Baclofen pump. I began medicinal cannabis in early 2017. In November 2018 I got the Baclofen pump, notice the diagram below. Besides the cannabis, I have been treated with medicine for the spasms and the neuropathic pain, as well as with Botox.

I have been through several phases after my accident. I am going to describe the development in my Tetraplegia and through the recap of my experiences in the use of medicinal cannabis – both the upsides and downsides.

It Includes:

- Effect on spasms
- Effect on primary neurogenic pain
- Primary experience
- The different ways of using
- Dosage intervals and strength
- The time before the Baclofen pump
- The time after the Baclofen pump
- Addiction and abuse
- Cerebral effect
- Side-effects
- Some comments related to research
- The Danish Trial Project with medicinal cannabis

My own experiences are naturally affected by my medical background as a doctor

[K3] MANAGEMENT OF NEUROGENIC BOWEL DYSFUNCTION

Klaus Krogh, *Aarhus, Denmark*

Most individuals with spinal cord injury (SCI) suffer from neurogenic bowel dysfunction (NBD). NBD includes constipation, fecal incontinence and, in some, abdominal pain. It is ranked among the two most common and bothersome complications to SCI. The pathophysiology behind NBD depends on the level of lesion but most have slow transit through the colon, incomplete evacuation of the rectum, poor anal sphincter control and reduced or absent anorectal sensation. Importantly, NBD also affects gastric emptying and bladder function.

Standardized assessment of NBD includes the NBD score and the International SCI bowel function basic data set. Digital anorectal examination should be performed, but other objective examinations are usually not indicated. In some, colonic transit time evaluated with radiopaque markers may guide treatment.

Basic treatment of NBD includes oral laxatives, digital stimulation/evacuation and suppositories or mini enema. Unfortunately, the level evidence for basic treatment is very low as no regular randomized trails have been performed in subjects with SCI. If basic treatment is insufficient, transanal irrigation (TAI) is the method of choice. TAI is usually performed every or every second day. It has a rate of success of approximately 60-70 %.

If TAI fails, or in elderly patients with poor hand function, a stoma should be considered. This can either be an appendicostomy for antegrade colonic irrigation, or an ileo- or colostomy. Other surgical procedures and electrical stimulation should be considered experimental in persons with NBD

[K4] Urinary Incontinence

Marlene Elmelund, Rigshospitalet, University of Copenhagen, Denmark

Urinary incontinence is an involuntary loss of urine that frequently occurs as a consequence of neurogenic bladder dysfunction following a spinal cord injury. Despite the abundance of complications after a spinal cord injury, persons with spinal cord injury have ranked urinary problems as some of the most important health complications after injury. Due to an overweight of men among persons with spinal cord injury, most of our knowledge on neurogenic bladder dysfunction and urinary incontinence is based on research conducted in male spinal cord injury populations. However, the anatomical, physiological and psychological differences between the genders underlines the need for research evaluating urinary incontinence and treatment of urinary incontinence in spinal cord injured women alone as well. Especially considering that urinary incontinence is a much more common condition in women compared to men in general, affecting approximately one third of all women.[1]

There are several treatments for neurogenic urinary incontinence available. The overall aim of the treatment is to improve continence and quality of life and to protect the upper urinary tract. Clean intermittent catheterization, bladder relaxant drugs and intravesical botulinum toxin injections are some of the most common ones, but not all individuals are candidates for these treatments and some will need additional treatment. Several other conservative treatment options are available and has been widely used in women with urinary incontinence in general, though little is known about the effect in spinal cord injured women, including the effect of pelvic floor muscle training and intravaginal electrical stimulation. This session will focus primarily on urinary incontinence in women with spinal cord injury. The physiology of the different subtypes of neurogenic bladder dysfunction and urinary incontinence following a spinal cord injury will be presented. In addition, the prevalence of urinary incontinence after spinal cord injury and new conservative treatments of female urinary incontinence will be discussed, including presentation of own research in the field.[2-4]

1. Hunskaar S, Lose G, Sykes D, Voss S. The prevalence of urinary incontinence in women in four European countries. *BJU Int.* 2004;93(3):324-330.
2. Elmelund M, Biering-Sorensen F, Bing MH, Klarskov N. Pelvic organ prolapse and urogynecological assessment in women with spinal cord injury. *Spinal Cord.* 2018.
3. Elmelund M, Biering-Sorensen F, Due U, Klarskov N. The effect of pelvic floor muscle training and intravaginal electrical stimulation on urinary incontinence in women with incomplete spinal cord injury: an investigator-blinded parallel randomized clinical trial. *Int Urogynecol J.* 2018.
4. Elmelund M, Klarskov N, Biering-Sorensen F. Prevalence of urinary incontinence in women with spinal cord injury. *Spinal Cord.* 2018.

[K5] The use of the International SCI Data Sets in clinical practice and research

Fin Biering-Sørensen, Clinic for Spinal Cord Injuries, Rigshospitalet, Denmark

Increased survival after spinal cord injury (SCI) worldwide has enhanced the need for quality data that can be compared and shared between centers, countries, as well as across research studies, to better understand how best to prevent and treat SCI. Such data should be standardized and be able to be uniformly collected at any SCI center or within any SCI study. Standardization will make it possible to collect information from larger SCI populations for multi-center research studies. With this aim, the international SCI community has obtained consensus regarding the best available data and measures for use in SCI clinical practice and research. Data elements are continuously updated and developed using an open and transparent process.
There are ongoing internal, as well as external review processes, where all interested parties are encouraged to participate.

The first attempt to standardize reporting in the SCI community was the neurological/ functional classification of individuals with SCI, called the "Frankel classification". The classification was further developed by the American Spinal Injury Association (ASIA), in collaboration with the International Spinal Cord Society (ISCoS), into the International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI) (http://asia-spinalinjury.org/learning), which paved the road for standardization including the International SCI Data Sets (http://www.iscos.org.uk/international-sci-data-sets). There are today the International SCI Core Data Set, 19 International SCI Basic Data Sets, and 5 International SCI Extended Data Sets. The majority of these are also included in the National Institute of Health (NIH), National Institute of Neurological Disorders and Stroke (NINDS), Common Data Elements (CDE): https://www.commondataelements.ninds.nih.gov/SCI.aspx#tab=Data_Standards

In the Electronic Medical Record (EMR) *Epic* are the International SCI Core Data Set and the Basic Data Sets implemented for. Likewise it is being discussed to have them implemented in the large EMR Cerner.

Worldwide experience: The International SCI Data Sets are currently being used within the international SCI community in an increasing number of registries worldwide. Likewise translations for several of the Data Sets into Dutch, Spanish, Portuguese, Italian, French, Danish, Swedish, Norwegian, Finnish, Icelandic, Korean,
…….. of one or more International SCI Data Sets exist.

The International SCI Data Sets are increasingly used in published work from all over the world.

[K6] Male sexual health and fertility after spinal cord injury

Jens Sønksen, MD, PhD, Professor of Urology, University of Copenhagen, Department of Urology, Herlev & Gentofte Hospital, Denmark

This lecture addresses issues when managing sexual and reproductive health of men with SCI.
Following SCI the majority of men faces erectile and/or ejaculatory disorder and poor semen quality, which might have a huge impact on quality of life.
The treatment options for erectile dysfunction are good and include phosphodiesterase-5 inhibitors, intracavernosal injections, vacuum devices and penile prostheses.
Most men with SCI cannot ejaculate by masturbation or sexual stimulation. Assisted ejaculation method utilizing penile vibratory stimulation (PVS) or electroejaculation (EEJ) are effective in obtaining an ejaculate. The ejaculates from PVS and EEJ often contains sufficient motile sperm to allow assisted conception procedures or even intravaginal insemination at home after PVS. If PVS and EEJ fail, surgical sperm retrieval from the testis might be an option.
With proper medical management, these men can expect to experience active sexual lives and biologic fatherhood, if these are their goals. Numerous tools are available for helping these patients reach their goals.

[W1] Ageing with SCI
Jane Horsewell
Mikkel Bundgaard, RYK, Denmark

Learning objectives
- Discuss how to prepare for a good old age - in physical, mental and social perspectives.
- Identify how we as consumers want the professionals to help us in this preparation.
- Exchange how the SCI organisations prepare our members for a good old age.

Content
When we get older the body degrades and will no longer be capable of what it used to be capable ofWith a SCI the ageing processes start earlier and have a higher impact. People with a SCI are in higher risk of getting diabetes, osteoporosis, contractions, overload of muscles and joints, arthritis, hyperreflexia, etc. Increased attention and knowledge of how to prevent late effects of SCI combined to smart technology and aids improve the possibility to get a good old age with a SCI.
Most important is awareness of the signals from our body. That demands knowledge, insight and good habits. *Therefore, this workshop*!
The discussion will focus on these headlines:
- The social life. Compensating aids and measures, smart technologies, domestic living, network, social activities
- The mental life. How do we sustain quality of life when we no longer have the same energy as before and when our demands change?
- The body. How do we prepare the body for a good old age? Aspects related to the SCI which need more focus. Prevention, physical and medical treatment, follow up, food and exercise.
- Political priority. How do we make the decision makers aware that we as a small part of the population are worth spending resources on? Will we need to live at homes with specially educated employees to take care of us when we no longer can ourselves?

Structure
1. Short presentations from key persons from the participating SCI organisations: challenges, risks and possibilities you see for the ageing people with SCI in your home country.
2. Panel debate, involving audience.

Suggested presenters
Central representatives from the Nordic SCI organisations. Moderator: Viggo Rasmussen, RYK.

[W2] WORKSHOP ON SPASTICITY MANAGEMENT

Dr. Bo Biering-Sørensen, Director of Spasticity Clinic, Rigshospitalet, Copenhagen
Alette Jensen, occupational therapist, Department of spinal cord injuries, Rigshospitalet, Copenhagen

Aim: To illustrate the complexity of spasticity in spinal cord injury and how to manage it in the clinic

Methods: First the terminology in spasticity will be discussed followed by the assessment and choosing the right patient for the right spasticity treatment and setting goals for the treatment. The workshop will focus on spasticity management in a multidisciplinary setting.
Results: After a short presentation, patient cases will be illustrated and discussed.
Conclusions: Participants at the workshop should afterwards have a good overview of spasticity management in spinal cord injury and have an understanding of the complexity of spasticity which supports the purpose of a multidisciplinary team around the treatment.

Learning objectives:

1. Being able to describe the different types of muscle overactivity that may occur with a lesion in the Central Nervous System (CNS)
2. Having knowledge about the different types of treatment against muscle overactivity
3. Selecting the right patient for the right spasticity treatment
4. Setting Goals in spasticity treatment
5. How to manage spasticity treatment in a multidisciplinary team

Workshop structure:

- Combination of lecture and case discussion including interaction with the audience

[W3] Enough, but not too much? Physically activity for people with Spinal Cord Injuries.

Birgit Juul-Kristensen
Camilla M. Larsen

Purpose: To present and discuss the relevance and possibilities for physical activity without overloading upper body structures in people with Spinal Cord Injuries

Learning objectives:

- To present levels of aerobic fitness of newly injured people with Spinal Cord Injuries
- To present the variation of aerobic fitness levels in physically active and inactive people with Spinal Cord Injuries
- To present possibilities for adherence to recommended exercise guidelines for people with Spinal Cord Injuries
- To present the feasibility of a high intensive interval training exercise program using simultaneously Functional Electric Stimulation leg cycling and arm ski-ergometer cycling for preventing lifestyle diseases in people with Spinal Cord Injuries

Abstract: People with Spinal Cord Injuries (SCI) die earlier than the normal population, with the primary cause being cardiovascular disease (CVD). They further have higher risk of myocardial infarct, overweight, hypertension and diabetes. Further, people with SCI normally belong to the groups with the lowest daily level of physical activity. But how active are people who are newly injured with spinal cord injures, compared with those who are physically active and inactive?

High intensity interval training is known to reduce the risk of CVD in able bodied. But is high intensity training in people with SCI really feasible and safe?

The questions discussed will be the relevance and how much training/physical activity is enough to give sufficient cardiovascular response to prevent lifestyle diseases, without being too much in regard to overload important joint structures in the upper body.

[W4] Workshop on Crisis Management

Anders Korsgaard Christensen, Chief Psychologist at Clinic of Traumatic Stress, Rigshospitalet, Copenhagen University Hospital.
Naja Bøje Casupei, Clinical Psychologist, Department for Spinal Cord Injuries, Rigshospitalet, Copenhagen University Hospital.

Learning objectives:

- Be able to identify the common psychological reactions experienced by patients with Spinal Cord Injuries (SCI).
- Be able to identify the common psychological reactions experienced by health care professionals dealing with SCI patients.
- Gaining new perspectives on coping with psychological reactions arising from contact with SCI patients.

Content: Suffering a SCI is in many cases a life altering event and has a range of consequences for the individual, not least in the psychological domain. Professionals working with SCI patients will be aware of the high prevalence of depression, anxiety, grief and despair in this patient group. In this workshop, we will focus on the wide range of psychological reactions SCI patients experience as a result of their injury, in the acute phase as well as during the subsequent rehabilitation. Since dealing with patients with serious injuries also inadvertently has psychological impacts on health care professionals, we will also focus on the reactions experienced by professionals dealing with SCI patients and how these reactions might be understood and coped with. We will outline strategies that may be used at the individual, group or organizational levels.
The workshop will include structured group discussions on the above topics, where it will be possible to utilize and optimise the participants' own experiences acquired from working with SCI patients.

Workshop structure: The workshop will consist of two parts, the first part consisting of oral presentations, the second part consisting mainly of smaller group and plenum discussions.

[W5] Workshop on Pediatric Spinal Cord Injury
Per Ertzgaard

Pediatric Spinal Cord Injury (PedSCI) differs in some aspects compared to SCI in adults. For once it is more rare. The incidence in Sweden fore traumatic PedSCI (under the age of 16) has been calculated to 2,4 new injuries/million children, which for Sweden means 5 new traumatic pedSCI each year. For non-traumatic pedSCI the numbers are unknown, though from international comparisons we can expect the incidence to be at least twice as high as the traumatic SCI. In all this would mean that around 15 children under the age of 16 suffers from a pedSCI each year in Sweden. As there is no systematic centralized care or registry for these patients, we can assume that these numbers are an underestimation of the real incidence.
Regarding prevalence there are even less information. A very uncertain estimation would be that there are between 50 and 100 children in the age group 0-15 in Sweden (assuming a mean age of 10). For Norway and Denmark, the incidence and prevalence should be in a similar range.
Rehabilitation and follow-up in PedSCI differs in some aspects to the adult care. For once rehabilitation has to follow the age-related development of the children. Initially re-acquiring skills, but thereafter acquiring new skills parallel to their non-injured peers. For this, we need knowledge on the normal development of children. Further, there are complications that are more frequent in the pediatric cohort as scoliosis and other skeletal deformity. Management for pulmonary-, bladder- and bowel care has to be adapted and sometimes implemented in an age-relevant manner.
As pedSCI care now are being centralized in the Scandinavian countries there are a need for collaboration on rehabilitation strategies, instruments, follow-up, telemedicine and not least regarding common education for increased competence.

We would like to have a workshop regarding pediatric Spinal Cord Injury. We can either have it as a more closed session for invited participants involved in pediatric SCI or as an open workshop, with 3-4 lecturers followed by a longer discussion on the topics above, mainly on how to collaborate and on what issues.

[W6] THE NORDIC ADVANCED SCI REHABILITATION COURSE – OVERVIEW, SHOWCASE, WAY FORWARD

The NASCIR course team: Wolfram Antepohl MD PhD, Berit Brurok PT PhD, Line Trine Dalsgaard RN, Anestis Divanoglou PT PhD, Hanna Persson PT PhD, Randi Steensgaard RN MSc, Johanna Wangdell OT PhD and NASCIR participants

Learning objectives

- Describe the structure and key topic areas addressed during NASCIR 2018-19
- Showcase examples of quality improvement work
- Identify contemporary educational needs in the Nordic SCI rehabilitation context
- Discuss options for basic and advanced education in Nordic SCI rehabilitation

Content

Nordic Advanced Spinal Cord Injury Rehabilitation (NASCIR) is an interprofessional course that is delivered primarily on distance and includes two face-to-face seminars. The course was offered for the first time in 2018-19 at the University of Gothenburg, in collaboration with the Gothenburg Competence Centre for SCI, the Neurology Development Unit at Sahlgrenska University Hospital and NoSCoS.

An open invitation was distributed to all SCI centres in Denmark, Sweden, Finland, Iceland and Norway. 12 teams, each with 4-7 members enrolled in the course. NASCIR was designed as an interprofessional course that utilized problem-based learning with real-life cases, incorporated available online education (e.g. elearnSCI) and knowledge translation platforms (SCIRE project), encouraged reflective practice and learning, promoted critical thinking, facilitated Nordic collaboration and networking, and employed authentic assessment.

As part of the assessment, each Nordic team identified an improvement work topic from a real-life challenge that their unit was facing. Each challenge was then allocated to another Nordic team, which were asked to problem-solve and recommend appropriate strategies. Students were encouraged to use their own experience and base their suggested strategies on contemporary scientific evidence. Each team developed a report and a poster.

We see NASCIR as the first step in developing both intra- and inter-professional education courses relevant to the Nordic context. By exploring the contemporary educational needs of health professionals working in SCI care and rehabilitation, we will be able to further improve the NASCIR concept in order to offer the courses in a pragmatic and integrated way, that is meaningful for the students, suitable for their educational needs, and useful for their centres.

Structure overview

Part A: Overview of NASCIR 2018-19 (15 min)

Part B: Short poster presentations followed by Q&A time (3 min/poster x 5 posters, 10 min Q&A)

Part C: Planning forward (45 min): The following topics will be proposed and discussed in small groups: topics/ content, structure, format and mode of delivery, funding, workload, concrete benefits for participants and employers, formal credits.

[W7] Workshop on The new 2019 revision of the International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI)

Rüdiger Rupp, Heidelberg University Hospital, Spinal Cord Injury Center, Heidelberg, Germany
Christian Schuld, Heidelberg University Hospital, Spinal Cord Injury Center, Heidelberg, Germany

ISNCSCI published by American Spinal Injury Association (ASIA) and continuously maintained by the International Standards Committee of ASIA and the International Spinal Cord Society (ISCoS) represents the gold standard assessment for documentation of the level and severity of a spinal cord injury (SCI). Since its first introduction, the ISNCSCI has undergone several revisions with its newest eighth edition released this year. This 2019 revision is based not only upon comments, questions, and suggestions from the international SCI community, clinicians and researchers, but takes also recently available evidence and structured feedback from ISNCSCI training courses into account. It introduces the following major changes:

1. **The Zone of Partial Preservation (ZPP)** definition has been refined. The ZPPs represent important pieces of information for the characterization of a patient's neurological status. Additionally, ZPPs are among the most important predictors of neurological recovery. In the 2011 ISNCSCI revision and the 2015 up-date, ZPPs were only defined for complete (= ASIA Impairment Scale (AIS) A) injuries with no sensorimotor function in the most caudal sacral segments. Recording ZPPs only in cases with totally lost sensation (ab- sent deep anal pressure (DAP), absent light touch (LT), absent pin prick (PP)) and motor function (no voluntary anal contraction (VAC)) in S4-5 is not intuitive and restricts the value of ZPP for effective clinical communication to AIS A lesions only. Therefore, the ZPP rules were modified and are not based on the AIS grade anymore. While motor ZPPs are now defined in all cases with absent VAC, sensory ZPPs on a given side are defined in the absence of sensory function in S4-5 (LT, PP on this side and DAP not present). It has to be emphasized that in complete lesions (AIS A) the new ZPP definition is fully compatible with the former definition and does not lead to different classification results. An analysis of ISNCSCI datasets from the European Multicenter Study about Spinal Cord Injury (EMSCI) found that in one third of the incomplete patients meaningful ZPPs can be provided with the new definition. A deeper analysis of the EMSCI dataset revealed that the prognosis of the lower extremity motor score after one year is more reliable with the new definition of the ZPP.

2. **A new taxonomy for documentation of non-SCI related impairments is introduced.** Based on the feedback from clinicians, there is an increasing (although still low) number of patients with pre-existing musculoskeletal or neurological problems which have an impact on the ISNCSCI examination results. Such problems include among others chronic peripheral nerve injuries, acute or chronic pain or age-related muscle weaknesses. In the former ISNCSCI revision, the *5*" was foreseen for cases, where not the full muscle strength is achieved, but the examiner thinks that it would be achieved if the non-SCI condition was not present. However, this approach has the drawback that 1) it is reserved for the motor examination only and 2) the real examination score is lost unless the examiner explicitly documents it in the comments box. To overcome this limitation a general "*"-concept has been introduced, where abnormal ex-amination scores can be tagged with a "*" to indicate that a non-SCI condition impacts the examination results. This general '*'-concept is applicable to the motor as well as the sensory exam independent from the level of occurrence (above, at or below the sensory/motor level). The use of the "5*" is not recommended anymore, except for ongoing clinical studies where is currently being used.
If an examiner tags a score with the '*', details on the reason for this and how this '*'-tagged score should be handled during the classification process need to be specified in the 'Comments box'. While '*'-tagged scores above the sensory/motor level will in most cases be handled as normal during classification, '*'-tagged scores at or below the motor/sensory level indicating a non-SCI related impairment superimposed to the deficit caused by the SCI will typically be handled as not normal. Each classification variable resulting

in defined motor, sensory or neurologic levels or AIS which is affected by the '*'-tagged scores, should also be designated with a '*'. By this method, it is clearly indicated that the classification results are based on clinical interpretation of the recorded scores.
In some cases, it might be difficult to decide whether a classification variable should be tagged or not. To simplify this decision process the following general approach is recommended: First, the classification should be performed on the basis of the examined scores. Then, the "*"-tagged scores should be replaced with the ones based on clinical judgment and a re-classification should be done. Finally, all differing classification variables should be tagged with a "*". With the new non-SCI taxonomy and the availability of the real examination scores, motor and sensory sum scores are always calculated on the basis of the examined scores. As in the past, if key muscles or dermatomes cannot be tested ('NT'), the sum score is not defined, which should be noted as 'ND'.

Learning Objectives

- To learn about the changes introduced with the 2019 revision of the ISNCSCI.
- To apply the new definitions and rules in practical sample cases.
- To interactively classify difficult ISNCSCI cases.

Workshop structure

1. Introduction of the changes of the 8th ISNCSCI edition (R. Rupp)
2. Documentation of non-SCI related impairments (R. Rupp)
3. New definition of Zones of Partial Preservation (C. Schuld)
4. Interactive classification of difficult cases (R. Rupp, C. Schuld)
5. General discussion

[W8] Workshop on Nursing workshop
Randi Steensgaard and Line Trine Dalsgaard

Can we find the pathway to good bowel management? Transanal Irrigation: who, why, when, how?
Keynote speaker: Brigitte Collins

The workshop will explore the pathway to good bowel management with a focus on transanal irrigation. Based on an oral presentation of Brigitte Collins we invite You to participate in dialogue in groups. Your knowledge and experience about bowel management and transanal irrigation will be put into play. We will discuss: When is trans anal irrigation a good idea? How do we identify the patients who will benefit from trans anal irrigation? How do we educate the patients? How do we evaluate and follow the patients after start up?

[W9] Occupational- and Physiotherapist Workshop

Dorte Dahl Hofmann, Nicolaj Jersild Holm and David Jonsson

Title: REHABILITATION OF THE ELDERLY SCI-PATIENT

Aim: To gain more knowledge about rehabilitation of the elderly SCI-patient (including both people with long-term SCI getting older and elderly with a new SCI) and to form networks among physio- and occupational therapists from the Nordic countries.

Methods: Exchange of physio- and occupational therapists experiences and ideas within rehabilitation of the elderly SCI patient. The workshop will consist of a plenary presentation, and a panel discussion involving the audience, based on pre-identified topics related to the topic. We hope that therapists from at least one SCI-unit per country will be represented in the panel discussion and make the workshop inspiring by presenting their approach to the elderly SCI-patient and work that is going on at their local SCI-unit.
Preidentified topics of importance that will be discussed at the workshop are for instance osteoporosis, late complications and lifestyle diseases, training/exercise intensity, pain, respiration, cognitive challenges, spasticity and contractures (including reconstruction of tendon transfers, orthosis management etc.).

Results: In addition to gain more knowledge about the elderly SCI-patient and exchange experiences and ideas at the workshop, we will encourage participants to form networks that they and their patients can benefit from in their future SCI rehabilitation work, in terms of clinical work as well as research.

Conclusions: The workshop will give the opportunity to meet with other Nordic physio- and occupational therapists and compare, discuss and get inspired by the similarities and the differences within Nordic SCI- rehabilitation of the elderly patient.

[W10] Get involved - about consumer empowerment
Birgitte Bjørkman

Learning objectives for the workshop

- To get a professional visual media for the presentation of an organisation, nationally and internationally.
- To obtain 100% financial sponsorship.
- Extend knowledge of your organisation.
- Visually and verbally convey the message about what your organisation stands for.

Process

- Coordinated in collaboration with a professional, Danish media agency.
- Preparation of ideas, production and editing.
- Selection of interviewees.
- Obtaining consent declaration according to. legislation.
- Contact with sponsors.

Result

- Video completion in February 2019.
- Length: 3.15 minutes.
- An edition without subtitles and one with English subtitles.
- Application agreement minimum 3 year

Suggested workshop structure

Presentation of the process and of the result.

[W11] Workshop on Exoskeletons – results and experiences from rehabilitation clinics and home use

Carsten Bach Baunsgaard, Clinic for Spinal Cord Injuries, Hornbæk, Rigshospitalet
Anu Piira, Department of Health and Care Sciences, Faculty of Health Sciences, University of Tromsø, Norway; North Norway Rehabilitation Center, Tromsø
Rosanne van Dijsseldonk, Department of Research, Sint Maartenskliniek Research, Nijmegen, Netherlands

3-5 learning objectives for the workshop

1. Get an overview of current available exoskeletons on the market in the Nordic countries
2. Learn about research results from locomotor training with exoskeletons
3. Learn about results and experiences from exoskeletons used as home/community mobility device

An abstract of the content

There will be three presenters providing content for this workshop from Denmark, Norway and The Netherlands. The content covered are the following: what types of exoskeletons are currently available for the Nordic market and where are they being used. There will be presented research results from research projects of locomotor function from "the Lokomat" as well as exoskeletons that walk over ground. Results from a study investigating a framework for measuring and predicting user's acquisition of skills for using an exoskeleton will also be presented. The last part of the workshop will be focused on research results and experiences on using exoskeletons as 'home devices', meaning users have the exoskeleton use the exoskeleton in their home setting and in their own time as an assistive device and home training, as opposed to guided training at rehabilitation facilities.

Suggested workshop structure

The first hour will be 3x20 minutes divided between the three presenters for their presentations. The last 30 minutes will be used for interaction with the audience for them to pose questions to the presenters and for panel discussion. To engage the audience there will be polls and questions for the audience as well.

[O30_W11] ROBOT-ASSISTED BODY-WEIGHT SUPPORTED LOCOMOTOR TRAINING IN PERSONS WITH CHRONIC INCOMPLETE SPINAL CORD INJURY IN AN OUT-PATIENT CLINIC: A RANDOMIZED CLINICAL TRIAL

Anu Piira[1], Anne Marie Lannem[2], Marit Sørensen[3], Thomas Glott[2], Raymond Knutsen[4], Lone Jørgensen[1], Knut Gjesdal[5], Nils Hjeltnes[2], Synnøve F. Knutsen[6]

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[2]Sunnaas Rehabilitation Hospital, Department of Research, Nesoddtangen, Norway

[3]Norwegian School of Sport Sciences, Department of Coaching and Psychology, Oslo, Norway

[4]North Norway Rehabilitation Center, Tromsø, Norway

[5]Oslo university hospital Ullevål , Department of Cardiology

[6]Loma Linda University, Department of Epidemiology and Biostatistics, Loma Linda, CA, United States

Aim: Various locomotor training methods have been used in attempts to recover walking function after spinal cord injury (SCI). The ATLET study (NCT00854555) was a single-blinded randomized intervention study among Norwegians with chronic incomplete SCI that assessed the effects of 1) manual or 2) robot-assisted body-weight supported locomotor training (BWSLT) on physiological and psychological variables. This presentation gives results of the robot-assisted BWSLT program.

Methods: The study planned to enroll 30 persons with chronic incomplete SCI (American Spinal Injury Association grades AIS C and D), randomized to receive standard care or intervention (robot-assisted BWSLT). The intervention group had 60 training days of robot-assisted BWSLT over six months, whereas the control group received usual care. Standardized evaluation tools assessed outcome of neurological injury, motor function and quality of life single-blindly before and after completed intervention or control period.

Results: Twenty-four persons (intervention/control = 8/12) enrolled in the robot-assisted BWSLT. Mean time since injury was 17 (SD 20) years. Walking function, lower extremity muscle strength and balance improved modestly in both groups, with no statistically significant group difference in walking function or muscle strength, whereas postural control declined significantly. Intervention group reported slightly improved physical functioning, however not statistically significant (p=0,07).

Conclusions: Independent walking function was not recovered by late-onset robot-assisted BWSLT in persons with incomplete SCI with poor baseline function. Robot-assisted BWSLT requires less staff than such training with manual assistance, but the robot is costly, and the training form is hardly cost-effective in the present patient group.

[W12] Management of traumatic cervical spinal cord injury (cSCI) in the Neuro Critical Care Unit (NCCU)

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LEARNING OBJECTIVES

Workshop A

- Understand pathophysiological circulatory and respiratory changes in acute cSCI
- How to assess and manage the airway in acute cSCI and how to ventilate. Pro and con tracheostomy. How to wean from ventilator and when.
    - How to support the circulation in acute cSCI When to discharge from the NICU – and where?

Workshop B

Bridging ventilatory support from the NCCU to longterm ventilator support: Cooperation between the Neurointensive Care Unit and the Respiratory Centre:

- Organization
- Which patients can be weaned from ventilator? Early planning of cough assists and longterm ventilatory support
- How to prepare the patient for long-term ventilation

ABSTRACT

Workshop A; Patients with acute cSCI present complex clinical challenges. Injury of the cervical spinal cord may result in cardiovascular and respiratory pertubations as well as motor and sensory deficit. Our understanding of pathophysiology and secondary injury mechanisms involved in SCI have advanced and the medical and surgical treatments changed in the last decade. The workshop will give an overview of the major pathological changes relevant for daily clinical treatment of the acutely injured cervical spinal cord patient and outline the overall management goals and challenges with focus on the cardiorespiratory compromise.

Workshop B; During the last 3 years a unique cooperation between NCCU and Respiratory Centre for long term ventilation have enhanced weaning from mechanical ventilation, identified patients with need for long term ventilatory support and bridged discharge from the hospital to SCI rehabilitation centre.

WORKSHOP STRUCTURE

Lecture ("This is how we treat our cSCI patient" or other learning point) 10-15 min followed by discussion. Case presentations followed by discussion – round table

[W13] WORKSHOP ON NUTRITION RELATED COMPLICATIONS IN PERSONS WITH SPINAL CORD INJURY (SCI) – A MULTIDISCIPLINARY WORKSHOP ON PATIENT EDUCATION, PREVENTION AND TREATMENT

Founding members of NutriNord_SCI:
Anna-Carin Lagerström, Spinalis Foundation, Rehab Station Stockholm, Sweden
Hanne Björg Slettahjell, Sunnaas Rehabilitation Hospital, Norway
Line Trine Dalsgaard, Clinic for SCI, NeuroScience Centre, Hornbæk, Denmark
Randi Steensgaard, Spinal Cord Injury Centre of Western Denmark, Viborg, Denmark

Learning objectives

- Explain to patients about changed body composition and energy needs after SCI
- Apply knowledge on metabolic complications after SCI and how to prevent it
- Support patients with weight management education materials
- Recognize the role of nutrition in relation to obesity, malnutrition, pressure wounds and
- bowel management

Abstract

A healthy, personally adjusted diet is important to help prevent development of common health issues such as overweight/obesity, bowel complications and pressure sores after SCI. In spite of well documented knowledge on nutrition related problems, few prevention and intervention strategies have been presented. At the NoSCoS meeting in 2017, NutriNord_SCI - a Nordic initiative on patient education on nutrition for people with SCI - was established as a Special Interest Group. Since then educational tools and materials on an easy-to-read level have been developed.

Aim

Exchanging ideas, research knowledge, clinical experience and user perspectives to strengthen the field of nutrition in SCI-rehabilitation.

Results

Tools for patient education on nutrition and weight management have been developed and implemented at several SCI rehabilitation units. The tools will be presented to facilitate further implementation.

Conclusions

This workshop provides a multidisciplinary and professional Nordic approach to raise awareness and knowledge-based practice on nutrition in SCI rehabilitation.

Workshop structure

- Oral presentations on prevention strategies, interventions and educational approaches for
- Patients and health professionals related to nutrition and SCI
- Information on NutriNord_SCI and invitation to the participants to take future part
- Demonstration of ”The Weight Station” including materials on patient information - all
- Available for translation
- Group discussions – sharing ideas and initiatives on nutrition and weight management

[W14] Workshop on Neuromodulation in Spinal Cord Injury

Learning Objectives

- You will learn about a new and promising treatment method using The LION (Possover) procedure to implant a pacemaker system for regaining motor and sensory function in lower body regions
- You will learn about new promising methods for enhancing muscular functioning and training smarter
- You will learn about advanced imaging methods and advanced animal model studies to reveal secrets of the healing processes after spinal cord injury
- You will learn from the impressive results from a Danish Study in which 12 SCI persons underwent the LION procedure and hear about the results after 18-28 months
- You will attend a live presentation of a person now living with a pacemaker and his new achievements

Abstract

Current clinical SCI treatment procedures are only partly effective. There is an urgent need for new therapeutic strategies that could significantly impact on recovery rates and improve the modest results regarding remobilization and restoration of functioning. In a recently published case study, professor Possover showed substantial improvement of motor function after 18 SCI persons underwent the so-called LION procedure (Laparoscopic Implantation Of Neuroprosthetic). Continuous neurostimulation and daily training programs increased motor functioning significantly.

In a collaboration between the Spinal Cord Injury Center at HEM Viborg, Skejby University Hospital, University of Southern Denmark and professor Possover, Zürich, we have performed the LION procedure in a prospective controlled study. Preliminary results from this study are presented. Similarly important research findings from the group aiming at improving QoL and more profoundly comprehend and interact with healing processes and improve neuro-functioning after SCI are presented.

Workshop structure

- 4 oral presentation of each 15 minutes
- Patient/SCI person demonstration of the Pacemaker System and its abilities. 10 minutes
- Discussion –Panel of 5 (including patient) with moderator 20 minutes

Presenters

- **Professor Axel Forman**, Dept of Gynecology, Aarhus University Hospital Skejby, and Department of Clinical Medicine, Skejby Aarhus University. President of The ISON (International Society of Neuropelveology)
- **Professor Michael Pedersen**, Comparative Medicine Lab., Department of Clinical Medicine, Aarhus University.
- **Associate Professor Ulrik Frandsen**, Muscle Physiology and Biomechanics Research Unit, Institute of Sports Science and Clinical Biomechanics, University of Southern Denmark.
- **Dr. Søren Bruno Elmgreen**, Senior Consultant Neurologist, PhD Student, Spinal Cord Injury Center of Western Denmark, HEM Viborg and Department of Clinical Medicine, Aarhus University. Moderator: Associate Professor **Helge Kasch**, MD PhD. Spinal Cord Injury Center of Western Denmark, HEM Viborg and Department of Clinical Medicine, Aarhus University.

[W15] WORKSHOP ON DYSPHAGIA AND SPINAL CORD INJURY (SCI) - HOW TO IMPROVE BEST PRACTISE AND FACILITATE INTERDISCIPLINARY COOPERATION

Bettina Aller, occupational therapist, Alette Jensen, occupational therapist

Learning objectives

Participants at the workshop will learn about the association between tetraplegia and dysphagia, considering prevalence, symptoms and prognosis.

An important theme of the workshop is to facilitate the intradisciplinary cooperation and teamwork around the SCI-patient with dysphagia, therefore a learning objective is to present some useable tools aiming to improve the workflow at the participants local SCI-units.

To introduce the workshop participants to the workflow at SCI-unit in Hornbæk, where the occupational therapist treats the SCI-patients with dysphagia with NMES combined with therapeutic eating, and how our intradisciplinary cooperation works. We expect that the dialogue concerning this treatment will inspire the participants, and lead to future Nordic cooperation and networking.

Abstract

Title	DYSPHAGIA AND SPINAL CORD INJURY (SCI) - HOW TO IMPROVE BEST PRACTISE AND FACILITATE INTERDISCIPLINARY COOPERATION
Introduction	Dysphagia is a known symptom with significant consequences for the patient with a tetraplegic SCI. Risk factors for developing dysphagia are injury severity, level of injury, presence of tracheostomy, mechanical ventilation and cervical surgery.
Aim	The purpose is to present a single-case study of occupational therapy (OT) intervention for dysphagia at Clinic for SCI in Hornbæk, Denmark. By presenting our case, we´re hoping to facilitate a dialogue of how to improve best practice by interdisciplinary cooperation.
Material and methods	The participant was a 75-year old male with a C5-6 incomplete tetraplegia. He received one hour of training, three times a week for 12 weeks. The intervention given was neuromuscular electrical stimulation (NMES) while eating food with increased bolus viscosity and volume, combined with surface electromyography (sEMG). At the ward the patient received Therapeutic Eating with the ward-staff. At baseline and after the intervention Functional Oral Intake Scale (FOIS) and Fibreoptic Endoscopic Evaluation of Swallowing (FEES) was used. The study participant will be a part of the workshop.
Results	Participants at the workshop will be presented to two videos of FEES-investigations before and after two months of treatment. Other results will be presented, and discussed, in collaboration with the audience and the interdisciplinary team.
Conclusion	This single-case study indicates that the treatment depends on the patient's motivation, cooperation, the interdisciplinary teamwork and evidence based clinical practice. Further studies in the field are needed.

Workshop structure

Part 1: Occupational therapy intervention of dysphagia. The single-case study participant will be a part of the workshop.

Speakers: Occupational therapists Bettina Aller and Alette Jensen.

- 3 min: Introduction to the speakers and the purpose of the workshop.
- 5 min: Introduction to the consumer and his history of illness and cause of injury.
- 5 min: Introduction to OT treatment of dysphagia at Clinic for Spinal Cord Injuries, Hornbæk Denmark.
- 25 min: During this session we will tell about the specific OT-treatment with neuromuscular electrical stimulation (NMES). It will be possible for the audience to have visualized the participant´s swallowing when combining exercises with sEMG, showing the bio-feedback live on a big screen.
- 8 min: Dialogue and questions from the audience.
- 2 min: Introduction to the second part of the workshop.

Part 2: Interdisciplinary treatment of the SCI-patients with dysphagia (facilitator for the process) Speakers: Study participant, occupational therapist, physiotherapist and ward-staff.

- 10 min. Introduction to the intradisciplinary team work to the SCI patient with dysphagia. What was challenging? What went well?
- 20 min. Dialogue and discussion concerning the intradisciplinary treatment of SCI-patients with dysphagia in other SCI-units.
- 5 min. How can we optimize intradisciplinary treatment of SCI patients with dysphagia in the future?

[W16] Workshop on Bowel issues and analirrigation and effect on quality of everyday life – from user and healthcare professional perspective

Klaus Krogh, MD, PhD, DMSc Professor of Gastroenterology and Chief Physician Director of Neurogastroenterology Unit Department of Hepatology and Gastroenterology Aarhus University Hospital Aarhus, Denmark
Stig Langvad SCI (1973) Member of RYK Former Coloplast, RYK responsible for survey

Learning objectives: Improve knowledge concerning: User perspectives on bowel management, QOL and channels for information.

Abstract: A survey conducted by RYK in May and June 2019 focuses on experiences with bowel management, including the bowel's impact on the quality of everyday life and the ability to participate in the labor market. Among others, it addresses the forms of treatment regimens and the sources of clinical information for members to best deal with their bowel issues. There is particularly a focus on anal irrigation as a form of treatment for bowel issues. The results of the survey are presented as background for a discussion of the experiences and needs – compared to the perspectives of the specialized healthcare professionals with expertise in the field. The objective is to discuss the standard of care in Denmark, and if we see a need to propose to adjust the current practices? The bowel is 2nd in ranking of major challenges to impact quality of daily life. Bowel problems are the reason for 25% of absence for those acting on the labour market. SCI-centers and SCI-organizations are absolute main sources of information. 438 people responded to the survey, corresponding to approximately 30% of RYK's members, making the results very representative and providing a solid background for the discussions during the session.

Structure: Presentation of results from RYK survey and follow by reflections on results by expert healthcare professional leading up to debate on results and proposals for improving QOL of persons with SCI. After presentations there will be time for Q/A.

[O1] PROFILE OF PATIENTS WITH SPINAL CORD INJURIES IN DENMARK, NORWAY AND ICELAND

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[3]Regional Hospital of Viborg, Department of Neurology, Viborg, Denmark
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[8]University of Gothenburg, Sahlgrenska Academy, Institute for Psysiology and Neuroscience, Gothenburg, Sweden

Aim: A Nordic Spinal Cord Injury registry (NordicSCIR) was established in 2017, to improve care for individuals with Spinal Cord Injury (SCI). NordicSCIR is collecting SCI data that facilitates comparisons regarding injuries, treatment, and outcomes between patients, centers and countries.

Methods: NordicSCIR is based on the International SCI Data Sets. The registration is electronically, web based on Medical Registry System (MRS). NordicSCIR includes all patients with SCI, hospitalized in one of the six SCI units in Denmark, Norway or Iceland. Written informed consent is obtained. Information is sent through the Norwegian Health Network, providing efficient, secure electronic exchange of patient information. Data controller is St.Olavs University Hospital, Trondheim, Norway. The MRS platform is adapted to multilingual use.

Results: In 2017, data from 230 individuals with SCI were included. The coverage was 82%. We observed predominance of men (71%). The major cause of SCI was traumatic (58%). However, an interesting finding was the distribution between traumatic and non-traumatic SCI in Denmark, 48 % / 52 %. The main causes of traumatic SCI are related to fall (25%). Mean age for traumatic SCI was 50 years, and for non-traumatic 55 years. The distribution between paraplegia and tetraplegia at discharge was 52 % / 48 % (N=180).

Conclusions: Through a Nordic Medical Quality Registry based on internationally provided data sets, we are able to present systematic and updated data from the profile of SCI patients in Denmark, Norway and Iceland.

[O2] THE RESULTS OF THE NATIONAL FINNISH SPINAL CORD INJURY STUDY PROTOCOL PROCESS

Susanna Tallqvist[1], Heidi Anttila[2], Mauri Kallinen[3], Eerika KOSKINEN[4], Harri Hämäläinen[5], Anna-Maija Kauppila[6], Anni Täckman[7], Aki Vainionpää[8], Jari Arokoski[5], Sinikka Hiekkala[9]

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[7]The Finnish Association of Spinal Cord Injured Akson
[8]Seinäjoki Central Hospital, Department of Rehabilitation
[9]The Finnish Association of People with Physical Disabilities

Aim: The purpose of the Finnish Spinal Cord Injury Study (FinSCI) is to identify factors related to the health and functioning of people with spinal cord injury, their challenges with accessibility, and how such factors are interconnected. The International Classification of Functioning, Disability and Health (ICF) is used as a structured framework in the study.

Methods: Exploration of patient registers to find out eligible subjects with spinal cord injury (SCI), the ASIA impairment scale, the neurological level of injury, the aetiology and date of the SCI.

Results: Study participants were recruited from all 3 spinal cord injury outpatient clinics in Finland. The systematic data collection resulted in 2,322 subjects who had visited outpatient clinics. The final target group consists of 1,789 subjects with spinal cord injury. The final questionnaire was formed utilizing 5 different ICF core sets and from 5 different patient-reported instruments. The spinal cord injury-specified instruments are the Spinal Cord Injury Secondary Condition Scale, the Spinal Cord Independence Measure, and the Nottwil Environmental Factors Inventory Short Form. In addition, questions from the following generic instruments were chosen after a selection process: the Patient-Reported Outcomes Measurement Information System, PROMIS®, and the National Study of Health, Well-being and Service, FinSote. Altogether, the final questionnaire covers 64 ICF categories and consists of 151 ICF-linked questions.

Conclusions: The formulated questionnaire covers widely different aspects of health, functioning and accessibility. The questionnaire results and subsequent interviews will help in developing care and rehabilitation policies and services for people with spinal cord injury.

[O3] THE EPIDEMIOLOGICAL CHARACTERISTICS OF NON-TRAUMATIC SPINAL CORD INJURY IN FINLAND - A FOUR-YEAR PROSPECTIVE MULTI-CENTER STUDY

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Aim: To reveal the incidence and epidemiological characteristics of non-traumatic spinal cord injuries (NTSCI) in Finland.

Methods: A prospective four-year epidemiological multi-center study in two of the three spinal cord injury (SCI) centers in Finland. In 2011 the acute care, immediate rehabilitation and lifelong follow-up of SCIs in Finland were centralized to Tampere, Oulu and Helsinki University Hospitals (UH). The study sample consists of all newly diagnosed NTSCI patients admitted to Tampere UH 2012-2015 and Oulu UH 2013-2016 serving a population of 3 073 052 (year 2013).

Results: 430 patients were included in the study resulting the incidence of 54.1/1 000 000. NTSCI was more common in male (n=260, 60.5%) than female (n=170, 39.5%). The mean age was 62.0 (±14.6) years. Degenerative causes were the most common aetiology (n=219, 50.9%) followed by malignant (n=88, 20.5%) and benign neoplasms (n=41, 9.5%). The injury resulted in tetraplegia in 177 patients (41.1%) and paraplegia in 252 patients (58.6%). AIS D injuries were common with the incidence of 71 per cent (n=304) of the patients.

Conclusions: There is no previous studies about the epidemiology of NTSCI in Finland, and the international knowledge has been limited. The incidence of NTSCI in our study is remarkably higher than in most of the previous studies, however there are only few good quality studies available. The present study provides important new data about epidemiological features of NTSCI, which can be used in prevention and planning of resources.

[O4] SPINAL CORD INJURY IN INDIAN CHILDREN: A REVIEW OF 204 CASES

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Aim: The purpose of the study was to analyze the incidence, type and epidemiological parameters in Indian children with spinal injury admitted at Indian Spinal Injuries Center (ISIC) in the last 14 years.

Method: The demographic and injury related data were analyzed descriptively. The incidence, type and level of injury were compared across the age groups using chi square test. Wherever appropriate Fisher exact test was used.

Result: There were 1660 pediatric trauma cases admitted at ISIC from the year 2002 to 2015, where 204 cases were with spine injuries. The average age of children with spine injury was 15.69 years, ranging from 3 to 18 years. There were 15 patients (3%) in group A, 27 patients (6%) in group B, and 162 patients (21%) in group C. This difference in spine injury incidence among the age groups was statistically significant (*chi square =97.1, df =2, p<.0001*). Cervical spine was the commonly involved region. Amongst cervical level injuries 9% subjects had upper cervical and 91% had sub axial involvement. Group C showed predominance of all regional level injuries.

Conclusion: Fall from height was the major mode of injury. The boys injured, were three times more common than the girls. There were high number of burst fracture. SCIWORA incidences are in the same line as of other published literature. There was very low incidence of death. This study gives an insight to the injuries and type management required in children. Also, no data have been published in Indian region so far.

[O5] CROSS- SECTIONAL AND PROSPECTIVE DATA -COLLECTION IN A COMMUNITY SETTING IN NORTH MACEDONIA-METHODOLOGICAL CONSIDERATIONS

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Aim: To describe and discuss methodological issues, experienced challenges related to data collection in North Macedonia*, University Hospital-Mother Teresa, as well as to discuss possible improvements of epidemiological data collection in future studies.

Methods: A description of methodological challenges experienced in collecting data from 78 persons with acute and chronic traumatic spinal cord injury (SCI) examined and interviewed in 2015-2017 using questionnaire and standard assessments tools.

Results: This study identified three major challenges with data collection data in this setting: 1) research logistics and procedures, such as recruitment, infrastructure and compensation. 2) ethical issues and the initial lack of mutual trust and understanding between researchers and participants and 3) scientific quality and interpretation, including representativeness.

Conclusions: Methodological issues influenced by settings, are important to consider when interpreting study results. Health-care-systems varies between (and sometimes in) countries, language and culture may introduce barriers to understanding, and epidemiological research also rely on infrastructure and surroundings. For this study, making time for and listening to the participants without being intruding was of special importance in building trust and a good relationship to the participants when recruiting participants and collecting data. We here provide suggestions regarding how to facilitate future epidemiological data collections in North Macedonia. We argue that the studies are valuable and contribute to the knowledge base of persons with SCI in North Macedonia.

[O6] PERSPECTIVES ON CAPACITY BUILDING IN SPINAL CORD INJURY (SCI) IN A LOWER INCOME COUNTRY: THE MONGOLIAN CONTEXT

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Aim: To outline the current situation, challenges and opportunities in relation to capacity building in SCI management in Mongolia from a technical and policy perspective.

Methods: Observations from a capacity building project, which took place over a two-year period in Ulaan Bataar, Mongolia.

Results: There are no healthcare staff specialised in SCI and prior to 2017, no SCI specific trainings organised.

Healthcare staff's limited knowledge of English and younger generations, limited knowledge of Russian, meant that www.elearnSCI.org was not readily accessible by healthcare staff.

Adult hospital admissions are limited to 10-14 days, regardless of pathology and there are no inpatient rehabilitation beds. Furthermore, there is no agreed national plan on rehabilitation.

In response, training programs were held, www.elearnSCI.org is in the process of translation into Mongolian and a policy dialogue meeting was held with national and international stakeholders to develop strategies to strengthen healthcare and rehabilitation services for persons with SCI.

Conclusions: Capacity building requires local engagement and international stakeholder commitment from the beginning, and engagement at a technical- and policy-level.

Challenges identified were language barriers, no specialised SCI services and frequent governmental changes. No inpatient rehabilitation beds meant no dedicated space for specialised SCI rehabilitation, thus greatly challenging any effective model of rehabilitation.

Opportunities include:

- The Health Law (2016) that outlines provision of rehabilitation services
- Plans to establish National Rehabilitation Centre
- International partnership and collaboration
- Development of a National SCI development programme.

[O7] DECISION GUIDE FOR TRANSANAL IRRIGATION - CHOOSING THE RIGHT EQUIPMENT

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Aim: Transanal irrigation (TAI) systems for bowel dysfunction, have emerged for patients who fail to adequately improve their symptoms with conservative bowel management. Having a range of products makes decision making on system use challenging. An expert consensus group has developed a decision guide to help decide the optimal equipment to use for each individual patient when initiating TAI.

Methods: The review is not product specific. The consensus group had a detailed and structured round-table discussion during where a pathway of care was developed, and a manuscript arose from that process, which was revised by each member individually until a group consensus was agreed. This review is presented in a deliberately pictorial way in order to make it as user friendly as possible. Information is presented in box text and tables to allow novice and experienced clinicians access to a handy summary guide to assist consultations and practical discussions.

Results: Information in text boxes and tables are presented to allow novice and experienced clinicians access to a handy summary guide to assist consultations and practical discussions. The intention is to optimise safe practice with an evidence-informed and expert consensus guide (on one page).

Conclusions: Transanal irrigation is a treatment to manage bowel dysfunction. With greater use and a range of products available, it becomes fundamental for the clinician to have guidelines to help make the decision on using the right system for the right reason. Making this a choice based on theory and practicalities for each individual patient.

[O8] UPPER EXTREMITY PAIN IN LONG-TERM SPINAL CORD INJURY: ASSOCIATION WITH EXERCISE CAPACITY AND PHYSICAL ACTIVITY

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Aim: Persons with spinal cord injury (SCI) are at risk of developing upper extremity musculoskeletal pain (UEMP). The expectation is that people with UEMP are less active and have a lower exercise capacity. The objective of this study is: (1) to determine the prevalence and severity of UEMP in adults with long-term SCI (>10 years), and (2) to estimate the associations between UEMP and exercise capacity or physical activity.

Methods: Cross-sectional study in eight specialized SCI rehabilitation centers. Persons with long-term SCI (>10 years) using a wheelchair were included (N=282). UEMP and physical activity (Physical Activity Scale for Individuals with Physical Disabilities (PASIPD)) were assessed with questionnaires (N=262), peak power output (POpeak) was measured with graded exercise capacity test (N=127). Regression analyses were performed to determine the relationship between UEMP and POpeak / PASIPD.

Results: UEMP was reported by 54.8%, with shoulder pain as the most frequent subtype (50.8%). 14.5% reported severe UEMP. No significant relationships were found between UEMP or severity of pain and POpeak or PASIPD. No differences in UEMP or severity of pain were found between persons who were able to perform an exercise capacity test versus persons who were not able to perform it.

Conclusions: About half of the persons with long-term spinal cord injury suffer from UEMP and about 15% report severe UEMP. Surprisingly, UEMP appears not to affect exercise capacity or physical activity. Possible explanations are the low number of patients with severe pain or that persons ignore their chronic pain and exercise nonetheless.

[O9] PREVALENCE OF SELF-REPORTED SHOULDER AND NECK SYMPTOMS IN INDIVIDUALS WITH CHRONIC SPINAL CORD INJURY - AN OBSERVATIONAL CROSS-SECTIONAL STUDY

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[10]*University of Applied Sciences, ACHIEVE, Center for Applied Research, Faculty of Health, Amsterdam, Netherlands*

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Aim: To describe the overall prevalence of shoulder and neck symptoms of individuals living with chronic spinal cord injury (SCI) in Denmark.

Methods: Data was collected through the nationwide **D**anish **S**pinal **C**ord **I**njury **S**houlder`(**D**an**SCIS**) study (N = 1,517, 62%) age 56.1 ± 16.1, 37% female, 42% tetraplegia) using a questionnaire battery. Shoulder and neck symptoms were assessed using the Standardized Nordic Questionnaire, consisting of hierarchical questions related to the shoulder and neck. Neck and shoulder symptoms were assessed by three month prevalence, and for the shoulder also one week prevalence.

Results:1,517 (62%) fulfilled the eligibility criteria and were included in the analysis. Most respondents answered the questions related to shoulder (86-94%) and neck (88-93%) symptoms). Of those, 63% reported shoulder symptoms in one or both shoulders, and 67% neck symptoms, within the past three months, which often prevented them from performing their usual activities. 61% and 38% had experienced shoulder and neck symptoms for more than 30 days/every day during the past 3 months, respectively. Half of the responders reported shoulder symptoms within the past week. Overall, most responders (75%) used assistive devices; 54% used some type of wheelchair, and 21% were walking with the use of assistive devices.

Conclusions: We found a high prevalence of self-reported shoulder and neck symptoms among a representative population of Danish adult individuals with longstanding SCI, which may limit physical and social activities. Future work will focus on the types and characteristics of symptoms, as well as, associations between SCI characteristics, QoL and levels of physical activity.

[O10] SHOULDER ROTATION STRENGTH, MUSCLE COACTIVATION AND SHOULDER PAIN IN WHEELCHAIR RUGBY ATHLETES - A CROSS-SECTIONAL STUDY

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Aim: To investigate if a portable handheld isometric (HHD) and a stationary 60°/s isokinetic (ID) dynamometer evoked the same strength and muscle activation pattern during maximal shoulder rotation in wheelchair athletes. To assess the association between shoulder pain and strength.

Methods: Twelve (11 males) tetraplegic wheelchair athletes (Age:40.8±10.9) participated. Shoulder external rotation (ER) and internal rotation (IR) strength were measured bilaterally with both HHD and ID. Muscle activity was expressed as electromyography (EMG) coactivation ratios of m. Infraspinatus/Latissimus during ER, and Latissimus/Infraspinatus during IR, and as relative EMG activity of triceps and middle trapezius during HHD and ID measurements. Shoulder pain was measured by Wheelchair Users Shoulder Pain Index (WUSPI) questionnaire. Concordance Correlation Coefficients (CCC), Wilcoxon rank-sum tests, and Linear regression analyses were used.

Results: Concurrent validity of HHD and ID strength comparison showed satisfactory CCC for both ER (0.89-0.91) (95%CI: Left:0.66-0.97; Right:0.77-0.97) and IR 0.86-0.90 (95%CI: Left:0.72-0.97; Right:0.68-0.94). There was no significant difference between HHD and ID in activation patterns, except for higher coactivation ratio in ID for ER (p=0.028). No significant relationships were found between strength and shoulder pain, except for ID in ER (p=0.03-0.04). Corresponding R^2 values demonstrated that 15.3 - 46.7% of the variation in rotation strength may be explained by the model containing only shoulder pain

Conclusions: Clinical applicable HHD and gold standard ID provide comparable scores for shoulder rotation strength, although indications of differences in coactivation must be considered. An association between shoulder pain and strength could not be confirmed in this minor study.

[O11] INCREASED DIVORCE RATES FOLLOWING TRAUMATIC SPINAL CORD INJURY: RESULTS FROM A NATIONWIDE REGISTER-BASED STUDY

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Aim: To investigate if acquiring a traumatic SCI (tSCI) increases the risk of divorce.

Methods: Patients with tSCI were identified in nationwide Danish patient registers as being admitted with an injury and receiving specific SCI-treatment afterwards. Patients treated during 2008-2016 were compared to a matched control group using propensity score matching. The controls could have had other health problems, but not SCI. The tSCI population (n=701) was compared to the control group (n=3,545) on several outcomes, one of these being marital status. Married couples within the SCI-population and the control group (tSCI-group: n=330, control group: n=1,672) were identified, and the risk of divorce within 1-3 years after the tSCI was assessed using a logistic regression model, adjusting for age, gender, labour market affiliation and dependent children.

Results: Within the married tSCI group, the risk of being divorced was 7%, which is higher than in the matched control group within 1-3 years after injury (OR= 1.68, 95% CI= 1.03-2.73, p<0.038). Male patients (p=0.034) and those 31-60 years old (p<0.0001) were more frequently divorced. No statistically significant difference for divorce was found in relation to children living at home or labour market affiliation, as measured by receipt of transfer incomes.

Conclusions: Increased divorce rates among couples living with the consequences of SCI emphasizes the effect of the injury on the significant other, and the strain that the injury poses on the marital relationship. This emphasized the need for interventions specifically tailored couples living with the consequences of tSCI.

[O12] Gender, Class, Employment Status and Social Mobility in Denmark, the Netherlands, Norway and Switzerland

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Aim: 1. To analyse the employment levels of people of working age with Spinal Cord Injury (SCI)**,** including possible gender differences. 2. To study the relevance of occupational class before SCI and its impact on employment and occupational class after SCI.

Methods: Cross sectional survey of 1,055 persons with SCI in Denmark, the Netherlands, Norway and Switzerland.

The analysis is based on multinominal and binary logistic regression analysis of employment on social mobility variables while controlling for demographic and SCI characteristics as well as perceived barriers to employment.

Results: Employment levels post injury were similar for men and women within countries and differed little across countries within genders. The one exception was the Netherlands, where women had lower predicted employment at the time of survey. Among both men and women, employment and social mobility trajectories post injury were heavily in favour of middle-class jobs at the expense of working-class occupations and people not employed before injury. Gender differences primarily occurred among those in working-class jobs. Whereas three quarters (75%) of men initially in working-class positions had a paid job after SCI, this was only the case for 60% of the women.

Conclusions: There was little variation in employment by gender within and across countries but significant differences between working- and middle-class occupations before and after injury. The results suggest that targeted employment measures should be invested in the rehabilitation of those with working-class occupations.

[O13] CHANGES OVER TIME IN LIFE SATISFACTION AMONG OLDER ADULTS WITH LONG-TERM SPINAL CORD INJURY

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Aim: Knowledge of changes over time in life satisfaction among persons aging with spinal cord injury (SCI) is very limited. The aim of this study was therefore to assess changes in global and domain-specific life satisfaction over six years among older adults with long-term SCI, and investigate associations with sociodemographics and injury characteristics.

Methods: From the original 123 participants (year 2011-2012) (29% women, injury levels C1-L5, American Spinal Injury Association Impairment Scale (AIS) A-D, mean age 63 years, mean time since injury 24 years) in the Swedish Aging with Spinal Cord Injury Study (SASCIS), 101 were alive for the follow-up (year 2017-2018) and the final sample comprised 78 participants (32% women, C1-L3, AIS A-D, mean age 68 years, mean time since injury 31 years). Data were collected at home interviews using the Life Satisfaction Questionnaire (LiSat-11). Changes were assessed using the Wilcoxon signed-rank test.

Results: There were no significant changes in global or domain-specific life satisfaction when assessing all participants together. In subgroup analyses, men and participants who were not married and/or not vocationally active at baseline became less satisfied with their somatic health over time ($p=0.034$; $p=0.022$, respectively). Participants who had been injured longer than 22 years (median) at baseline became more satisfied with their financial situation at follow-up ($p=0.021$).

Conclusions: Life satisfaction remains stable over time among older adults with long-term SCI. Men, individuals with a limited social network and low participation in meaningful activities may require special attention in long-term management to maintain satisfaction with somatic health.

[O14] LONG TERM CONTINUATION WITH REPEATED BOTULINUM TOXIN A INJECTIONS IN PATIENTS WITH NEUROGENIC DETRUSOR OVERACTIVITY AFTER SPINAL CORD INJURY

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Aim: The aim of the study was to examine compliance of patients with spinal cord injury and neurogenic detrusor overactivity, treated with repeated vesical Botulinum toxin A injections, and to investigate factors associated with discontinuation of treatment.

Methods: This retrospective study included 128 patients with spinal cord injury and neurogenic detrusor overactivity. Patients were offered repeated Botulinum toxin A injections between 2001−2018. Continuation rates of the treatment were estimated using a Kaplan Meier analysis. A Cox proportional hazard analysis was used to investigate factors associated with discontinuation.

Results: A total of 1156 treatments were performed. The median number of treatments was six (range 1−51), and median follow-up was 10.6 years (range 0−16.9).
All urodynamic parameters changed significantly after the primary treatment ($p<0.001$). The continuation group had significantly higher mean maximum bladder capacity after the primary injections compared to the discontinuation group, with a mean difference between the groups of 84.5 mL ($p=0.038$).
The probability of receiving treatments was 59.1% (95% CI 50.0-67.8) after 5 years and 50.1% (95% CI 40.1-59.3) after 10 years. Patients aged 31-50 years were more likely to continue treatment compared to patients aged >50 years ($p=0.008$). No association was found between discontinuation and gender, level and completeness of injury, etiology of injury, bladder emptying method, urinary incontinence at baseline or anesthesia at first treatment.

Conclusions: This long-term follow-up study showed that 50% of patients with spinal cord injury starting vesical Botulinum toxin A for neurogenic detrusor overactivity are still receiving injections after 10 years.

[O15] LONG-TERM OUTCOMES OF TRANSANAL IRRIGATION USING A CONE SYSTEM IN PATIENTS WITH SPINAL CORD INJURY

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Aim: For spinally injured people who are able to sit for bowel management, a cone-based transanal irrigation (TAI) system may have an advantage over catheter based systems in terms of ease of setting up, procedure time and low likelihood of complications. The system comprises a tube connecting a suspended water bag via a simple valve to a hydrophylic-coated cone. We report on long-term outcome of cone-irrigation in patients with upper and lower motor neurone (LMN) spinal cord injury.

Methods: We prospectively followed-up 27 consecutive patients (15 female; mean age 46, range 23-77) in whom we had at least 1-year follow-up data. Data is included for patients who had stopped TAI. All had LMN spinal injury and bowel symptoms refractory to lifestyle, laxative or rectal management. The aetiology of injury: spina bifida (n=9), following spinal disc herniation and surgery (n=10), following spinal tumour surgery (n=8). Mean follow-up was 33 months (range 12-72). Data from symptom questionnaires, healthcare utilization and irrigation was obtained from the notes.

Results: At latest follow up, 23/27 (85%) were still using cone TAI. The NBDS fell from baseline 19 to 8 at latest follow-up. Mean time spent on toileting, levels of depression and frequency of uti treatment was reduced. Three patients discontinued to lack of effect, and one opted to have a stoma. No complications were reported by any individual.

Conclusions: TAI with the Qufora cone is a safe effective option for patients with bowel symptoms secondary to lower motor neurone spinal cord injury.

	Baseline	Time since starting TAI					
		1 year	2 years	3 years	4 years	5 years	6 years
Patients	27	27	24	19	13	8	5
Patients irrigating	0	25	21	16	10	6	4
NBD score	19 (7-37)	8.2 (2-33)	9.1 (4-39)	7.7 (2-28)	8.5 (2-30)	6.8 (2-19)	7.3 (4-16)
HAD-Depression score	9.2 (0-17)	5.4 (0-15)	6.4 (0-17)	5.6 (0-14)	5.2 (1-10)	4.3 (0-13)	4.5 (0-8)
Treatment for u.t.i. in prior year	0.75 (0-3)	0.62 (0-3)	0.53 (0-3)	0.5 (0-2)	0.58 (0-3)	0.5 (0-1)	0.4 (0-2)
Irrigation frequency (/week)	-	6.2 (2-7)	6.4 (3-7)	6.3 (3-7)	6.2 (3-7)	6.3 (3-7)	6 (3-7)
Time spent toileting (/week)	413 (24-1260)	253 (90-450)	272 (60-540)	266 (60-480)	250 (60-450)	198 (60-480)	189 (60-450)

[O16] MALNUTRITION AND BODY COMPOSITION IN PATIENTS WITH SUB-ACUTE SPINAL CORD INJURY

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Aim: Assess prevalence of malnutrition among patients with sub-acute spinal cord injury (SCI) admitted for rehabilitation in Norway using screening tools and diagnostic criteria, including determination of fat-free mass (FFM).

Methods: SCI patients (≥18 years) were assessed with MUST (Malnutrition Universal Screening Tool). PG-SGA (Patient-Generated Subjective Global Assessment) were used to categorize patients as moderate (ICD-10 E44) or severe malnourished (ICD-10E43). BIA was used to assess FFM.

Results: Twenty patients with SCI; 16 male. Median time since injury; 2 (0.5-15) months, mean body mass index (BMI): 24.2 (±2.3) kg/m^2; age: 59.9 (±14.4) years; 1-month weight loss: 5.2 % (±5.3) and fat-free mass index (FFMI): 17.5 (±2.6) kg/m^2. 11 patients (55 %) were at moderate or high risk of malnutrition, whereas 15 (75 %) were diagnosed with moderate or severe malnutrition. MUST predicted patients with a malnutrition diagnosis according to PG-SGA with a sensitivity of 0.80 and a specificity of 0.53. Six patients had a low FFMI according to BIA; MUST detected patients with low FFMI with a sensitivity of 0.5.

Conclusions: Sub-acute SCI patients have a high prevalence of malnutrition. MUST detects patients with a malnutrition diagnosis with high sensitivity. Several patients had low FFMI despite classified as not at nutritional risk according to MUST.

[O17] BODY MASS INDEX DURING PRIMARY REHABILITATION IN DENMARK

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Aim: This study investigates Body Mass Index (BMI) among people with a new Spinal Cord Injury (SCI) during primary rehabilitation.

Methods: A nation-wide prospective cohort study during 10 months with participation of both SCI-Centers in Denmark. In-patients aged ≥ 18 years with an acquired new SCI within the last 12 months at the time of admission to primary rehabilitation, were invited to participate and were consecutive enrolled after verbal and written informed consent. Data on BMI at admission and discharge was obtained.

Results: In total 93 eligible in-patients from the two SCI-Centers gave informed consent and were enrolled in the study. The enrolled participants included 65% men and 35% women in the age 21- 87 years and neurological level of injury between C1 to L4 with ASIA impairment scale classifications ranging from A to D. Average length of hospitalization during primary rehabilitation was 124 days. Preliminary findings on the national data for BMI, revealed an average BMI of 25,5 at admission and 25,8 at discharge from primary rehabilitation. Data on BMI at each center and any differences between the two centers together with subgroup analysis on BMI related to the level of injury and functional level will be presented. Demographics and characteristics of non-participants is presented as well.

Conclusions: This is the first national study on BMI after SCI in Denmark and contributes with important information for clinicians about the development of BMI during primary rehabilitation amongst people with newly acquired SCI.

[O18] EFFECTS OF NON-PHARMACOLOGICAL TREATMENTS IN INDIVIDUALS WITH CHRONIC PAIN AND SPINAL CORD INJURY

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Aim: To describe all non-pharmacological treatment options (regular and complementary) used for chronic pain in a Dutch population with spinal cord injury (SCI) and to explore in more detail the use of cannabis for SCI-related pain.

Methods: A questionnaire was sent out to individuals with SCI who visited the outpatient clinic of De Hoogstraat Rehabilitation Center between June 2016 and April 2018. The questionnaire included questions about demographics, SCI characteristics, pain, non-pharmacological treatments and their perceived effect on pain. Patients mentioning the use of cannabis were invited for an additional interview.

Results: 116 out of 251 questionnaires were completed (response rate: 46.2%). 89 patients (76.7%) experienced SCI-related pain. Neuropathic pain, most often located under the SCI-level, was reported most frequently followed by musculoskeletal pain. Of all patients with pain, 88.8% had tried at least one non-pharmacological treatment of which physiotherapy, massage and exercise were the most often used and the most effective therapies. 14 patients were interviewed to discuss the use of cannabis. Three types of cannabis were or had been used: cannabis-tea (12.5%), CBD-oil (62.5%) and cannabis for smoking (25%). Although perceived effects were small, smoking cannabis seemed most effective.

Conclusions: Regular treatments are the most frequently used as well as perceived as the most effective non-pharmacological treatments. Complementary treatments, including the use of cannabis, seem to have a smaller effect. However, since subgroups for complementary therapies were relatively small, studies with a larger sample size should be performed.

[O19] LOOKING FOR ADDITIONAL FACTORS THAT AFFECT SCI-ARMI AND ITS GAIN IN PATIENTS WITH SPINAL CORD OR CAUDA EQUINA LESIONS

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Aim: Assess factors that may affect the Spinal Cord Ability Realization Measurement Index (SCI-ARMI) and its gain, in addition to rehabilitation, which have not been examined yet.

Methods: Data were retrospectively collected from records of 479 spinal cord injury (SCI) or cauda equina lesion patients aged 55±16, 64% males, admitted for rehabilitation in Israel. The injuries were cervical, thoracic, or lumbar (49%, 19%, and 32%, respectively). AIS grades were A, B, C, or D (8%, 5%, 19%, and 68% respectively). The factors expected to affect SCI-ARMI and its gain, which were assessed in addition to those that had been assessed and presented previously, were years of education, admission ASIA sensory score (ASS), admission visual analogue scale (VAS) pain score, admission report on depression, and admission modified Ashworth spasticity score. Age, gender, length of stay in rehabilitation (LOS), SCI level, admission ASIA Impairment Scale (AIS), admission ASIA motor score (AMS), and admission SCIM III were also examined. Pearson correlation tests, analysis of variance, and linear regression were used to assess the relationship between the independent variables and SCI-ARMI and its gain.

Results: Only AIS grade and gender affected admission SCI-ARMI ($p<0.05$). Controlling for the various factors, only admission SCIM III, age, and LOS predicted SCI-ARMI gain ($r^2=0.388$, $p<=0.05$).

Conclusions: The factors that have not been examined before did not affect SCI-ARMI or its gain. Further study is required to quantify the effect of such factors, and to allow isolation of the effect of rehabilitation on daily functioning and its improvement.

[O20] EVALUATION OF AN INDIVIDUALIZED OUT-PATIENT EXERCISE PROGRAM FOR PERSONS WITH NEUROLOGICAL DISORDERS

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Aim: Physical activity promotes healthier life and less complications in persons living with neurological disorders, as spinal cord injuries (SCI). In order to maintain a physical active lifestyle after in-patient rehabilitation a specialized out-patient exercise program was established. The aim of the present project was to evaluate the participants' self-perceptions of the exercise intervention.

Methods: The exercise program was individually adapted and included muscle strength and endurance training 3 times per week for 12 weeks. Persons with neurological disorders who were admitted to and fulfilled the program were included. The study is ongoing with inclusion till June 2019. So far 12 persons (8 men) with neurological disorders (SCI = 6) aged 47 – 74 years, have fulfilled the program. Self-perceptions were reported with questionnaires during the first and last week of the program; i.e. goal achievement (Visual Analogue Scale; VAS, 0–10), and the Self-Perception in Exercise Questionnaire (SPEQ fitness and SPEQ mastery, 1-4).

Results: The VAS result for goal achievement the result was 7.7 (median) and min/max range of 0–10. The positive change in self-perceived fitness was statistically significant, 1.7 (1-4) versus 2.5 (1.3–3), p = .02. Change in perceived exercise mastery was not significant, 1.8 (1–2.8) versus 1.6 (1–2.4), p = .67.

Conclusions: The high degree of goal achievement and the positive trend in self-perceived fitness indicate that an individualized out-patient exercise program might be usefulness to maintain a physical active lifestyle after in-patient rehabilitation.

[O21] EFFECTS OF ACTIVE REHABILITATION PROGRAMS FOR PERSONS WITH SPINAL CORD INJURY IN SWEDEN - PRELIMINARY RESULTS FROM COMMUNITY PEER-BASED PROGRAMS

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Aim: To evaluate the effects of the Active Rehabilitation training programs in Sweden.

Methods: This prospective study is part of the INTERnational Project for the Evaluation of "activE Rehabilitation" (inter-PEER). These residential community-rehabilitation programs last 7-10 days and are led by peer-mentors as trainers and educators. All participants from the three programs in 2018 were evaluated in the beginning (T1), at the end (T2) and at 3 months (T3) follow-up. Evaluation involved an online survey with standardized outcome measures (T1-T2-T3) and a practical-test of wheelchair-skills (T1-T2).

Results: Among the 49 participants, there were 30 (61%) men, 25 (51%) with tetraplegia and 31 (63%) with incomplete lesions. The mean age was 43 years (SD=16;range:17-74) and the mean time-since-injury was 3 years (SD=7;range:0.4-37). Participants improved their overall Spinal Cord Independence Measure Self-Report score by 3.3 points between T1-T2 ($p<.001$;$d=0.71$) and results were largely retained at T3 ($p=0.038$;$d=0.36$). Participants reported higher scores on Moorong Self-Efficacy Scale at T2 ($p=0.014$;$d=0.41$), but the gains were halved at T3. Improvements were also achieved in the Queensland Evaluation of Wheelchair Skills score ($p<.001$;$d=0.25$). No improvements were reported in the secondary outcomes related to life-satisfaction, resilience and participation.

Conclusions: This is the first full-scale evaluation of the AR training programs internationally. Despite the lack of a control group, the relative long time since injury supports that improvements could be attributed to the Active Rehabilitation program, rather than on spontaneous progression. Continuation of the data collection in 2019 will provide more participants and allow for sub-group analysis.

[O22] THE ROLE OF WHEELCHAIR RUGBY IN THE REHABILITATION OF PEOPLE WITH SPINAL CORD INJURIES

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Aim: The present article aims in revealing and analyzing the relation between Wheelchair Rugby and the rehabilitation / independence of people with Spinal Cord Injuries. In order for a person to participate in that sport, he needs to have loss of sensibility and/or function to at least 3 of his limbs. More than 40 countries internationally have developed this sport. Additionally, approximately half of the spinal cord injuries that are happening every year all over the world are leading to quadriplegia.

Methods: 3 Different groups were used, one with professional level players of wheelchair rugby, one with amateur players and one with people that they could play (due to their sci) but they don't. The Functional Independence Measurement (FIM) scale was used for the data collection with personal interviews to all the teams from a researcher certified for the use of the instrument. Data was analysed by the Graph Pad program with t-test and anova.

Results: The results are showing high positive correlation between the scores of the FIM scale from every team and percentage that they are performing the sport, but also the same for every classification and for all spine surgery levels that were analysed.

Conclusions: It is important to analyze more the contribution of the sport holistically in the rehabilitation of SCI, not only in matters of functional independence but where the occupation with this sport is leading in terms of social, psychological, emotional ways.

[O23] KNOWLEDGE IS POWER - COMBINING AN ONLINE COMMUNITY WITH AN INFORMATION WEBSITE TO SUPPORT AND STRENGTHEN SCI CONSUMERS

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Aim: Spinalis motto is "A better everyday life for the spinal cord injured".
By providing a platform to interact and medical and practical information online to people with SCI, Spinalis promotes a healthy and active lifestyle, thus avoiding secondary complications.

Method: In 2013 Spinalis initiated a Facebook group exclusively for people with SCI. The community grew rapidly and today has more than 1 500 members. Considering that there are 5-6 000 people living with SCI in Sweden, it is a powerful group with a lot of lived experience. The community is a useful tool for peer support and advice, especially for newly injured and people living in rural areas. But the group also made it obvious that there is a need for easy accessible, evidence based information online. Spinalis therefore launched a website, ryggmärgsskada.se, which provides an overview of SCI. The information given is written in everyday language. The team behind the website are people living with SCI, but the texts are written by experienced clinicians. Spinalis also arranges seminars and patient network meetings which are broadcasted online.

Results: With an active presence on the internet it has become possible for Swedish SCI-consumers to interact, exchange experiences and learn about their injury.

Conclusion: By creating communities and providing online information people with SCI can be more involved in their health and avoid secondary complications. It can be discussed though, whether this is a task for NGOs or if the health care providers should take a bigger responsibility.

[O24] DOES AN EXERCISE CLASS VIA INTERACTIVE VIDEO-CONFERENCE MAKE A DIFFERENCE FOR PERSONS WITH PHYSICAL DISABILITIES?

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Aim: Physical activity is reported to prevent lifestyle problems such as obesity, diabetes and cardiovascular diseases. Even so, persons with physical disabilities have a low level of physical activity, most often the hardest part is to get started. To develop low-threshold services with adapted exercise is therefore important. Weekly aerobic training in an out-patient clinic revealed a need to make the training sessions available via video-conference. Previous evaluations of telemedicine have shown high satisfaction amongst both patients and clinicians. A video-conference exercise class was therefore set up, and the aim of the ongoing study is to evaluate the program.

Methods: The intervention consists of an aerobic group class to music, transferred with video-conference to six different locations. Eight persons participated in a group at the out-patient clinic, five participated at home and three in another training facility. The conference is interactive with two-way audio and video communication. The group class is also available online as a pre-made video, for self-training. The study is ongoing from April to June 2019. The evaluation method was questionnaires, filled in the first and last week of the intervention, focusing on coping, goal achievement, perceived fitness, communication, social interaction and quality of technical solutions.

Results: In total 16 persons (12 women) with neurological disorders (spinal cord injury =10), mean age 57 years, are included. Total results will be presented.

Conclusions: The development of a clinical telemedicine program like this program, will hopefully contribute to equivalent training opportunity regardless of location and physical mobility.

[O25] TELESCI- HOSPITAL BASED CARE AT HOME

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Aim: Identify risk factors for pressure ulcer (PU) in the group of people with spinal cord injury (SCI) in Norway, and find an effective and less time consuming- treatment for the condition among different available methods for follow-up.

Methods: Based on an epidemiological design, the national cumulative incidence of PU among persons who suffered SCI between January 2004 and January 2014 is found, and risk factors for acquiring PU are identified. Performing a randomized controlled trial (RCT), the outpatient SCI follow-up in a hospital versus outpatient follow- up from the patient`s home, using telemedicine (TeleSCI) interventions, have been compared. Validated forms have been used to monitor the healing, changes in health related quality of life (HRQoL) and the need for assistance. In addition to primary outcome measures, a cost- benefit evaluation and an assessment of patient satisfaction and –participation have been performed, using customized questionnaires.

Results: The results from the study will be presented**.**

Conclusions: The results of the RCT will influence future guidelines for outpatient treatment of persons with PU, as well as other conditions in need of time consuming continuous follow- up.

[O26] TONGUE CONTROL OF EXOSKELETONS AND ASSISTIVE ROBOTIC ARMS FOR INDIVIDUALS WITH TETRAPLEGIA

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Aim: This abstract presents the current state of the research on providing individuals with complete tetraplegia control of assistive and rehabilitative robots to support activities of daily living (ADL). It presents the results from pilot experiments in tongue controlling an assistive robotic arm and further the design considerations for the implementation of a tongue controlled semi-automatic exoskeleton arm, the EXOTIC.

Methods: New methods to apply an inductive tongue control system for the control of an assistive robotic arm were developed and used by able-bodied individuals to perform simple ADL activities with the robot. In addition, a new exoskeleton arm designed for facilitation of semi-automatic tongue control was implemented. The design and the related considerations are presented.

Results: Semi-automation and sensor interpolation (Figure 1) improved tongue control of an assistive robotic arm for selected ADLs.

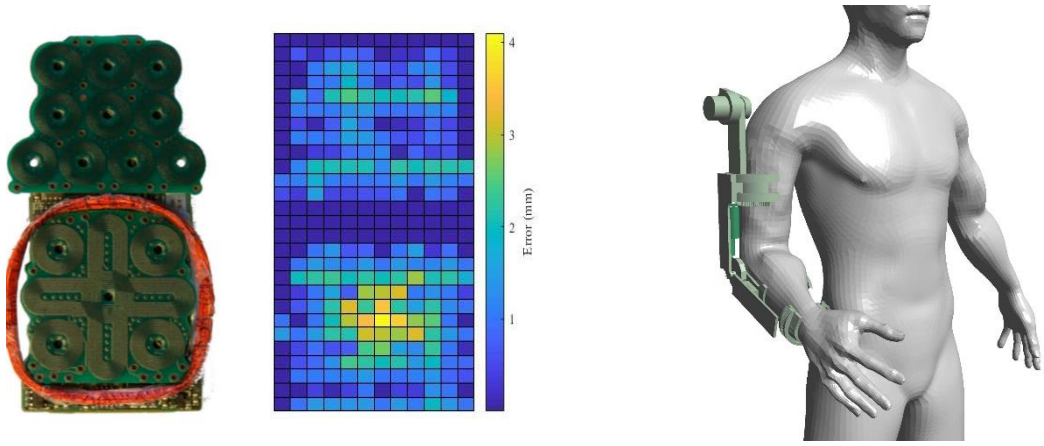

Figure 1: Tongue sensor layout: Left: The sensor PCB of Tongue interface with 18 sensors. Middle: Precision of interpolation of the sensor signals (1 mm resolution). The bar shows how the error color scale relates to mm. Right: the EXOTIC.

User specific considerations such as a desire for exoskeleton arm functionality, exoskeleton size and further, reduced “strapping” of the user was implemented in the EXOTIC.

Conclusions: New tongue control methods for control of assistive robotic arms and of exoskeleton arms for individuals with tetraplegia were implemented. Pilot test showed the feasibility of these methods and future studies will include experiments with individuals with tetraplegia.

[O27] THE SWEDISH SPINAL CORD INJURY STUDY ON CARDIOPULMONARY AND AUTONOMIC IMPAIRMENT (SPICA): METHODOLOGY AND COHORT DEMOGRAPHICS

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Aim: To present the methodology and the cohort demographics of the Swedish Spinal Cord Injury Study on Cardiopulmonary and Autonomic Impairment (SPICA).

Methods: Cross-sectional cohort study. Participants were persons aged 50 to 65 years with traumatic SCI for at least 5 years, neurological level of injury C1-T6, American Spinal Injury Association (ASIA) Impairment Scale (AIS) A-C. The study protocol was based on the baseline protocol of the Swedish Cardiopulmonary and Bioimage Study (SCAPIS) combined with generic and SCI-specific assessment tools. Assessments cover the structure and function of the cardiopulmonary and autonomic systems using bioimaging (computed tomography and ultrasound) and functional analyses (e.g. spirometry, diffusing capacity, impulse-oscillometry, 24-hour electrocardiogram and blood pressure registration and arterial stiffness). Biochemistry, anthropometry and metabolic factors (e.g. body composition). Study-specific questionnaire and assessment tools focusing on functioning and disability, autonomic dysfunction, psychological factors, sociodemographics, secondary health conditions (SHCs) and lifestyle.

Results: Of 38 potential participants, 25 persons comprised the final sample (20% women, mean age 58 years, mean time since injury 28 years). Spasticity and autonomic dysreflexia were common SHCs (76% and 68%, respectively). Eight percent had sustained a cardiovascular event, and 72% were classified as high-risk of cardiovascular disease. Asthma was previously diagnosed in 8% and none had chronic obstructive pulmonary disease. The occurrence of chronic cough and chronic phlegm was 8% and 12%, respectively.

Conclusions: SPICA aims to generate in-depth knowledge of the cardiopulmonary and autonomic health in middle-aged persons with chronic high-level SCI, which is likely to improve the long-term care.

[O28] STRUCTURAL AND FUNCTIONAL CHANGES IN THE PULMONARY SYSTEM IN MIDDLE-AGED PERSONS WITH CHRONIC HIGH-LEVEL SPINAL CORD INJURY

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Aim: To describe structural and functional changes in the pulmonary system among middle-aged persons with chronic, traumatic, high-level spinal cord injury (SCI), investigate associations between structural and functional changes, sociodemographics and injury characteristics, and to compare the findings with matched controls.

Methods: Cross-sectional study. Data from the Swedish SPinal Cord Injury Study on Cardiopulmonary and Autonomic Impairment (SPICA), including 5 women and 20 men (mean age 58 years, mean time since injury 28 years, injury levels C1-T6, American Spinal Injury Association Impairment Scale A-C). Structural changes in the lungs were assessed with computed tomography. The lung function was assessed with spirometry, impulse oscillometry (IOS) and diffusing capacity. Matched controls (ratio 4:1) were obtained from the general population. Associations were investigated using regression analyses.

Results: Lower level of injury (i.e. each level C1-T6) was significantly associated with lower occurrence of structural findings (OR=0.65, p=0.02). Older age was significantly associated with greater occurrence of linear scars of atelectasis (OR=1.40, p=0.03). Every spirometric parameter was positively related to lower level of injury, indicating better pulmonary function with lower level of injury. Diffusing capacity and IOS parameters were all significantly worse in participants with SCI, and more pronounced among participants with tetraplegia, as compared to matched controls.

Conclusions: Structural and functional changes in the pulmonary system are common in middle-aged persons with chronic high-level SCI and both depend to a large extent on the level of injury. As persons with tetraplegia are particularly vulnerable, this group should receive particular attention in the clinical context.

[O29] PREFERENCE OF ELECTRO- TO MECHANICAL VENTILATION DESPITE LACK OF CLASS A CONTROLLED RANDOMISED TRIALS

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Aim: To show that RCTs sometimes will not be available for decision making

Methods: Selective review of the literature. Patients are rare whose life depends on a respiratory device. The reasons for respiratory device dependency (RDD) are different and, therefore, expertise for optimum treatment is rare, too, and rarely covers all varieties of RDD. Patient numbers for comparison between methods are low and even smaller within special needs. Methods available are frog breathing, use of accessory respiratory muscles in the neck, non-invasive ventilation (NIV), mechanical ventilation (MV) and phrenic nerve stimulation (PNS). The yearly incidence of patients with SCI-induced RDD is 0.32 to 0.1 per million inhabitants. Patients with RDD caused by tetraplegia generally use MV or PNS. There are two groups of SCI-caused RDD: Those with preserved peripheral phrenic nerves and those who lost the motor neurons. So far, those who lost their motor neurons are significantly older in the five studies comparing PNS to MV. Those with lost motor neurons cannot use PNS and those with intact nerves, when informed, will not agree to randomization.

Results: The groups' age difference, low patient numbers, and informed patients' strict preference of PNS prevent class A RCTs.

Conclusions: Fortunately, for purchasing decisions, patients' preference correlates positively with the life-long lower-cost method of artificial ventilation, PNS. Additionally, to the difference in money that counts, compared to MV PNS significantly reduces upper airway infections, cost for airway nursing, improves the quality of speech, and obviously quality of life.

[O30_W11] ROBOT-ASSISTED BODY-WEIGHT SUPPORTED LOCOMOTOR TRAINING IN PERSONS WITH CHRONIC INCOMPLETE SPINAL CORD INJURY IN AN OUT-PATIENT CLINIC: A RANDOMIZED CLINICAL TRIAL

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Aim: Various locomotor training methods have been used in attempts to recover walking function after spinal cord injury (SCI). The ATLET study (NCT00854555) was a single-blinded randomized intervention study among Norwegians with chronic incomplete SCI that assessed the effects of 1) manual or 2) robot-assisted body-weight supported locomotor training (BWSLT) on physiological and psychological variables. This presentation gives results of the robot-assisted BWSLT program.

Methods: The study planned to enroll 30 persons with chronic incomplete SCI (American Spinal Injury Association grades AIS C and D), randomized to receive standard care or intervention (robot-assisted BWSLT). The intervention group had 60 training days of robot-assisted BWSLT over six months, whereas the control group received usual care. Standardized evaluation tools assessed outcome of neurological injury, motor function and quality of life single-blindly before and after completed intervention or control period.

Results: Twenty-four persons (intervention/control = 8/12) enrolled in the robot-assisted BWSLT. Mean time since injury was 17 (SD 20) years. Walking function, lower extremity muscle strength and balance improved modestly in both groups, with no statistically significant group difference in walking function or muscle strength, whereas postural control declined significantly. Intervention group reported slightly improved physical functioning, however not statistically significant (p=0,07).

Conclusions: Independent walking function was not recovered by late-onset robot-assisted BWSLT in persons with incomplete SCI with poor baseline function. Robot-assisted BWSLT requires less staff than such training with manual assistance, but the robot is costly, and the training form is hardly cost-effective in the present patient group.

[OP1] MODE OF MOBILITY AND COGNITIVE FACTORS ASSOCIATED WITH MUSCLE FUNCTION I ADULTS WITH SPINA BIFIDA

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Aim: Spina Bifida (SB) is a complex congenital spinal cord injury, often associated with physical and cognitive impairments. Mode of mobility differs between ambulation and wheelchair use. Today the adult group is increasing as most persons reach adulthood and live longer. The aim was to describe mode of mobility and cognitive function in relation to muscle function in adults with SB

Methods: A total regional cohort of adults with SB at a spinal cord injury clinic in Sweden (*n* = 219) was invited to participate. 196 persons (104 women; mean age 35, SD 13 years) were included. Mode of mobility according to Hoffer was used together with assessment of muscle- and cognitive function. Descriptive and inferential statistics was used.

Results: 84 (42%) persons were community ambulators, 22 (12%) were household ambulators, 90 (46%) were wheelchair users (including non-functional ambulators), 123 (63%) had hydrocephalus. Cognitive function was one SD below the general population with a significant difference ($p < 0.001$) between participants with hydrocephalus and without. The community walkers had significantly lower prevalence of hydrocephalus compared to household ambulators ($p<0.00$) and wheelchair users ($p<0.00$). In persons with midlumbar SB (n=58), the most common level, mode of mobility varied despite similar muscle function.

Conclusions: Around half were ambulatory and half were wheelchair users. Cognitive function was reduced in the whole population, and more so in those with hydrocephalus. Mobility mode was also implicated in those with hydrocephalus. The mode of mobility varied in persons with similar muscle function.

[OP2] MEDICAL CANNABIS IN DENMARK- EFFECT ON NEUROPATHIC PAIN AND SPASTICITY IN PATIENTS WITH SPINAL CORD INJURY AND MULTIPLE SCLEROSIS. A NATIONAL MULTICENTER DOUBLE-BLIND PLACEBO-CONTROLLED STUDY

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Aim: Neuropathic pain (NP) and spasticity are frequent symptoms in patients with spinal cord injury (SCI) and multiple sclerosis (MS). Recommended available treatment options often show only minor to moderate effect and patients ask if treatment with cannabis-based medicine (CBM) can relieve the symptoms. For a four-year trial period physicians in Denmark can prescribe CBM. There is sparse knowledge about dosage, effect and side-effect of CBM. We present an on-going study.

Methods: In a national multicenter double blind placebo-controlled study (EudraCT number 2018-002315-98) the effect of CBM on NP and spasticity is examined. Patients will be randomized to treatment with either tetrahydrocannabinol (THC), cannabidiol (CBD), THC&CBD in combination or placebo for a seven-week period. Intensity in pain and spasticity compared to baseline are primary endpoints. Secondary outcome includes quality of life and sleep, symptoms of depression, anxiety, relief of pain and spasticity and a range of clinical tests. Further the adverse event profile of cannabinoids will be assessed. A sub-study examines pharmacodynamics and pharmacokinetics regarding duration of effect, blood concentration and drug excretion of CBM.

Results: According to the protocol a total of 448 patients will be included and 40 patients will be included in the sub-study regarding pharmacodynamics and pharmacokinetics. The study is ongoing and the two SCI-centers as well as 12 MS-clinics in Denmark are screening and include patients on a weekly basis.

Conclusions: This study will provide additional knowledge of dosage, effect on NP and spasticity and side-effects of CBM in patients with SCI or MS.

[OP3] ABILITY REALIZATION AFTER SPINAL CORD INJURY IN SIX COUNTRIES

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Aim: To compare ability realization before and after spinal cord injuy (SCI) rehabilitation in several countries.

Methods: Six hundred and sixty-one patients were included. They underwent rehabilitation in specialized SCI units in 6 countries: Spain, Italy, the UK, Portugal, the US, and Israel. Values of the third, international version of the Spinal Cord Ability Realization Measurement Index (SCI-ARMI), at admission to rehabilitation and at discharge, were calculated. The statistical significance of SCI-ARMI gain values (difference between discharge and admission values) was assessed using a t-test. The value of SCI-ARMI gain in different countries was compared using one-way analysis of variance followed by the Tukey test for repeated comparisons.

Results: SCI-ARMI values ranged between 32-43 before and 70-80 after rehabilitation. Values in the different countries varied at admission but were quite similar at discarge from rehabilitation. SCI-ARMI gain was 25-46, and the improvement in ability realization during rehabilitation was found significant ($p<0.0001$). The standardized SCI-ARMI gain values were found significantly lower in the US than in Israel and Italy ($p<0.01$), but no significant differences were found in the other comparisons.

Conclusions: The similarity between most countries in SCI-ARMI after rehabilitation, despite the initial variability, indicates that caregivers are aiming at similar ability realization in all the participating countries. The smaller improvement in ability realization in the US may be related to the shorter length of stay in rehabilitation, and the aim to reduce the burden of care rather than to maximize ability realization.

[P1] TEST - RETEST RELIABILITY OF THE NORWEGIAN WHEELCHAIR SKILLS TEST - QUESTIONNAIRE (VERSION 4.3)

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Aim: Mastering wheelchair skills can make a difference between dependence and independence in daily life. Wheelchair Skills Test -Questionnaire (WST-Q) is a self-reporting questionnaire designed to assess wheelchair skills. The test is available in several languages, but until resently not in Norwegian. The aim of this study was to translate Wheelchair Skills Test – Questionnaire (WST-Q) version 4.3 into Norwegian, and to assess the test-retest reliability of the new Norwegian version, WST-Q (NV).

Methods: Translation according to international guidelines. Fifty adult manual wheelchair users with spinal cord injury were recruited from rehabilitation centers treating spinal cord injuries in Norway. Participants completed WST-Q (NV) at two-day intervals. Test-retest reliability was calculated with ICC and absolute reliability was illustrated by Bland-Altman plot.

Results: The translation achieved good equivalence with the original version. Test-retest reliability of WST-Q (NV) total score showed excellent reliability (ICC 0.96). The categories of Capacity and Confidence have excellent reliability with ICC values of 0.97 and 0.95 respectively, while Performance has good to excellent reliability with ICC value of 0.84. ICC and Bland-Altman plot shows no systematic errors for all categories. No ceiling effect is present for WST-Q (NV) total score, but ceiling effect occurs in the assessment of Capacity.

Conclusions: This study shows that WST-Q (NV) is a reliable tool for subjective assessment of a wide range of wheelchair skills. In order to avoid ceiling effect and to increase responsiveness, it may be preferable to utilize the entire test instead of just the mandatory category of Capacity.

Table 1: Correlation between Test and Retest

Wheelchair Skills	$ICC_{1.1}$	95 % CI	$ICC_{3.1}$	95 % CI
Total score	.96	(.93 - .98)	.96	(.93 - .98)
Capacity	.97	(.96 - .99)	.97	(.95 - .99)
Confidence	.95	(.92 - .97)	.95	(.92 - .97)
Performance	.84	(.74 - .91)	.85	(.75 - .91)

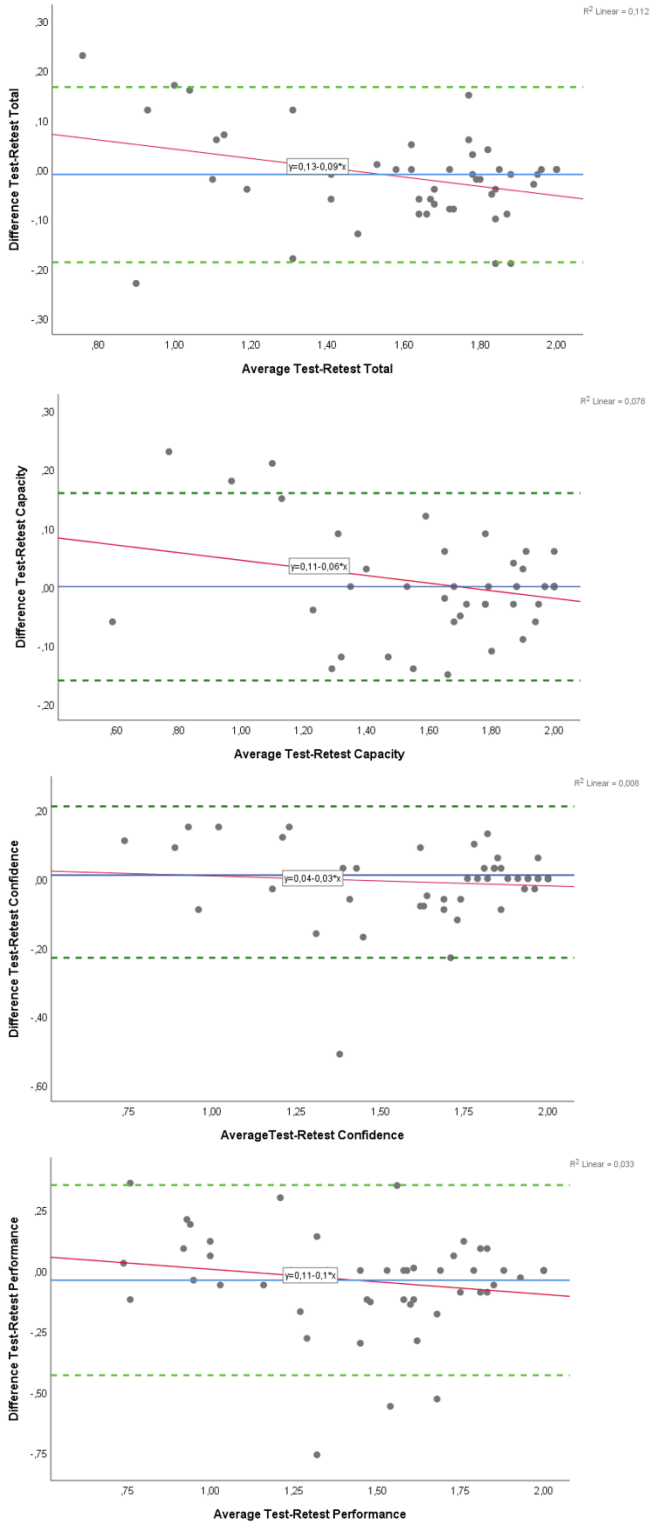

Figure 1: Absolute reliability illustrated by Bland-Altman Plot

[P2] VALIDITY TESTING OF SELF-REPORT QUESTIONNAIRES ON PHYSICAL ACTIVITY

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Aim: To describe the criterion validity of two self-report questionnaires on physical activity (PA). Another aim was also to investigate eventual differences in validity between a specific self-report questionnaire for persons with spinal cord injury (SCI) and a generic questionnaire.

Methods: The method was cross-sectional. The questionnaires used were the SCI-specific; Frågeformulär om fysisk aktivitet efter ryggmärgsskada (F-FAR) (e.g. Questionnaire on PA after SCI), adapted and tested for the SCI-population. The generic questionnaire was the Swedish National Board of Health and Welfare physical activity questions (BHW PA questions). The results from the questionnaires were later compared to data from accelerometers and correlated to moderate and vigorous intensity cut-points respectively. Accelerometer data was stratified as moderate intensity at 9515-11960 counts per minute and vigorous >11961 counts per minute.

Results: Eighteen participants with motor-complete paraplegia were included in the study, 13 men. Mean age 47±14.5, weight 74±14.2 kg, years since injury ranged from 2-46. It was found a statistically significant correlation between the F-FAR and accelerometer data ($r=0.574$, $p=0.013$). There was no statistically significant correlation between the BHW PA questions and accelerometer data ($r=0.337$, $p=0.186$).

Conclusions: The study suggests that F-FAR is a promising method to capture PA level in persons with SCI. The non-significant correlation to the generic and shorter self-report BHW PA questions indicates that a SCI-specific questionnaire is a more appropriate method for the SCI-population.

[P3] GLOBAL AND DOMAIN-SPECIFIC LIFE SATISFACTION AMONG OLDER ADULTS WITH LONG-TERM SPINAL CORD INJURY

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Aim: Knowledge of life satisfaction many years after a spinal cord injury (SCI) is very limited, particularly from a Northern European perspective. This study aims to assess global and domain-specific life satisfaction among Swedish older adults with long-term SCI, compare their life satisfaction to a Swedish reference sample and investigate the association with sociodemographics, injury characteristics and secondary health conditions (SHCs; eg, pain, spasticity).

Methods: Cross-sectional data from the Swedish Aging with Spinal Cord Injury Study (SASCIS) including 78 participants (32% women, injury levels C1-L3, American Spinal Injury Association Impairment Scale A-D), mean age 68 years, mean time since injury 31 years. Data were collected at home interviews using a study-specific questionnaire and the Life Satisfaction Questionnaire (LiSat-11). The Chi-square test and the Mann-Whitney U-test were used to address the objectives.

Results: The participants were at least rather satisfied with most of the 11 life domains, but significantly less satisfied with life as a whole and six other domains compared to the reference sample. The largest differences were seen in satisfaction with sexual life, activities of daily living and somatic health. Having a partner and being vocationally active were associated with a greater satisfaction with life as a whole and with several other life domains. More SHCs were negatively associated with satisfaction in five life domains.

Conclusions: Life satisfaction can be affected many years after SCI. The social context, participation in meaningful activities and minimizing SHCs seem to be important for maintaining life satisfaction in older adults with long-term injury.

[P4] SELECTING AND IMPLEMENTING ADVANCED TECHNOLOGY IN A REHABILITATION UNIT USING AN IMPROVEMENT MODEL

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Aim: In healthcare services and various rehabilitation units the selection and implementation of advanced technological equipment is a challenge. Only limited amounts of systematic documentation on the subject exists.
Most equipment fails to provide the expected quality improvement once implemented in clinical practice. There can be many reasons for this, and it may lead to great frustration in employees. A rehabilitation medical clinic has requested a tool for optimizing their process in selecting and implementing advanced technology for care and rehabilitation.
The aim of the project is to present a modified improvement model specifically intended for a medical rehabilitation clinic. The model can be used for implementing advanced technological equipment as well as other quality improvements in the organization.

Methods: The model is primarily constructed from the Danish improvement model, Forbedringsmodellen, with elements from, The Quality Implementation Framework, and the, OFF theory.
We have described the process from theory to implementation in the clinic and pointed out some of the most expected problems during the process.

Results: Our modified improvement model requires structural changes in the clinic and the management has to create an overall strategy for the rehabilitation clinic with associated aims, and to construct an improvement team. The modified improvement model consists of four steps and involves a comprehensive work with the Plan-Do-Study-Act-cycle.

Conclusions: Hopefully the implementation of the presented improvement model will result in better rehabilitation and quality of care, improved satisfaction from patients and employees, as well as sound investment policy in the rehabilitation clinic.

[P5] A SMART APPROACH TO REHABILITATION OF CHILDREN WITH SPINAL CORD INJURY

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Aim: In this case study we present two cases concerning the interdisciplinary team at The Spinal Cord Injury Center of Western Denmark combining SMART-goals; Specific, Measurable, Attractive, Realistic, Timeable, with very short admissions in rehabilitation of children with Spinal Cord Injury (SCI).

Methods: Children and caregivers visit the clinic with regular intervals because as the child develops towards miliestones, new goals become relevant. At the center the child is assessed by an interdisciplinary team who with the caregivers and network evaluate or change the SMART-goals. If necessary, the child is offered a short admission of 3 to 8 days insuring stability for the child, caregivers and their network.
Review of 2 cases:

Case I: 8 years, incomplete C6. Admitted 3 days.
SMART-goals: Use corset, better transfers, dressing, independent swimming.

Case II: 7 years, complete TH1, Admitted 3 days.
SMART-goals: Transfers, dressing and underwater swimming.

Under admission SMART-goals are in primary focus. On the last day the local network is invited to review progress and take SMART-goals forward until the next visit.

Results: Case I: Able to dress himself, improved swimming, using corset more and working further with transfers. The caregivers feel the child is less reliant.
Case II: Put trousers on, transfer from bed to chair and chair to floor and swimming under water.
The feedback from the caregivers is, that their child can have a more independent life.

Conclusions: These cases show that SMART- goals and short admission have potential to maximize the rehabilitation outcome for children with SCI.

[P6] THE DANISH SPINAL CORD INJURY STUDY (DANSCIS) STUDY - METHODOLOGY AND OVERALL RESULTS

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Aim: Present the design of the nationwide ´Danish Spinal Cord Injury Shoulder (DanSCIS)` survey and describe the demographics and characteristics of the participants with SCI.
Methods: Potential participants with ≥2 years of SCI were identified through three Danish SCI rehabilitation hospital departments. The primary aim of the study was to obtain information regarding musculoskeletal shoulder and neck symptoms, quality-of-life (QoL), and leisure time physical activity (LTPA). Further, socio-demographic details, medical history and SCI characteristics were obtained. The self-administered mixed mode survey gave possibilities to fill out an online or a paper-based questionnaire.
Results: Of 2,670 potential participants, the final sample comprised of 1,517 participants (62% response rate). Mean age 56.1 (SD 16.1) years (37% females), and mean time since injury 16.9 years (SD 13.5). Traumatic SCI accounted for 52% (23% complete SCI), 42% had tetraplegia. More than half reported shoulder symptoms within the past three months. About one third had paid work or were self-employed. The majority was married or had a partner, and 75% used some form of assistive device. Item response-rates on muskuloskeletal symptoms, QoL and LTPA varied from 73% to 94%, lowest for LTPA (73%).
Conclusions: The ´**D**an**SCIS**` study provides a description of a large mixed population of adults with long-term SCI. The overall response rate was good, but item response rates varied. This study facilitates forthcoming studies in generating new insights regarding the relationship between musculoskeletal symptoms, QoL, and physical activity. The use of international recognized data sets and questionnaires allows for better comparison internationally.

[P7] SURGICAL TREATMENT FOR PRESSURE ULCERS - WHICH PATIENTS AND WHAT ABOUT COMPLICATIONS?

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Aim: Pressure ulcers (PU) are a common complication to spinal cord injury (SCI). In cases of category III or IV PU flap surgery is a possible alternative to conventional treatment. Two centres are responsible for highly specialized rehabilitation of people with SCI who have had a flap surgery in Denmark. The study describes the population of SCI patients who are treated with flap surgery and study the risk of defects in cicatrices after flap surgery.

Methods: A retrospective study. Data collected April 1st, 2018 to April 1st, 2019. 11 out of 12 patients admitted at the two clinics after lap surgery participated.

Results:

Number of patients	Total: 11 Clinic for spinal Cord Injuries, Rigshospitalet: 10 Spinal Cord Injury Centre of Western Denmark: 1
Age	Average: 58,9 years (30-77)
Sex	Men: 7 (63,6%) Women: 4 (36,4%)
Number of ulcers	Total: 14 Per patient: 1,3
Location	Tubes ischidicus: 10 Sacrum: 2 Trochanter major: 2
Previously flap operation in same area	Yes: 4 (36,4%) No: 7 (63,6%)
BMI	Average: 26,4 (17,6-39,1)
Tobacco habits	Never smoked 4 (36,4%) Former smoker 3 (27,3%) 15 cigarettes daily 2 (18,2%) 15 or more cigarettes daily 2 (18,2%), Pipe / cheroot / cigar 0 (0,0%)
Defect in cicatrice	Yes: 10 (90,9 %) No: 1 (9,1%)

Conclusions:
The study reveals large differences in the number of lap-surgery patients admitted at the two centers. Great variation in sex, age, BMI, smoking habits. The results indicate that the risk of defects in the cicatrice after flap surgery is very high (90,9%).

[P8] EVALUATING AND MANAGING SYRINGOMYELIA-ASSOCIATED SYMPTOMS FROM AN ACTIVITY BASED PERSPECTIVE - A LITERATURE REVIEW AND PROPOSAL FOR NORDIC GUIDELINES

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Aim: Syringomyelia is defined as a longitudinal cavity within the spinal cord. Usually it is associated with spinal cord injury or Arnold-Chiari malformation. Syringomyelia may cause pain and loss of neurological function and is often progressive. Patients with syringomyelia are often referred to "conservative treatment" as an alternative to surgical intervention. Functional outcome and quality of life are in certain cases described to be equally good. However, it remains unclear, what the term "conservative treatment" actually implies. The aim of our study was to identify papers that describe and evaluate "conservative" approaches to manage the condition, and, if possible, to develop guidelines based on our findings.

Methods: Based on clinical experience during a period of several years, we developed a research question with focus on conservative treatment of syringomyelia as a complication to traumatic- or non-traumatic spinal cord injury. A literature search was performed using the PubMed, EMBASE, Web of Science and Scopus databases combining relevant search terms.

Results: We present a proposal for assessment and conservative management, based on the limited references identified, as well as our own clinical experience. The conservative approach should involve an interprofessional team. Crucial is to identify physical activities that trigger the syringomyelia-related symptoms to create an individually tailored strategy for each patient regarding activity modification and training.

Conclusion: We hope to establish Nordic guidelines for conservative management of syringomyelia (and identification of indicators for surgical management) and to constitute a network within the NoSCoS framework to further develop and evaluate them.

[P9] PRESSURE ULCERS - FREQUENCY OF PRESSURE ULCERS AND REFLECTIONS ON HOW TO IMPROVE PREVENTION AND TREATMENT

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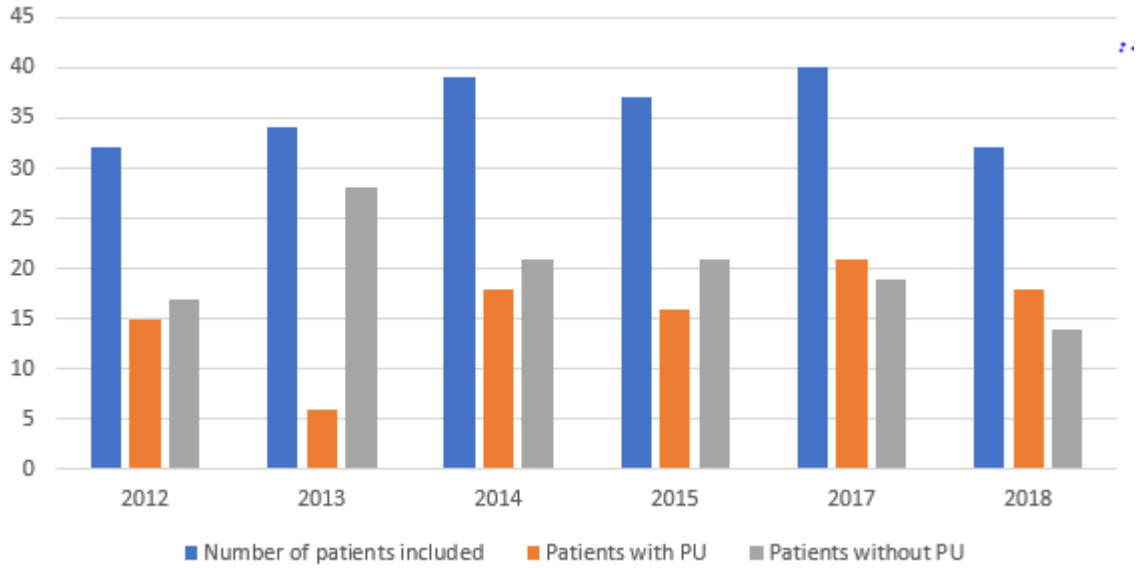
Aim: Prevention and treatment of pressure ulcers (PU), is high focused in observation of patients with spinal cord injury (SCI). Despite of a great focus PU still occur in the acute phase and during rehabilitation. Annual surveys to provide an overview of the occurrence of PUs has been made at The Clinic for Spinal Cord Injuries, Denmark. The results have led to the implementation of various interventions to improve prevention and treatment.

Methods: Once a year, skin inspections have been performed on all patients at the clinic. Data was not collected in 2016. The results have been the focal point for evaluation of prevention and treatment efforts.

Results:
Patients with pressure ulcers stage I-IV



The percentage of patients with PU has not decreased despite of the evaluation and implementation of new intervention during this period. During the inspection's nurses have become aware of significant risk factors and have focused on prevention. For example, easyslide is introduced to reduce shear during repositioning and mobilization. A more systematic documentation has been implemented. In 2018 the *PU inspection round* was implemented and consists of two special qualified wound nurses. They evaluate and assess treatment plans for all wounds at the clinic once a week.

Conclusions: The surveys indicate that better prevention is still needed. We hope to see effect of the PU inspection round in coming years. Maybe the PU rounds need to be upgraded so that all newly admitted patients have a visit and an individual prevention plan.

[P10] THE NORWEGIAN VERSION OF WWW.PHYSIOTHERAPYEXERCISES.COM

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Aim: The webside www.physiotherapyexercises.com includes physical exercises for persons with injuries and disabilities. It is free of charge and accessible to all, both by computer and cell phone. Creating a personal profile opens the possibility to save and change exercise programs. Exercise programs could also be created without a profile. The original website is in English, and so far it is also available in 13 other languages.
In order to promote the use of www.physiotherapyexercises.com in Norway and other Scandinavian countries, the website, including all exercises in the database, has been translated into Norwegian.

Methods: The website, including all exercises in the database, has been translated into Norwegian by employees at Sunnaas Rehabilitation Hospital and financed by the Norwegian ExtraFoundation for Health and Rehabilitation. The first translation was carried out in 2006 and has since been updated in accordance with extensions of the database, in 2012, 2015 and 2018, respectively.

Results: The most recent version, including 1451 exercises, was published in September 2018. During the last year (May 2018 – March 2019) the Norwegian version has received 481 unique page views, and 617-page views in total.

Conclusions: The Norwegian version of www.physiotherapyexercises.com is updated. It is an important, as well as cost free database of exercises especially suitable for persons with injuries and disabilities. However, there is a need to increase the use of the website for the benefit of the persons targeted.

[P11] THE SPINAL CORD INDEPENDENCE MEASURE - SELF REPORT IN THE FINSCI STUDY

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Aim: The Spinal Cord Independence Measure – Self Report (SCIM-SR) is used as a part of a questionnaire in the Finnish Spinal Cord Injury Study (FinSCI). The ASIA impairment scale (AIS) was collected as part of the patient register data.

Methods: Preliminary results of ongoing study consists of 775 individuals with SCI. SCIM-SR comprises 17 self-reported items from self-care, respiration and sphincter management, and mobility (0-100, high score indicates high independent functioning). Patients were classified according to ISCoS Core dataset recommendations: 1) Ventilator dependent 2) C1-4, AIS-A, B or C; 3) C5-C8, AIS-A, B, or C; 4) T1-S5, AIS-A, B or C; 5) AIS-D at any injury level.

Results: The mean age was 61 years, 57 % had a traumatic SCI. Part of the individuals had not filled all the items. The majority of the individuals (61 %) belonged to category 5 and their mean SCIM-SR score was 77 (SD 16, range 20-95). In the category 4 (22 %) it was 61 (SD13, range 21-92), in the category 3 (7 %) it was 50 (SD 18, range 19-91) and in the category 2 (10 %) it was 42 (SD 21, range 13-92). The difference was significant ($p<0.001$) between all the categories, except between 2 and 3 ($p=0,074$).

Conclusions: Individuals in the neurological category 5 had the highest level of functioning according to SCIM-SR. The higher the scores, the lower the injury level in categories from 2 to 4. The level of the injury is a significant variable describing functioning.

[P12] REHABILITATION 24/7 - HOW THE MULTI-PROFESSIONAL TEAM IS RECOMMENDED TO WORK TO OPTIMIZE THE PATIENT'S REHABILITATION

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Aim: XXX find that many of their patients are inactive in the ward, outside of the planned rehabilitation. The training initiated on physio- and occupational therapy is not implemented on the ward. Activities are not performed independently, on their own initiative; but are handed over to the employees at the ward.
Tools that focuses on "Rehabilitation 24/7", both for patients and employees and increases the multi-professional cooperation are requested.

Methods: Based on the literature, XXX recommends to use the SMART model with a salutogenic perspective to implement the project. Further workshops and education for employees with focus to accomplish the same rehabilitation ambition, to use a new weekly schedule and role models on a daily basis in the rehabilitation.

Results: Evaluation of the project is possible after XXX have worked with the proposed strategies. A positive result will be patients, who feel greater involvement, become more independent and are able to move home earlier and therefore save resources for society.
Another result can be that employees and patients focus on "Rehabilitation 24/7" – the requested goal.

Conclusions: *"Rehabilitation 24/7"* – Is possible with correct information, resources and attitude! Changes in workplaces are often difficult to implement. One challenge is to get all employees, including management, to strive for the same goals.

[P13] A USEFUL PROCESS OF TRANSLATION AND VALIDATION OF THE ISCOS INTERNATIONAL QUALITY OF LIFE AND ACTIVITY & PARTICIPATION BASIC DATA SETS INTO SWEDISH

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Since 2012 the International Spinal Cord Society (ISCoS) has developed data sets that will facilitate consistent collection and reporting of areas affecting a person with a Spinal Cord Injury (SCI). None of the datasets have previously been translated into Swedish.

Aim: To describe the process of translating and validating the ISCoS basic data sets, Quality of Life (QoL) and Activity & Participation (A&P) into Swedish.

Methods: Based on the ISCoS recommendations for translating the data sets, a process in finally six steps was used. An expert group of professionals and persons with SCI were assembled to scrutinize the first translations but also for content validation related to the understanding and clarity of the items and cultural adaptation, during two consensus meetings.

Results: The translations were time consuming, especially the A&P data set. However, we found a few steps that can be improved to minimize the time of the consensus group meeting.
The main concerns emerging from the content validation related to the understanding and clarity of some of the basic data sets items.

Conclusions: The translated QoL and the A&P basic data set can be feasible in the Swedish context to use for quality monitoring and for research.
By describing the process of translating and validating this basic data set, as well as adding a few steps, we might be able to facilitate further translations in non-English speaking countries, a work that is crucial to enable national and international comparisons between different SCI units.

[P14] DYSPHAGIA SCREENING AT THE SPINAL CORD CENTER OF WESTERN DENMARK - A TRIAL INTERVENTION

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Aim: We wish to increase patient safety, by trying a screening method for problems in swallowing for all admitted patients at the Spinal Cord Injury Center of Western Denmark (VCR).
We experience greater patient complexity, co-morbidity and increased age. there is a need for a screening method that not only focuses on patients with tetraplegia as the releasing factor for dysphagia.

Methods: Trial interventions have been used as a method. 141 patients admitted to VCR from 28.08.2016 to 28.02.2017 were screened with the Eating Assesment Tool (EAT-10): Screening of swallowing function for early detection of dysphagia.
The EAT-10 consists of 10 questions with a maximum score of 40. The nurse on admission screens and records the result of EAT-10. A score of 3 or above indicates the severeness and always leads to additional investigation for dysphagia by the occupational therapist.

Results: The trial intervention showed that approximately 10 procent of all submitted patients indicated possible problems in swallowing safely, and the need for further dysphagia assesment. The 10 procent consisted of both patients with tetra- and paraplegia and indicate the increased risk for dysphagia caused by co-morbidity and increased age.

Conclusions: EAT-10 is a relevant method for early detection of dysfagia. The screening method has detected early signs of dysphagia not only caused by the spinal cord injury in patients we would not normally have screened using our earlier procedures.
After the good results of our trial intervention, we have changed our procedure and now use EAT-10 on all admissions.

[P15] THE DESCRIPTION OF A WHEELCHAIR SKILLS TRAINING METHOD: DRIVKRAFT

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Aim: To describe the method wheelchair skills training called Drivkraft

Methods: Methodological triangulation was done by having three persons observe two wheelchair classes over a period of eight days. Based on these experiences, two semi-structured interviews were held with the developer of the method. Interviews were transcribed, coded and analysed. Literature studies were conducted to find out what evidence could be found on the components of the method.

Results: Participants come for five weeks, three times a week for 2 hours. The findings showed that the method was based on three components that can be further divided in subcomponents. These are: 1) wheelchair adjustments (mechanics, posture & working position); 2) components of training (basic skills, obstacles, patterns & control of centre of gravity); 3) patient education (wheeled mobility). Literature supports all of the components and supports using the peer mentor and giving the training in heterogeneous groups for transferring the knowledge.

Conclusions: The training method is an intensive program in which not only wheelchair skills are trained, but the wheelchair will also be adapted to a participant's physical measurements and capabilities, and participants will also learn relevant theory about the wheelchair. A strength of this training is that it is taught by a peer mentor in heterogeneous groups.
Future research is needed to determine the effectiveness of the method and for this a wheelchair manoeuvre test has been developed and its psychometric properties are being tested.

[P16] IMPROVEMENT OF THE INTERDISCIPLINARY RELATIONS USING RELATIONAL COORDINATION

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Aim: As a part of the Nordic Advanced Spinal Cord Injury Rehabilitation (NASCIR) Master module, we have developed an improvement work project for our partner group at Sunnaas Rehabilitation Hospital. The aim is to improve the interdisciplinary relations at the Spinal Cord Unit at Sunnaas Rehabilitation Hospital, with focus on an improved and more well-coordinated process for the patient.

Methods: Based on the evidence-based theory of relational coordination developed by Jody Gittell (2012), daily interdisciplinary meetings in smaller groups are implemented. The meetings are designed to support the interdisciplinary relations by frequent, timely and accurate communication, as well as problem-solving shared goals, shared knowledge and mutual respect.
To measure the grade of relational coordination the questionnaire developed by Gittell is used at baseline and at end evaluation.

Results: By implementing relational coordination in daily interdisciplinary meetings, we expect to:

- Improve interdisciplinary relations, measured in the grade of relational coordination.
- Improve professional ownership of the rehabilitation process.
- Optimizing the interdisciplinary coordination of the everyday rehabilitation for the patient.

Conclusions: In recognition of the complexity and the comprehensiveness of the improvement project there can be many aspects of focus, where new steps can be taken forward.
Evidence based research indicates significant improvement on various aspects using relational coordination. We strongly believe that relational coordination will give a positive result acting as a catalyst to the process of coordination and that the interdisciplinary relations will be strengthened.

[P17] NEUROPLASTICITY AND FUNCTIONAL CHANGE AFTER THERAPY IN INPATIENTS WITH SPINAL CORD INJURY - AN EXPLORATIVE STUDY

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Aim: To investigate correlations between neuroplastic changes and the improvement of function in spinal cord injury (SCI) individuals following therapy. Of importance is whether neuroplastic changes throughout the entire neuroaxis are related to the clinical outcome, which is the functional gain observed following SCI therapy, or whether only restricted neurological areas of the neuroaxis are related to the functional gains.

Methods: SCI Inpatients with minimally affected upper limbs are eligible for inclusion in the study. By using electroencephalography, electromyography and electrical stimulation, assessments of the nervous function at the motor cortex, somato-sensory cortex and the spine, are performed every two months during therapy. Assessment of movement-related cortical potentials and muscle activity are made during voluntary movement. Assessment of somato-sensory evoked potentials and conditioned Hoffmann reflexes are made during electrical stimulation. Prior to and after the investigation, SCIM III and ISNCSCI are assessed and correlated with possible neuroplastic changes.

Results: Data regarding changes in amplitude and delay of movement-related cortical potentials, somato-sensory evoked potentials, conditioned H-reflexes and muscle activity, will be presented. Additionally, correlations between individual measures of plasticity and functional gain will be examined.

Conclusions: This explorative study examines any significant relationship between eventual neuroplastic changes and the obtained functional gain, in order to elucidate which regions/levels of the neuroaxis are of interest and may play a role in the changes observed during recovery in SCI. The results may imply important networks, or confined areas to engage during rehabilitation.

[P18] IMPROVING SPINAL TEAM COMMUNICATION - A QUALITY IMPROVEMENT WORK AS PART OF THE NORDIC ADVANCED SPINAL CORD INJURY REHABILITATION COURSE

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[2]*University of Iceland, School of Health Sciences, Reykjavik, Iceland*

Aim: The Uppsala spinal cord team expressed the need to improve their communication, to ensure that every member of the rehabilitation team has the most up-to-date information regarding the patient and the rehabilitation.

Methods: The Lean healthcare is a quality improvement method to improve communication and workflow. It is implemented by educating and involving all employees and managers. It includes identification and understanding of workflow problems, root-cause analysis, collecting a baseline data, implementing a reform, reviewing data for follow-up and ensuring sustainability.

Results: We recommend the implementation of the following strategies: (1) Structured situational meetings for 5-10 minutes daily to provide a quick overview of the last 24 hours and highlight upcoming, unscheduled items. (2) Incorporating the Cosmic Nova Ward Board and Tablet as two add-on applications to the existing computer system that the Uppsala team is using. (3) Addition of the Cosmic Nova Ward (CNW) which is an interface designed for touch screens to schedule, assign tasks and perform tasks in daily work. (4) Implementation of the adapted Situation-Background-Assessment-Recommendation (SBAR) interprofessional communication tool to develop a shared structure for effective team communication.

Conclusions: The Landspítali University Hospital and specifically our team implemented Lean and have benefited by adapting common methodology for improvement projects and implementation of changes, changing management know-how, putting emphasis on procedures and standardization, collecting quality indicators, focusing on reducing waste, and improving safety, quality and productivity. There has also been greater employee participation and ownership of work development and improvement in job satisfaction levels.

[P19] HYBRID HIGH-INTENSITY INTERVAL TRAINING USING FUNCTIONAL ELECTRICAL STIMULATION LEG-CYCLING AND ARM SKIERGOMETER FOR PERSONS WITH SPINAL CORD INJURY PARAPLEGIA: A FEASIBILITY STUDY

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Aim: The aim was to assess safety and feasibility of hybrid high-intensity interval training (HIIT) as FES-leg cycling and arm skiergometer, in persons with Spinal Cord Injury (SCI) paraplegia before conducting a randomized controlled trial (RCT).

Methods: Single group feasibility study with 8 ambulatory men and women with SCI paraplegia. The intervention was hybrid exercises of 4 x 4 minutes intervals (intensity 90% peak watt) 3 times a week for 8 weeks. Primary outcomes were adverse events (AE), participant acceptability, shoulder pain, training intensity and compliance. Secondary outcomes were peak oxygen uptake (VO2peak), self-reported leisure time physical activity, quality of life and fatigue.

Results: No serious AE occurred, all participants gave positive feedback using the protocol, while shoulder pain increased by mean 9% (range: -97-204%). Training intensity of min. 90% peak watt was reached by 3 participants (43%) for FES-legcycling and 1 participant (14%) for arm skiergometer, with grand mean intensity of 91% (range: 70-127%) and 83% (range: 76-103%), respectively. Seven participants (88%) were compliant, with one drop-out after 6 weeks due to back pain. Fulfilled training minutes were mean 662 minutes (82%, range: 36-100%). Mean VO2peak increased 17%, from mean 1.64 to 1.91 ml/min. Participants reported increased leisure time physical activity, health related quality of life, and reduced fatigue.

Conclusions: Hybrid HIIT was safe and feasible for persons with SCI paraplegia. Due to the limited number of participants reaching the training intensity of 90% peak watt, effects of hybrid HIIT with modified intensity is recommended in a future study.

[P20] SOCIAL WORK DURING INPATIENT SPINAL CORD INJURY REHABILITATION

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Aim: The purpose of this study is to explore and identify the amount and type of social work that an individual with spinal cord injury receives during acute inpatient rehabilitation.

Methods: The data used consists of social work documentation in patient records. The method used is thematic content analysis. The quantity and quality of social work interventions provided for patients with spinal cord injury during acute inpatient rehabilitation were evaluated from patient documents from a one-year sampling (2016). Amount and type of social work interventions were examined against type of spinal cord injuries.

Results: In a year 2016 82 spinal cord injury patients were treated in acute inpatient rehabilitation unit in Tampere University Hospital. Patients received a mean total of 9 social worker contacts during inpatient rehabilitation. Majority of social work interventions were related to: 1) coordination of social, health and rehabilitation services and forms of support, 2) organization of multiprofessional meetings and 3) variety of patient assistance tasks. Tetraplegic patients received more social work interventions compared to patients with paraplegia especially in cases where tetraplegic patients were discharged to service housing units.

Conclusions: This descriptive study data makes social work interventions and effort visible and is helpful in pointing out most relevant social work tasks with different spinal cord injury patient groups. This information will be useful in social work resource planning for meeting patients needs.

[P21] THE ICELANDIC VERSION OF THE SPINAL CORD INDEPENDENCE MEASURE VERSION III (ICE-SCIM-III)

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Aim: To describe the translation process and the psychometric properties of the Icelandic version of the Spinal Cord Independence Measure (ice-SCIM-III).

Methods: The translation process involved several steps: two independent groups of rehabilitation experts developed the first version; a professional translator provided comments; a multidisciplinary committee of SCI-experts including an individual with SCI reviewed and agreed upon a common version; minor improvements were made during pilot testing. A physiotherapist with experience in SCI assessed each participant through an interview. The session was video-recorded and assessed by a second independent rater. Content validity was examined by three rehabilitation professionals and a person with SCI. Discriminant validity was assessed through comparison of ice-SCIM-III scores in relation to level and completeness of injury, as well as to ice-SCIM Self Report.

Results: Out of the 24 participants (mean-age: 50 years), 17 were males, 18 had paraplegia and 14 had complete lesions. Cronbach's alpha for the total scale was 0.84, and for the subscales between 0.58-0.90. All weighted-kappa-coefficients were statistically significant ($p<0.001$) except for item 5 (Respiration). The Pearson-correlation-coefficients when comparing the two raters were above 0.93. Ice-SCIM-III total and subscale scores correlated well with the corresponding scores of the ice-SCIM-SR. Participants with tetraplegia scored significantly lower than those with paraplegia on the total score. The content validity was perceived as good with no major remarks.

Conclusions: The ice-SCIM-III is a valid and reliable tool to assess physical independence among persons with SCI in Iceland. Its use will facilitate research in Iceland and international collaborations.

[P22] THE SWEDISH VERSION OF THE SPINAL CORD INDEPENDENCE MEASURE SELF-REPORT (S-SCIM-SR)

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Aim: To describe the translation process and the psychometric properties of the Swedish version of the Spinal Cord Independence Measure Self-report (s-SCIM-SR).

Methods: The translation process involved several steps: two native Swedish speakers with proficiency in English (physician and peer-mentor with SCI) developed the first version; a professional translator provided comments; a multidisciplinary committee of SCI-experts and individuals with SCI agreed upon the final version. As part of the INTERnational Project for the Evaluation of "activE Rehabilitation" (inter-PEER), s-SCIM-SR was distributed on-line to participants and peer-mentors with SCI. Content validity was examined by two bilingual health professionals. Discriminative validity was assessed using one-way-analysis-of-variance and Mann-Whitney-U-test to perform comparisons of the s-SCIM-SR total score and subscale scores in relation to injury level and completeness.

Results: 69 individuals (77%) answered all items in the s-SCIM-SR and obtained a total score. Most missing data were found in items 5 and 8. All subscales and the full scale spanned a large range of possible scores. Cronbach's alpha for the full scale was 0.89, for the Self-care subscale 0.92, for Respiration and sphincter management 0.58 and for Mobility 0.86. The content validity was perceived as good. Participants with tetraplegia scored lower than those with paraplegia on all subscales and the total score. Intraclass correlation coefficient was excellent in all but two items.

Conclusions: Our results support the reliability and validity of the s-SCIM-SR. The s-SCIM-SR is a psychometrically sound and suitable tool to assess physical independence among persons with SCI in Swedish community settings.

[P23] EPIDEMIOLOGY OF TRAUMATIC SPINAL CORD INJURY IN FINLAND

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Aim: In Finland, the acute care, sub-acute rehabilitation and life-long follow-up of patients with spinal cord injury (SCI) were centralized into three university hospitals in 2011. The aim of the study was to determine the incidence and evaluate the characteristics of newly injured patients admitted to two out of three national SCI centers during a 4-year post-centralization period (2012-2015).

Methods: This prospective population-based study was conducted in the SCI centers of Oulu and Tampere. Every patient with an acute SCI and persisting injury-related neurological symptoms were evaluated by the rehabilitation team of each SCI unit. Epidemiological characteristics were collected and classified using the International SCI Data Sets.

Results: During the 4-year period, 347 new patients with traumatic SCI (TSCI) were admitted to study centers. In the Oulu and Tampere University Hospitals' catchment areas, the mean annual incidence of TSCI was 37/1,000,000. The mean age was 59 years, and 72% were male. Falls were the leading cause of injury (62%; ≤60 years: 46%; and >60: 73%) followed by traffic accidents (19%; ≤60 years: 26%; and >60: 15%)). The overall proportion of cervical injuries was 70% (≤60 years: 60%; and >60: 77%). Of the whole sample, 34% were under the influence of alcohol at the moment of injury (≤60 years: 47%; and >60: 25%).

Conclusions: The mean annual incidence of TSCI was 37/1,000,000, which corresponds to about 200 new annual cases in Finland. TSCI prevention should be focused on elderly falls, and alcohol-related injuries.

[P24] WEEKEND LEAVE, INVOLVEMENT OF NEXT OF KIN

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WEEKEND LEAVE, INVOLVEMENT OF NEXT OF KIN

Aim: How to involve the next of kin to primary spinal cord injury patients before weekend leave and in witch way can a structured goal plan contribute?

Methods: In order to reach this aim we compiled a checklist, a goal plan and a questionnaire. Timeframe is 6-12 months. Intervention team uses a checklist before weekend leave and invites 8-10 patients with their next of kin to separate goal meetings. The patient's goals for the weekend are described in a goal plan. Control team following the same routines as today. Both teams will receive a questionnaire at the end of the rehabilitation period. Teach back as a communication method for quality assurance will be used for making sure all parties understand the purpose.

Results: The results from the questionnaire will point to whether or not the involvements of the next of kin before weekend leave, leads to higher goal achievement. It will also clarify whether the next of kin experience themselves more involved in the intervention team then in the control team.

Conclusions: When the weekend leave is utilized optimally, there is expected to be more coherence in the rehabilitation process. Both patient and next of kin will hopefully feel an increased coping along the way. A side effect may be that the patients get further in their rehabilitation process before they are discharged from hospital.

[P25] THE SCI APP - A MODERN COMMUNICATION TOOL

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My Spinal Cord Injury

Aim: Whether a new spinal cord injury (SCI) patient or family member, there arise many questions as to what a SCI involves. Previously the staff at Nya Karolinska Sjukhuset (NKS), Rehab Station Stockholm (RSS) and The Spinalis Clinic provided patients with an information folder which is neither read nor updated. Accordingly, the staff have doubts whether the right information reaches the patients. The purpose of this project is to propose the development of a modern tool that will address this problem. We suggest the development of an app.

Methods: Interviews with Danish SCI patients, experience and wishes from the staff from the Clinic for Spinal Cord Injuries and NKS, RSS and The Spinalis Clinic together with an analysis of the content of webpages aimed at SCI patients have all formed the basis for the suggested format of an app and accompanying web-portal.

Results: The app allows patients and their families to gain insight into what life is like for a SCI patient as well as access information which is pertinent to the individual patient. The web-portal allows the staff to update the patient's app with information of both a general and patient-specific nature, while at the same time giving staff an overview of the information that has been shared with the patient.

Conclusions: Despite the costs incurred with the development and maintenance of the app, it is expected that the app will provide an effective tool for both the staff and the SCI patient in their day to day life.

[P26] FEASIBILITY OF A MULTISENSOR ACTIVITY MONITOR TO MEASURE ENERGY EXPENDITURE IN SPINAL CORD INJURED PATIENTS

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Introduction: Obesity as a late effect of spinal cord injury (SCI) is recognized as a risk factor of cardiometabolic syndrome. The resulting cardiovascular disease is one of the leading causes of death in SCI. Visualizing energy expenditure has been suggested as a tool for facilitating physical activity and weight management.

Aim: The aim of this study is to test the feasibility of a multisensor activity monitor (MAM) in SCI patients in a clinical setting during primary rehabilitation

Methods: All newly injured patients 18 years or older admitted to primary rehabilitation in Clinic for Spinal Cord Injuries, Rigshospitalet is asked to participate in a VO2 peak test and afterwards wear a MAM for 48 hours. Patients who decline VO2 peak test; are unable to complete VO2 peak test; decline wearing MAM; has insufficient activity recordings; or experience any adverse effects will be registered and excluded from further assessment. The study will continue until 20 patients has delivered acceptable recordings for further analysis.

Results: Final results of this study is expected in ultimo July 2019. As of now 20 of 48 patients have been fitted with the MAM. Nine delivered sufficient recordings (age (19-82 years), AIS (A-D), injury level (C2 to L1)). Highest complete injury was T2 AIS-A among the accepted recordings.

Conclusions: Preliminary data suggests various levels of feasibility depending on injury level and completeness, patient compliance and type of equipment.

[P27] THE EFFECTS OF REPETITITVE TRANSCRANIAL MAGNETIC STIMULATION (RTMS) TREATMENT DURING EARLY REHABILITATION OF SCI

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Aim: To investigate if rTMS can improve motor and sensory function and spasticity during rehabilitation following SCI.

Methods: 20 patients admitted to initial rehabilitation at the Spinal Cord Injury Centre of Western Denmark with sub-acute (0-6 months post-injury) motor incomplete SCI (ISNCSCI: B-D) were consecutively recruited to undergo daily (mon-fri) sessions of actual (*active, n*=10) or sham (*sham, n*=10) rTMS application over the leg primary motor cortex for 8 weeks, supplementary to standard care. Participants in both groups also underwent twice weekly sessions of resistance training of the lower limbs immediately following treatment. Gait function (10MWT, 6MWT, TUG), knee joint muscle strength and rate of force development (chair dynamometry), sensory function (Quantitative Sensory Testing, Algometry), spasticity (MAS, H-reflex) and pain levels (100mm VAS) were assessed before, during (4 wks) and after the period of intervention.

Results: Patient enrollment is currently on-going. As of April 2019, 3 pilot study participants (SCI patients, single rTMS sessions) and 3 main study participants have received active rTMS treatment, while 2 participants have completed sham treatment. The active treatment was well tolerated among the participants, even though a few participants displayed moderate initial anxiety towards the method.

Conclusions: rTMS treatment appears to be well tolerated in SCI patients. Preliminary data are expected to be presented at the 2019 NoSCoS Congress.

[P28] MODIFICATION OF SPASTICITY WITH TRANSCUTANEOUS STIMULATION OF THE SPINAL CORD IN INDIVIDUALS WITH SPINAL CORD INJURY - A PILOT STUDY

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Aim: Spasticity is reported as restricting activities of daily living (ADL) in some individuals with spinal cord injury. Promising results from two smaller studies indicated that transcutaneous stimulation of the spinal cord could reduce spasticity in lower extremities and increase walking speed. To verify these findings, a pilot study was conducted with the aim to assess the effect of transcutaneous stimulation of the spinal cord on spasticity after one single treatment.

Methods: 14 participants (men/women = 12/2) aged 23-66 years, with SCI C4 – T12, AIS A – D participated, of whom 7 were able to walk. 30 minutes of transcutaneous stimulation of the spinal cord was applied using NeuroTrac multiTENS from Quintet (symmetrical, rectangular impulses, 2 ms phase, 50 Hz). Four electrodes were placed bilaterally, two paravertebral at level T11-12 and two on the lower abdomen. The current density should result in paresthesia under the electrodes. Clinical examinations and questionnaires were performed before, directly after and 2 hours after the stimulation.

Results: Preliminary results indicate a statistically significant decrease in perceived grade of spasticity directly and 2 hours after one treatment ($p < 0.01$). The reduction in walking speed was minimal and not significant.
Conclusions: The stimulation was well tolerated, and participants reported less spasticity after stimulation. The minimal change in walking speed in this sample could be due to the fact that some of the ambulatory participants used their spasticity for walking. We are now planning to investigate the effect of repetitive stimulations over a period of time.

[P29] HYPNOTHERAPY AS PAIN TREATMENT FOR ALLODYNIA IN SPINAL CORD INJURED PATIENTS: A FEASIBILITY CASE STUDY

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Aim: The purpose of the study was to test 1) changes in allodynia, which is pain due to a stimulus that does not usually provoke pain, (primary outcome) and functioning, life satisfaction and quality of sleep (secondary outcomes) in patients with spinal cord injury (SCI) over the course of a hypnotherapeutic intervention program as well as 2) the feasibility of conducting such an intervention in these patients.

Methods: A convenience sample of 6 SCI patients with allodynia was offered a 4-week hypnotherapy intervention (one session a week plus self-hypnosis at home) in addition to usual treatment in a Danish specialized rehabilitation facility. Adult traumatic or non-traumatic SCI patients (≥ 6 months post-injury) with allodynia with no brain damage, severe psychiatric disorders, nor misuse were included. Pain, pain-related functioning, life satisfaction, and sleep quality were measured pre- and post-treatment and at 3 months post-treatment. In addition, qualitative evaluative interviews were made to get feedback on different elements of the study and the intervention itself.

Results: One patient dropped out during treatment, while the remaining 5 followed protocol. Results will be presented at the conference.

Conclusions: The results will be discussed in relation to earlier findings and the potential relevance in future promising treatments for chronic allodynia in SCI – a type of pain that is very hard to provide pain relief for. Particularly, the results will provide important information on how to design a randomized controlled trial on hypnotherapy in this patient group and our treatment setting.

[P30] NEUROPATHIC PAIN IN SPINAL CORD INJURY: TOPICAL ANALGESICS AS A POSSIBLE TREATMENT

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Aim: To investigate the possible use of topical analgesics for the treatment of neuropathic pain in spinal cord injury (SCI).

Methods: PubMed, Google Scholar and Web of Knowledge were searched for articles published up to December 2018. Keywords used were synonyms of: SCI, neuropathic pain and topical analgesics. In addition 7 SCI patients who were treated with topical analgesics were interviewed.

Results: A total of five articles describe the use of topical analgesics in spinal cord injury. All articles are case reports, none of which show placebo-controlled results. Articles describe the use of baclofen, lidocaine, capsaicine and isosorbidedinitrate. All articles describe a decrease in neuropathic pain over time. Patients interviewed used topical agents containing fenytoine, amitriptyline, baclofen, ketamine or loperamide. Age ranged from 49 to 72 years old. All lesions were incomplete and cervical or thoracic. Six out of seven patients showed a decrease in pain on the numeric rating scale ≥ 3 points.

Conclusions: Evidence on the use of topical analgesics in SCI is scarce. Case reports and interviews suggest that the use topical analgesics can be beneficial in treating SCI patients. Further placebo-controlled studies are needed to investigate the use of topical analgesics in SCI.

[P31] FOLLOW UP ON CHILDREN BORN TO MOTHERS WITH SPINAL CORD INJURY

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Aim: To study neonatal outcomes, growth development and duration of breastfeeding during the first six months of life in infants born to mothers with spinal cord injury (SCI).

Methods: This is a retrospective cohort study. Participation was voluntary. Inclusion criteria: Mothers with acquired SCI. Mothers who met inclusion criteria submitted questionnaires regarding SCI level. Exclusion criteria: Mothers with SCI during pregnancy, intrauterine fetal death. A total of 50 delivery records and 25 medical records from child health care centers were collected and analysed. The nationally adopted growth-chart was used as reference.

Results: Term infants with SCI mothers were smaller at birth regarding height, weight and head circumference, when compared to reference data. The infants had a catch up within three months when no difference was to be observed. There was no difference in time spent fully or partially breastfeeding between the higher- (SCI at or above Th6) and lower lesion (SCI below Th6) group. However, the higher-lesion group had a shorter duration of breastfeeding than the lower-lesion group.

Conclusions: To our knowledge, this is the first study to investigate development during the first six months in children with SCI mothers. We conclude that the children, although term, are significantly smaller at birth than the reference population. The higher-lesion group stopped breastfeeding sooner after birth. Further studies are warranted to corroborate these findings and elucidate possible reasons.

[P32] PEER COUNSELING - EFFECTIVE WAY TO IMPROVE ADAPTION TO THE LIFE WITH SCI

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Aim: Aksons main goal is to make sure that all newly injured people get the best possible start with their new life with SCI.

Methods: The Finnish Association of Spinal Cord Injured Akson maintains, develops and improves the benefits and rights of people with SCI and their families in Finland. Peer support is the best way to increase the understanding of SCI and the life with it. Experiencing the same situation and sharing mutual feelings with another SCI person, gives us courage and strength to manage in everyday living. Akson is the main provider for SCI peer support and also service provider of peer counseling for SCI-centrals (public healthcare units).

Results: Regulation of spinal cord injury treatment centralization came into force on 1.5.2011 in Finland. Akson was the main party for making this regulation to happen. These SCI-centrals are located in University Hospitals in Oulu, Tampere and Helsinki. They cover acute phase of hospitalization, the immediate rehabilitation and life-long monitoring of all the people with SCI. Akson does close work with all SCI-centrals. By this collaboration Akson can influence and improve the SCI rehabilitation and monitor the implementation of the regulation.

Akson started to develop peer support 2014 and peer counseling 2016 in Finland. Organization started to provide these services to SCI-centrals. All the changes of SCI person's life start at these centrals.

Conclusions: Akson has noticed that the knowledge, understanding and support provided by professional peer counselor at acute phase is the key for better life after injury.

[P33] EVALUATING THE FEASIBILITY OF A FAMILY INTERVENTION FOLLOWING TRAUMATIC SPINAL CORD INJURY: PRELIMINARY EXPERIENCES

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Aim: Traumatic spinal cord injury (tSCI) constitutes a severe life change not only for the individual acquiring the injury, but also for the whole family. Few interventions have addressed changes in family relations and dynamics following tSCI including both the patient and the surrounding family. The aim of this ongoing study is to investigate the feasibility of a newly developed family intervention consisting of 8 manualized sessions for the whole family. This preliminary study reports on the experiences of the first two families with tSCI completing the intervention, more specifically in relation to 1) attendance and completion of assigned homework, and 2) the families' feedback regarding the content and the cultural appropriateness of the intervention.

Methods: Two families participated in semi-structured interviews. Both families were couples living together, and the injuries were acquired within the last 3 years. One family were in their 50s, where the person with tSCI was retired and the partner was still working, the second family was in their 70s and both retired.

Results: Both families completed all 8 sessions and all homework assignments. One of the families expressed a significant interest and pleasure in working with the assignments. They found the intervention concrete, feasible and applicable in their daily life. The other family expressed that the amount of homework was excessive, but feasible. Overall the intervention was found cultural appropriate, only a few answers pointed at cultural differences.

Conclusions: The intervention was evaluated as feasible and applicable based on the responses of the two families.

[P34] INTRAVESICAL THERAPY IN RECURRENT URINARY TRACT INFECTIONS IN SPINAL CORD

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Aim: Neurogenic bladder and bowel are highly common conditions that can result in people who have sustained traumatic spinal cord injuries (SCIs) or other neurological damage. The goal of lower urinary tract management in neurogenic patients is to preserve the upper urinary tract and renal function. The most common urologic complications following SCI are urinary tract infection (UTI). In literature is reported that Hyaluronic acid (HA) and chondroitin sulphate (CS), formulated as intravesical instillation can improve ITU symptoms.
The aim of the study is to investigate the efficacy of medication in intravesical administration in SCI patients with UTI.

Methods: 8 patients with SCI were enrolled to intravesical HA 800 mg and chondroitin sulfate (CS) 1g in 50 mL of saline solution once weekly for 4 weeks then once every 2 weeks twice more. 48 hours after each intravesical drug administration, the urine culture test was evaluated in all patients.

Results: All considered SCI patients (mean age 55.4) completed follow up. No adverse effects were recorded. From the second week of treatment all patients became no symptomatic for UTI and the administration of antibiotic therapy was not necessary.

Conclusions: Intravesical HA and CS in combination significantly reduced UTI in SCI patients. The local therapeutic approach has proved to be particularly effective, because it addresses the inflammation at its origin. Intravesical medication helps to accelerate / complete the physiological restoration of the urothelium, that the body naturally implements during lesions or alterations. Study limitations include a small sample and relatively short follow-up.